From The Heavens to the Markets: Development, Nation, and the Mediation of Water in Northwest China

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From The Heavens to the Markets:
Development, Nation, and the Mediation of
Water in Northwest China

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From The Heavens to the Markets: Development, Nation, and the Mediation of Water in Northwest China

written by Afton Eben George Elling Clarke-Sather

has been approved for the Department of Geography

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Timothy Oakes

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Emily Yeh

Date________________

The final copy of this thesis has been examined by the signatories, and we find that both the content and the form meet acceptable presentation standards of scholarly work in the above mentioned discipline.

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Over the past 20 years the relationship between peasants and water in the semi-arid Zuli Valley of Northwest China has been radically altered by a series of state-backed development projects. 20 years ago peasant grew primarily rain-fed subsistence crops and relied on centuries-old rainwater harvesting techniques for their domestic water supplies. Following a series of state-backed interventions, peasants today grow primarily cash crops and depend on state-backed projects for their domestic water supplies. These changes were brought about through development projects. In the Reform and Opening Period a series of spatial hierarchies has emerged—westernness, rurality, and poverty—that categorized certain regions of China as backwards and in need of modernization through state-backed development. The Zuli valley was categorized as backwards based on each of these criteria, and the solution to its poverty was believed to be solving the problem of water shortages. As a result, a series state actors aimed to change how peasants related to water by providing irrigation water, changing the crops that they grew, improving rainwater harvesting technology, and providing running water. This dissertation examines these changes from the perspective of the governance of the aleatory—the element of risk and chance. The aleatory is an important, yet underdeveloped, element of Foucault’s examination of governmentality. Each of the interventions made in human relationships with water in the Zuli Valley was designed to reduce the chances of or ameliorate the effects of potential water shortages. Yet, each of the programs ultimately shifted risk to other areas, particularly variations in market prices and the dependability of state water supplies.
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My family has made this bearable. Abbie has supported me both during research and in the long period of writing. Knut has put up with me working Saturdays. My mother, Nancy, has supported my education over the years, and helped by proofreading drafts of my dissertation. My father Karl and brother Peder have been encouraging throughout. All my best ideas come when I go on walks with Luwa. Despite these efforts, many errors no doubt remain, for which I am solely responsible.
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Chapter 1. Introduction Scope of the Study

Over the past 20 years, the semi-arid Valley of the River of Ancestral Strength (Zuli) in Northwest China has been transformed by a series of state-backed changes in water management. For as long as anyone could remember, peasants grew their own food, primarily spring wheat, pulses, and millet, with the region’s sparse rainfall. Following the introduction of a variety of policies and technologies during the Reform and Opening Period (post 1978) peasants now grow primarily cash crops: maize, potatoes, and vegetables. None of these crops are among their primary foodstuffs. Peasants had depended on sparse rainfall for domestic water. Now domestic water arrives through a series of state-backed interventions.

This transition from subsistence to market agriculture was facilitated by a fundamental transformation in the political ecology of water of the Zuli river valley. The previously direct connection between rainfall and what people ate has been interrupted at several points by state backed development programs that aim to change the way peasants relate to both agricultural water and food. Similarly, changes in peasants’ domestic water supplies have altered their relationships with a natural resource, state actors, and the markets. These development programs have transformed the political, technical, and economic institutions that mediate the relationship between people and water. But the alteration of the environment in the Zuli Valley has been about far more than merely changing how people relate to water. It has also been an exercise in changing how people relate to the polity of China. The remaking of water in the Zuli Valley has been an instance of nation building through development. This drive for national integration through development and poverty alleviation was discursively constructed by intellectuals concerned with China’s growing spatial disparities during the 1980s, and has been instituted in
policy ever since. In Dingxi, the region where the Zuli Valley is located, poverty was linked to aridity, and the transformation of people from backwards, impoverished masses to modern citizens was imagined in terms of changing peasants’ relationship with nature.

I began this project interested in how water management projects served to encourage ethnic minority populations to feel a stronger Chinese national identity. Due to unforeseen circumstances, I was not able to complete the research as planned, and was required to move from an ethnic minority site to a majority Han region of Northwest China. However, upon arriving in this Han county of Dingxi, I was struck by how similar the discourses around development and national integration in the area were to my earlier planned, ethnic minority site. It was not only ethnic minorities, I came to realize, but also impoverished majority Han who occupied a place on the periphery of the Chinese national imagination. Ultimately this change of research venue was fortuitous, for it also allowed me to think through how peripheral spaces, rather than ethnicized minority groups, are imagined into the national consciousness. These observations will form the core of Chapter 3 of this study. Understanding the construction of Dingxi as a backwards, impoverished region of China by Chinese intellectuals and policy makers became essential to make sense of the policies towards water management that were implemented there.

Changing research sites also forced me to examine something other than my initially planned focus on an integrated water management plan. While my intention was to study a system that combined drinking water with irrigation management, the site in Dingxi proved far more complex, and ultimately more interesting. The reason Dingxi’s water policies proved

---

1 In 2008 and 2009 I had gained approval to begin work at an ethnically mixed Hui and Han site in Ningxia Hui Autonomous region. When I arrived at the site to begin testing my survey instrument in March 2010, research
interesting was the sheer variety of approaches that have been attempted in the region to combat aridity. While I have documented the more successful strategies here, including irrigation, maize, and planting potatoes, still others were tried that proved less successful (and there were, no doubt, other failures of which I have not even heard).

This breadth of approaches to dealing with the problem of aridity allowed me to think through the political ecology of water quite broadly. As will be described in the second section of Chapter 2, this dissertation will take the perspective of an aleatory political ecology of water. The aleatory is a major theme of Foucault’s later writings that is concerned with the role of chance, contingency, and risk in governance. I will argue that development projects in the Zuli Valley have at their heart been projects intended to regulate elements of chance in how peasants relate to rural water. In other words, development in the Zuli Valley has been a process of regulating the aleatory nature of water. Examining the political ecology of water from this perspective requires viewing the political, social, and economic systems that interact with water quite broadly, an approach used by Foucault (2007) in describing the rise of government in early modern Europe. This broader view requires looking beyond the management of the biophysical resource of water, and requires thinking through how policies that obviate biophysical water also constitute forms of water governance. That is to say, this study has as much to do with what peasants do without water as it has to do with what peasants do with water.

In my new site, I began to focus on a series of new questions:
1. How has Dingxi been constructed by state actors, academics, and residents as a backwards and peripheral place in the post-reform period?
2. How has Dingxi’s backwardness been linked to its environment in general, and water in particular?
3. What policies have been introduced to solve the problem of aridity in Dingxi’s agriculture?
4. What policies have been introduced to solve the problem of aridity in domestic water supplies?
5. How have peasants received, modified, or resisted these policies? How have these policies changed peasants’ behaviors, social relationships, and beliefs?
6. What do the policies that have been introduced say about how development has integrated Dingxi into the Chinese nation?

The findings of this study are many and elaborate several distinct conversations. First I argue for an aleatory political ecology by examining how the role of the state in water management has changed when the problem of water governance is framed as reducing the risk of water events rather than one of allocating and distributing water. Second, this study will contribute to our understanding of the state in China by showing that myriad actors, many from outside of traditional water related bureaucracies, have developed policies that aim to change how people relate to water. A third significant finding is that the hierarchical and teleological nature of Chinese national identity that is expressed in Chinese minzu (ethnicity/nationality) policy is similarly present in framings of Chinese peasants and rural spaces as backwards. These framings interpellate peasants, and are adopted by peasants as a form of identity vis-à-vis the polity of China.

There are some inherent limitations to this study. First, it must be understood that this study does not address the formation of peasant subjectivities broadly. Instead this study only considers the formation of subjectivities vis-à-vis two areas that have been subject to intensive state intervention: agriculture and domestic water. These two areas by no means press the limit of types of state intervention. The spread of television and education, for example, have had profound impacts on how peasants view their place in the China, perhaps more important than those economic impacts I study here. Similarly, the rise of migrant labor has fundamentally shifted people’s understanding of their locality in relation to the Chinese nation, but this is not an issue that I consider. What agriculture and domestic water do share is that both form the primary means by which peasants relate to the environment. Environmental factors have been
discursively constructed as the source of poverty in the Zuli Valley, and the enterprise of state-
backed development and national integration has been built around ameliorating those factors,
which is why I have chosen them as a starting point for understanding peasant subjectivities.

This study proceeds as follows. The balance of this chapter will be dedicated to explaining
the location and methods of the present study, and explaining why aridity is viewed as the central
development challenge in the Zuli Valley.

Chapter 2 is a review of three strains of literature relevant to this dissertation. First I examine
development and nation and the connection between them. Second, I examine the nature of the
state in China from the perspective of both theories of the state specific to China, most notably
fragmented authoritarianism and the cellular state models, and from a Foucauldian approach of
apparatuses of security. Finally, I will use Foucault’s writings about the aleatory in nature in his
later writing to propose a framework for an aleatory political ecology of water.

Chapter 3 will explain several spatial hierarchies through which the need for development in
China has been constructed, and how those spatial hierarchies are accepted and instantiated by
individuals. I begin by examining perhaps the best known spatialized hierarchy of difference in
China, *minzu* identity, which is deeply tied to ethnicity and national identity. I then demonstrate
that *minzu* is but one of many spatialized social hierarchies that form valences of a broader
dichotomy between backwardness and modernity that is constitutive of the nation. Hierarchies of
East/West, juridical poverty designations, and urban/rural, are based on similar assumptions
about backwardness, and were at times categorized by the same scholars who were engaged in
ethnic classification. Each of these categories was then presented as a reason why a particular
space was in need of modernization and development.
Chapter 4 presents the case of drinking water development in the Zuli Valley, and examines why most households have been reluctant to connect to a running water system. The success of an early state backed effort to improve rainwater harvesting, combined with the emergence of informal markets in hauled water, has created an environment in which connecting to running water has proven relatively expensive. This chapter will provide a concrete case study of an aleatory political ecology of water. I will examine the role of framings of national identity in building a large inter-basin transfer project, the local political economy of water hauling, and the reasons based in daily use that peasants have chosen not to connect to running water.

Chapter 5 will address state development interventions in agricultural water in the Zuli Valley as they are intended to govern the aleatory nature of water. This chapter begins by laying out a theoretical underpinning of what agricultural hydro-social changes have occurred in the Zuli Valley, and presents empirical data on changes in cropping patterns reported by peasants. Chapter 5 next turns to irrigation agriculture that has been attempted in the Zuli Valley. An early attempt at basin-scale irrigation began in the 1970s and collapsed in the early 1990s due to siltation in dams. By the early 2000s an ad hoc, state-sponsored groundwater irrigation program was begun in portions of the Zuli Valley. However, this irrigation program only effected a change in peasants’ relationship with national institutions when combined with a program to develop agricultural marketing for vegetables originating in a nearby town. Chapter 5 next examines the rise of climate-appropriate cash crops, particularly potatoes, as a means of addressing aridity in the Zuli Valley. Potatoes are better adapted to seasonal patterns in precipitation in the Zuli Valley than are the small grain and legume crops that they replaced. However, potatoes are not viewed as a staple food, and the promotion of potatoes as a strategy to battle aridity required the introduction of national markets for potatoes as a cash crop. These
national markets did not form organically, but were instead heavily promoted by local state actors through a variety of market-supporting mechanisms. Finally, Chapter 5 examines the recent introduction of maize agriculture, which is dependent on a series of state-backed technologies. Maize requires the introduction of state-backed research on film mulches to maintain soil moisture, as well as state extension effort to promote the technology. It also relies upon the introduction of hybridized seeds, and national grain markets to purchase the maize crop. These changing agricultural patterns will also be examined from the perspective of an aleatory political ecology by examining apparatuses of security and discipline in the governance of nature. Finally, Chapter 6 will provide some concluding remarks.

1.1. Research Setting
The Zuli River Valley, located in Anding District (county) of Dingxi Prefecture in Eastern Gansu province, stretches approximately 80 km through the Loess Plateau of the upper Yellow River Basin (Figure 1-1). Most of the year the stream of the Zuli River is quite small, but swells to a muddy torrent when rainfall comes in late summer. Accumulated salts in the loess soils render groundwater in most of the valley saline, but the Zuli River’s headwaters in the upper valley are underlain by metamorphic rock formations that contain fresh ground water. These headwater areas are also located at a higher elevation, and receive up to 130 mm more rain than areas in the lower valley (Wei et al., 2005). As the river flows north towards the Yellow River, it becomes saline from accumulated salts in the loess soils, and, in the lower reaches of the valley, is polluted by effluent from industrial food plants. Because of both the saline and organic pollution, the downstream river is considered unusable for most agricultural and household purposes.
The Zuli Valley, and Dingxi more broadly, are known for their poverty and aridity. The aridity of Dingxi has become one of its central defining characteristics, and that aridity has often been linked to the lack of development. Most books or articles about Dingxi begin with a reference to the dryness of Dingxi. Yan (2008b) for example in a history of the potato promotion programs in Dingxi begins by describing how children in Dingxi barely know water. Dingxi’s poverty, he says, is an “illness in the deep heart of China” (gongheguo de xinkou zhi bing) (Yan 2008b) that is cause by the aridity of Dingxi. Most writing about Dingxi begins with some variation of the saying “Central Gansu’s hardship is famous throughout the land” (longzhong kuji
When I arrived in the first village where I conducted interviews, the local party chief also reminded me of this phrase. Fei Xiaotong (1985), among China’s most prominent anthropologists who wrote several articles about Dingxi in his later years (and whose work I will return to in Chapter 3) explained the phrase thus:

Central Gansu’s Dingxi is what has historically been known for the saying "Central Gansu’s hardship is famous throughout the land". Where does this hardship come from? I have not fully verified. But poverty’s origin clearly lies in its high altitude, cold climate, aridity, soil erosion, and vicious ecological cycle that have for a long time caused Dingxi to experience repeated famines. Fei, 1985 pg. 4

Fei then located the origins of Dingxi’s poverty in environmental conditions, particularly its aridity. Examples of poverty attributed to aridity abound in both academic (Cao, 2004; Zhu, Wu & Drake, 2004) and journalist (Hu, 2009; Wang, 2012; Yan, 2008b) accounts of Dingxi’s poverty. Another couplet often repeated about Dingxi that appears in many commentators’ descriptions of the place goes:

The mountaintops are like a monk’s head
no water flows in the gullies,
nine years out of ten are drought
for generations the people have worried
Shan shi heshang tou
gouli wu shui liu
shi nian you jiu han
Suisui ren fachou (Yan, 2008b, p. 40)

This couplet presents an interesting case of the explanation of poverty in Dingxi. Like other interpretations it locates the source of Dingxi’s poverty in its aridity. But the last line is telling. It expresses that what this lack of water has caused is worry about the availability of water. It is not

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2 This saying is attributed to Zuo Zongtang, the governor of Shaanxi and Gansu during the 1860s-1870s. Although this phrase is almost invariably associated with aridity and poverty, Zuo had been sent to put down the Dungan rebellion which had resulted in eastern Gansu being in an anarchic state of civil war at the time (Lipman, 1997) raising doubts about its original meaning.
that there will certainly be drought, but rather that there may be drought. In other words it is the risk of a potential water shortage that causes worry for the peasants.

The problem of aridity in the Zuli River Valley has as much to do with timing as it does with quantity of rain. The area is technically defined as being semi-arid rather than arid, and the 380 mm annual rainfall isopleth that divides rain-fed from irrigation agriculture in China bisects the valley (Wei, Li & Liang, 2005). However, the region is influenced by the monsoon cycle of East Asia, and as a result 60% of precipitation in the area comes between July and September, leaving crops vulnerable to drought early in the growing season (Wei et al., 2005). The average annual precipitation requirements for spring wheat in the Zuli Valley during its growing season (March to July) is 357mm but the average rainfall during that growing season is 226mm, for an average water deficit of 36% during the wheat growing season (Wei et al., 2005). A further temporal element of the temporal risk of aridity of the region is that it experiences significant inter-annual variability in rainfall (Wei et al., 2005), making the success of crops unpredictable from one year to the next.

For these reasons the variability of water in the Zuli Valley is explained as being the central cause of poverty in the valley. In Chapter 3 I will explain how this classification as impoverished has led to calls for development. However I wish to emphasize here that academics and policy makers alike have located the origins of Dingxi’s poverty in its aridity and the potential lack of water. Therefore the development interventions that have been proposed have largely focused on transforming the environment. These transformations have primarily focused on how people relate to water (in the broadly defined sense I will present in Chapter 2). This is not to say there have not been other forms of development that have occurred in Dingxi. A focus on improving
education, for example, has been seen throughout rural China. However, the programs that are unique to Dingxi have largely focused on changing peasants’ relationships with water.

A final point to note about the location of Dingxi is that it is remote. Though located a mere 100 miles from the geographic center of China, the incised topography of the loess plateaus has long made transportation particularly difficult (Cressey, 1934; Lipman, 1997). This has led to Eastern Gansu being particularly inaccessible. To this day, among China’s major infrastructure projects, Dingxi tends to be the last section finished. The section through Dingxi was the last part of a major highway between Shanghai and Xinjiang to be completed (it was finished shortly after I completed field work), and the Eastern Gansu section is scheduled to be the last section of China’s primary high-speed rail network to be completed.

The nomenclature of Chinese geography can at times be challenging because of frequent name changes and territorial reorganizations. Anding District is a case in point. Anding District was previously known as Dingxi County, and indeed is still often referred to as Dingxi County in official literature, and is almost invariably colloquially called Dingxi County. The name Anding District came into being when Dingxi was promoted to a prefecture level city (but has also been a historical name for the county). The name Dingxi is now applied to the prefecture, which is formally known as Dingxi City. Even before the prefectural reorganization that resulted in Dingxi becoming a prefecture level city, the area surrounding Dingxi was widely known as Dingxi region (dingxi diqu). However, Dingxi City also colloquially refers to the built up urban areas of Dingxi, rather than the prefecture. Throughout this dissertation, I will refer to Dingxi County and Anding District interchangeably depending on the time period or referent in question. Dingxi Prefecture will refer to the prefectural level government, whereas Dingxi City will refer to the urban area known as Dingxi. The question of naming of rivers is similarly
vexing. The formal name of the river that flows through Anding District is the *Guanchuan River*. Local officials refer to it as the *Donghe* or East River, while those who live in the lower valley refer to it as the *Zuli he* or River of Ancestral Strength. *Zuli* actually refers to a river with which this river conjoins 15 miles to the North, but I have referred to the river throughout as the Zuli River because it was the name presented to me when I first worked there.

### 1.2. Methods

The present study is a case study of the political ecology of state development with respect to a river valley in Gansu, China. This study was conducted in the Zuli river valley that forms the nucleus of the Anding District of Dingxi Prefecture. The scale of the river valley was selected for several reasons. First, from a logistical standpoint, the scale of the river valley was congruent with the scale of the drinking water project that initially formed the nucleus of the project. Second, I hoped to examine processes at a scale broader than the village alone, but did not wish to generalize to a population or attempt to sample an entire county or township. The river valley proved an interesting scale for other reasons as well. Upper portions of the valley have usable ground water while the lower villages do not. This comparison across portions of the valley shows interesting patterns in how peasants relate to water that are not available when simply comparing villages within one township.

Anding District of Dingxi City was chosen because it is considered a county-level jurisdiction that is relatively open to outsiders. My earlier attempts to work at a different site had ended in having my research permits withdrawn, and my collaborators at the Chinese Academy of Sciences were anxious that we instead locate a site that was relatively open. Dingxi has been something of a showcase in poverty alleviation efforts in Gansu, and therefore was an obvious target. The district water department already had an ongoing international collaboration program,
training visitors from developing countries (primarily in Africa) on rainwater harvesting techniques. Therefore, Dingxi was originally chosen based on accessibility. However, it proved an ideal site for a number of reasons. Because Dingxi has been a center of poverty alleviation efforts, it has seen a greater number of projects, both successes and failures, than other counties in Gansu. It also has received far more visits from state leaders and academic writers than other parts of Gansu, providing a rich record of state discourses about poverty and development. Finally, Anding County will be the primary (and earliest) beneficiary of an ongoing water development project, the Tao River Transfer project, which is the largest hydrological engineering project in Gansu’s history. This allows Dingxi to serve as an ideal site for future long-term study.

1.2.1. Village Selection

Six villages were selected based on suggestions from my primary contact (who will remain anonymous) in the Anding District water bureau. There were a variety of considerations that went into choosing villages. First, I asked for a mixture of wealthier and poorer villages. Second, I asked for villages that had ground water and those that did not to compare the importance of relatively accessible potable water. Finally, I asked to include some Hui populations (though this ultimately proved a rather insignificant factor). My contact then suggested villages based on those criteria. In addition to my requests, he chose research sites based on how easy he expected local government officials to be to work with. In the end three villages each were chosen in the upper and lower valleys, of which one village in both the upper and lower valley was located in a mountainous area. Mountainous villages were selected because they are relatively poorer and have less access to water resources that valley villages. In each village my primary contact in the water bureau would make arrangements in advance to work with the local officials, usually
either a village leader (*cunzhang*) or party secretary (*shuji*), and I would arrive in the village and we would work out the details of how I would conduct research. I will at times throughout the text refer to the local officials with whom I dealt, and when I do so I will use pseudonyms to protect the anonymity of these informants. I have also chosen to anonymize the villages themselves to provide additional anonymity to both interviewees and local leaders.

Villages were segregated according to their position in the valley and the type of land that they contained. People often speak of the difference between mountainous land (*shandi*) and valley land (*chuandi*). In truth, most valley settlements also utilize some mountain land, and in many villages individual households are allocated a portion of valley land and a portion of mountainous land (often several kilometers apart). This difference between types of land has implications in the relationship between water and agriculture. Mountainous land cannot be irrigated because it is generally difficult to get water to higher elevations. All irrigation systems in the Zuli Valley rely upon gravity-fed distribution. Mountainous land also generally cannot be used for maize because plastic mulches are limited in the slope upon which they can be used. Therefore, in mountainous areas the only form of non-traditional agriculture is the introduction of potatoes. In general, mountainous areas also have lower standards of living, and in general have lower populations.

In addition to mountainous or valley locations, I stratified villages between upper and lower valley villages. In the Zuli River Valley the only available ground water is located in the upper valley, which is underlain by rock formations (the rest of the valley includes deep loess). While there is groundwater elsewhere in the valley, it is generally too saline for agricultural use. Therefore the upper valley has benefited from usable irrigation water. The central valley was not
surveyed because of the large influence of the cities of Dingxi and Chankou, which makes agriculture a less prominent part of its economy.

Five of the six villages were ethnic majority Han in composition. Ethnic minority Hui Muslims were present in Village 5, and accounted for approximately 70 percent of the population. Although one nearby village, which was not surveyed, contained a large Hui population and contained irrigated land, my contacts recommended against surveying there.

The general characteristics of each are listed in Table 1-1 along with the number of interviews for each village. In general all she (a she 社 is the lowest unit of social and political organization in China often translated as work-team) were interviewed in each village, with three exceptions. Villages 1 and 3 each included a remote, mountainous she that was too far away from the rest of the valley to be readily accessible. Each of these she also contained fewer than ten households, and as a result I decided not to survey them. Village 6, in contrast, was quite large, including over 1000 households and was too large to complete at one time. As a result I decided to select three contiguous she of the eleven she in the village to interview in that village.

Table 1-1 Characteristics of Surveyed Villages

<table>
<thead>
<tr>
<th>Village</th>
<th>Upper/Lower Valley</th>
<th>Mountain/Valley</th>
<th>Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lower</td>
<td>Valley</td>
<td>36</td>
</tr>
<tr>
<td>2</td>
<td>Lower</td>
<td>Mountain</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Lower</td>
<td>Valley</td>
<td>37</td>
</tr>
<tr>
<td>4</td>
<td>Upper</td>
<td>Valley</td>
<td>26</td>
</tr>
<tr>
<td>5</td>
<td>Upper</td>
<td>Mountain</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>Upper</td>
<td>Valley</td>
<td>16</td>
</tr>
</tbody>
</table>
A sampling scheme was developed where ten percent of the registered households were interviewed in each village. The choice of a ten percent sampling rate was more logistical than scientific. Local village leaders in China at times limit access to outsiders, whether they are foreign researchers or represent other branches of Chinese government. A particular problem is that village leaders are likely to guide outsiders to the wealthiest households, the most accessible households, or the households that are most likely to present the picture of the village that they would like to present (on the steering of outsiders by village cadres see Oi, 1989; Smith, 2010). Sampling ten percent of households based on the procedure described below presented an easy number that could be communicated to village leaders and readily applied across villages. In each village I was required to negotiate for access, and presenting a standardized rule of sampling made this task easier.

The actual sampling procedure consisted of selecting every tenth name from household registries maintained by the village government and organized by she. These lists contained the name and age of everyone who was registered as living in a household. When a household was not available, the closest name was selected from the registry. For example, if household number 50 were not present, I would first try household 51, followed by household 49, until I found a household. There were two primary reasons why people would not be home: they were working in the fields, or they permanently lived outside of the village but had been unable to change their household registration (hukou) status. In the former case I would make arrangements to return to the household. In the latter, I would move on to another household. If I expected household

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3 It should be noted that the attitudes of village leaders varied widely. Some were genuinely excited to have me staying in their villages while other tried as hard as possible to get me out.
4 The Hukou system in China requires that every Chinese citizen be registered to a specific administrative location. Changing the location where one’s residence is registered is quite difficult, and as a result many people work and live in cities, while still having their official residence status remain in a village.
members to return, and it was logistically possible to do so, I would plan to return later in the day or the next day. However, in a few cases the distances that I traveled (generally on foot) required me to find new households to interview rather than return. Generally I was able to find a household in the first three numbers, but I deliberately did not keep records of which households were surveyed to preserve the anonymity of households.

Any consenting adult household member of reasonable mental acuity who was present was interviewed. Consent was obtained by describing what I would be asking them and orally gaining consent to be interviewed. Written consent was not obtained since it would be the only record compromising respondents’ anonymity. Mental acuity was screened (only if the mental acuity of the respondent was in doubt) by asking several test questions in advance. This was intended to screen out the large number of senior citizens being cared for by their family who were no longer able to give clear answers, but were more likely to be home. Two other groups were sometimes excluded. A few respondents were mentally ill. The second group that sometimes did not pass screening was middle-aged illiterate women. The problem for such women was not one of their mental acuity, but willingness. Many illiterate women were reluctant to answer my questions. This was not particularly a problem with literate women or women whose husbands were present. I took this reticence to be indicative of such women’s lower standing within the household and local society. Women marry into their husbands’ families. I believe that their reticence to answer questions was born of a fear of divulging information about the household, or generally doing something that they felt they should not do. However, they also seemed to be reluctant to decline to be interviewed because I was often accompanied by somebody associated with the local production brigade (see below), and refusing to be
interviewed could similarly cause trouble for their household. I then took these groups as people who had not truly consented to be interviewed, terminated the interviews, and moved on to new households. Such terminated interviews have not been included.

There were several advantages to using household registries to derive interview lists. The first and most obvious was that it produced a relatively systematic sample of the population of each village. This technique particularly was effective at preventing local officials from steering interviews towards households that they preferred. Second, the established procedure allowed uniformity in sampling between villages. Because I was clear in how I would ask to speak to people, and my survey procedures were established early on, I was able to use the same sampling strategy in each village, and not have to negotiate access on a case-by-case basis with village officials. Finally, much of the authority that I was able to derive came because this sampling strategy was perceived to be scientific. Because this procedure was viewed as being scientific, and because of the authority that science carries, this left little room for officials to deny access on trumped up grounds (which some village leaders attempted to do). While in most places appealing to the scientific nature of my research was not necessary, there were two village leaders with whom this proved helpful. There was one notable shortcoming, however. The interview lists did not provide an accurate statement of the true populations of the villages. Because of the hukou policy that governs residence in China, there are many people whose residence is registered in the countryside but actually live in the cities. There are two distinct types of such people. First, many households have one or more family members that have left to work, while other stay behind. This pattern of labor migration is particularly true of young men, often leaving their wives behind. While there was some migration of young women, it was less
prevalent than that of young men in Dingxi. Second, there are often whole households that have left to live in other areas (primarily cities). The prevalence of this phenomenon is difficult to estimate, but one village official estimated that as many as one-third of households registered in his village did not presently live there. Therefore, sampling one in ten households actually included more than 10% of the population, but how much more is unclear.

1.2.2. Data

Data were collected primarily through an interview methodology. 165 interviews were completed from six villages. Each interview consisted of a history of cropping patterns asking how much land was allocated to each potential crop currently (2010), five years in the past (2005), and twenty years in the past (1990). When respondents were literate, they were asked to fill in a table of this history themselves. This not only gave more accurate estimates, but also often resulted in respondents discussing why changes had happened as they filled in the table. If respondents were illiterate or had difficulty filling in the tables, I completed it for them according to their answers. In addition to information on cropping patterns, informants were asked to discuss changes that have occurred in water management, and changes in pesticide and fertilizer use. Respondents were then asked for the reasons for these changes. Households were also asked about their domestic water supplies and where their water supplies had come from in the past. I also attempted to assess relative household wealth both through asking people their income and a household wealth assessment. Such assessment proved problematic. Peasants frequently did not know or refused to divulge how much money they made. While a household wealth survey based on what material possessions households owned attempted to get around this problem, it similarly encountered problems. Most notably, when a son is married in rural northwest China,
the family is expected to provide a lavish new home for the new family, including a large number of electronics and furniture. As a result, households will save in expectation of, and borrow at the time of, a wedding. This makes it difficult to use household surveys to predict wealth.

Due to my belief that peasants’ responses would be significantly influenced by the presence of voice recording, interviews were not recorded. Instead I took thorough notes on their responses as they were responding, and transcribed those notes each night. As a result, although some quotes do appear, they are generally quite brief, since I could only note one interesting sentence at a time. Instead I will paraphrase what an interviewee said from my field notes. Throughout this dissertation if an interview is referenced directly I will do so by noting it with the interview number in the following format which is a four digit number beginning with the village number followed by the interview number. For example interview 3016 is the 16th interview in Village 3. Daily field notes also included identifying broad patterns in interviews from the day, as well as other interactions with local villager or leaders, which were often among the most important information. A copy of the interview questionnaire is included as Appendix A. Questions for the questionnaire were developed in collaboration with researchers at the Chinese Academy of Sciences and were pretested in four interviews in April 2010 in households in the lower valley.

In addition to surveys with peasants I gathered information from several other sources. I interviewed approximately 40 potato traders in Dingxi and Guangzhou. Guangzhou was chosen

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5 This belief arose from my early experiences recording interviews in an early phase of research in my previously planned research site.
6 Four digits were used because it was unclear at the beginning of research whether some villages might involve more than 100 interviews.
as a location for these interviews because it was the most often cited location that Dingxi potatoes were sent to. In addition to formal interviews I had numerous conversations with local party and government leaders, and officials of the county water bureau. These conversations were often the most helpful. When possible, brief notes were taken on these interviews, and all conversations were written out as field notes each night. Additionally extensive document review was conducted. Documents reviewed included academic and popular works in Chinese that have created discourses around poverty and development, news sources, and official planning documents.

At all times during the interview process I was accompanied by a student from Lanzhou University. One student assisted me in Villages 1, 2, and 3, and a different student helped in Villages 4, 5 and 6. It is normal in China that foreigners are required to travel with a peitong or accompanier when conducting survey- or interview-based research in rural areas. The nominal role of the peitong is to keep the foreigner safe, though many foreigners feel that the role also includes observing the foreign researcher’s conduct. In the case of my own research the role of the peitong was to be responsible for anything I did. Initially the local water bureau was frustrated that they would, per regulations, have to send someone to accompany me, and they were relieved when the role of the peitong could be assigned to someone from Lanzhou University instead. The peitong had a further role as a field assistant, helping me to translate from the local dialect to standard Mandarin Chinese (particularly in the early stages; by the later stages of the research I had learned most of the relevant local dialect). In addition to my field assistant I was usually accompanied by a guide of some type who showed where each of the houses on the list was. The responsibility for arranging such a person was generally placed on
the lowest ranking village official, who would then assign responsibility to the head of a local she. If at all possible, the head of the she would also pass the responsibility off, often to a teenager. Overall, any desire to influence the responses I received tended to be overwhelmed by how boring my questions were, and few local officials would sit through more than one interview with me. Nonetheless, it should be noted that when conducting interviews I was generally accompanied by two people, one a college student from Lanzhou, the other a person with some peripheral connection to the local production team.
Chapter 2. Literature Review

This chapter will review the literature on several debates in which this dissertation hopes to intervene. It is divided into three parts each addressing a separate literature. The first section of this review examines the literature on development and national identity. While this pairing may seem odd, by reviewing the post-colonial scholarship of both national identity and development, I will argue that these two concepts are deeply intertwined. Both development and the nation are teleological concepts that share a common telos of modernity, and in both cases such modernity is never actually achieved. Second, I will argue for a conceptualization of state power as it will be employed in this dissertation that examines state power from the Foucauldian perspective of apparatuses of security. In the final section of this literature review I will turn to Foucault’s (2007) engagement with the aleatory to examine how we may conceptualize an aleatory political ecology of water.

2.1. Development, Nation, and the Telos of Modernity

The first two concepts that this dissertation addresses are the nation and development. I treat these ideas in parallel because nation and development emerged in relation to one another, and both concepts were animated by a progressive teleology of modernity. I argue that this progressive teleology for both nation and development is ever incomplete, and that by remaining constantly in process, progressive teleologies legitimate state interventions to develop the modern nation. This section will begin with a discussion of the nation, continue with a discussion of development, and finally examine some of the ways that these two concepts have interacted both globally and in China.
2.1.1. Nation

My conceptualization of national identity in this dissertation is informed by two theoretical approaches. First, drawing on Brubaker’s (2004) emphasis on ethnic identification as a form of cognition and a way of enframing social phenomena undertaken by political actors, I will examine how national identity is a project that is used by state actors in China. Second, while the nation is a discursive object or cognitive frame that is mobilized by political actors, it is an object of a particular sort. I will draw upon Duara’s (1995) argument that the nation a teleological object that is deeply intertwined with notions of modernity. The nation, in Duara’s view, is the vector through which ‘History,’ defined as an immanent process teleologically proceeding towards modernity, unfolds itself. In Duara’s view the nation has come to be viewed as the primary subject of this progressive form of history. My conceptualization of the nation then is as a cognitive frame used by state actors that is imagined to be the vector of a teleological modernity, and that modernity is something that is never stable or complete.

There has been a rich debate about the origins and spread of nationalism, pitting constructivists who view nations as imagined communities (Anderson, 1991) or otherwise constructed social groupings (Gellner, 2006) against primordialists who view nations as originating in long-standing ethnic communities (Smith, 1988). Brubaker (2004) believes that this debate misses the point. Instead of focusing on what nations and ethnic groups are and where they came from, the study of ethnic and national identity should focus on how national and

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7 While Brubaker writes about ethnicity, he argues that his approach was equally applicable to studies of national and racial identities, and that ethnic, racial, and national identities are part of a common domain. The choice of whether to use national, racial, or ethnic categories in any analysis is largely locally and historically contextual. See Brubaker (2004, pp. 81-83).
8 History, with a capital H is the unilinear, progressive, and teleological master narrative that animates human society. This is to be contrasted with history (small h), which is the study of what happened in the past.
ethnic identities are used.\(^9\) It is not that nations and ethnicities are not real things, but that their reality is one that arises through people’s perceptions. Brubaker calls for using a cognitive approach focusing on national identities as ways of seeing the world rather than things in the world. National identities are ways of enframing the world, and social phenomena of all types are coded as being national or ethnic in character. Brubaker’s central example of this habit of coding events in ethnic terms is the tendency to code violence in civil war, which may have myriad complex origins, as ethnic in nature (Brubaker, 2004; see also Kalyvas, 2006). In a similar way, this dissertation will illustrate that development is most often encoded as national in character. Even the descriptions of the measures of development, *Gross National Income*, for example, enframe the problem of development as being one that is national. These ethnic and national framings begin as categories, or ways of separating the world by identifying differences between peoples. While Brubaker has examined categories between groups, in this dissertation I will examine categories within the polity of China. These internal categories are turned into groups that gain coherence through *projects*, particularly projects of national development, which are undertaken by political (primarily state) actors. The projects that these actors undertake are development projects, and political actors both frame development as a national problem (as will be discussed in Chapter 3) and carry out solutions to solve these problems (as detailed in Chapters 4&5). While Brubaker’s examples of projects of national categorization are quite blatant, such as civil wars, such group making based on categorization can occur through far more banal media as well, including schools, television, and I will argue development (Billig, 1995).

\(^9\) While the point of Brubaker’s research is well taken, he may overstate the degree to which previous research has examined the uses of ethnic and national identity by political actors. For examples of thorough monographs on the political use of ethnic identification in China see Kaup (2000) and Litzinger (2000).
Duara (1995) argued that the enframing of social processes within a national framework extends to history as well. His central contention is that the nation (as constructed by historians, politicians, and broader discourse) is the subject of (big H) History. The subject in this view is that which is able to act; only nations are capable of carrying out the progression of History. Duara identifies the origins of the History in Hegel’s *Philosophy of History* as a progressive, linear, and teleological notion of history (Duara, 1995 pg. 17-18). History, in this reading of Hegel, is the unfolding of the Spirit that will ultimately result in the achievement of rationality (in Hegel’s example through the Prussian state). The nation, in Duara’s analysis, is the primary subject that is capable of carrying out history. He argues that “if History is the mode of being, the condition which enables modernity as possibility, the nation-state is the agency, the subject of History which will realize modernity” (Duara 1995 pg. 20). In this reading, modernity is the telos of History, and is also the end of history. The agent of history is the nation state, which is capable of achieving modernity.

Modernity is, coincidentally, also the telos of development (as will be discussed below, see Gupta (1998)). In this way the nation is similar to development, in both cases the nation is enframed as the central subject of a teleological process, sharing a common telos of modernity. Yet the nation is never able to be modern, because it must constantly appeal to the past. The nation is for Duara an impossible passage between the past and modernity:

*As the subject of History, it (the nation) must daily reproduce the project of recovering its national essence-to secure its transparency as the already-always of the nation-space-especially in the face of internal and external challenges to this claim. At the same time, the Enlightenment discourse of modern civilization has made it imperative for all societies to affiliate themselves with modernity. Committing oneself to modernity and progress, however, is a commitment to the celebration of the new, the breaking of old shackles. Thus while on the one hand, nation-states glorify the ancient or eternal character of the nation, they also seek to emphasize the unprecedented nature of the nation-state, because it is only in this form that the people-nation has been able to realize itself as the self-conscious subject of History. Duara 1995, pg. 29.*
In this way a nation is a passageway between the past and the modern, but it is one that is always in the process of change, the status of having arrived at the modern never having been achieved. The nation is in this view a cognitive frame through which history, the study of the past, is viewed. As a result historians write histories in ways that take the nation as the central actor, obscuring the voices of those, including ethnic minorities or women, who do not fit within the narrative of unilinear, progressive history. I will show in Chapter 3 that just such a teleological approach to the nation is present in a series of classificatory schemes through which western China is identified as in need of development.

I draw from Duara’s work that the nation is a teleological framework through which the world can be seen. The telos of the nation is modernity, and the practical expression of modernity is through the practice of development (as will be discussed with reference to post-colonial approaches to development below).

In summary, the nation in this dissertation in conceptualized as a mode of cognition, a way of discursively enframing political, economic, and cultural processes. National identity begins with categorization, which is then operationalized into groups as part of a project. Yet the nation is a special kind of discursive frame, as the primary way of seeing the world through which modernity is striven for, yet never attained. The means of striving for that modernity is through development.

2.1.2. Development
Wainwright (2008) has pointed out that development has two distinct but often conflated meanings. First, development can mean the natural unfolding of an immanent nature, as in child development, or the development of an organism (Wainwright, 2008, p. 6). Simultaneously, development is a process that requires active intervention of the force of will to be achieved.
Development is in this way something that actors actively do. These two notions of development are often conflated, such that the notion of ‘national development’ is simultaneously something that requires intervention, and that is the natural telos of the nation. Gillian Hart (Hart, 2001) has made a similar argument distinguishing between ‘big D’ Development which was “a post-second world war project of intervention in the ‘third world’ that emerged in the context of decolonization and the cold war” (2001, p. 650) and ‘little d’ development which was the unfolding of the process of uneven capitalist development. Hart’s analysis also distinguishes between development as a ‘natural’ or immanent process and development as an active political intervention. Cowen and Shenton (1996) have made a similar distinction between development as intervention and development as immanent process. Each of these thinkers has approached this distinction in slightly different ways—Wainwright’s project is ontological, Hart’s historical-materialist, and Cowen and Shenton’s an intellectual history—yet all have converged upon the notion that development has both a meaning that is a point of intervention and an immanent unfolding of a natural process. The merging of these two meanings is a central feature in creating development, particularly national development, as an organizing principle of the modern nation-state. Development as a naturally unfolding process creates a discursive and cognitive frame of what ought to be. Development as a point of political intervention then is justified by the unfolding of development towards a telos of modernity.

Development has been widely studied and critiqued within geography. In the interest of brevity, I will limit my discussion to two schools of analysis of development that have direct bearing on the present case study. First, I will examine the post-development school, from which I derive an emphasis on the role of discourse in general, and categorization in particular, implementing development as a form of power. Second, I will examine post-colonial forms of
development, to consider: (1) the local specificities of development in different places with differing histories, (2) how development becomes a form of identity on both the individual and national level, and (3) how development comes to be imbricated with national identities through the common telos of modernity.

2.1.2.1. Post-Development

Some of the most sustained critiques of development as a project or intervention have come from scholars identified with the post-development school. This school, influenced by the writings of Foucault, has argued that development is a form of knowledge power that has structured relationships between the global north and global south. The discursive creation of poverty as a problem is most frequently associated with Arturo Escobar’s (1995) book, *Encountering Development*. Escobar traces the genealogy of development as a discourse to U.S. President Harry Truman’s 1949 inaugural speech in which he called for using the technical competencies of the United States to transform the countries of the global south. While there had always been disadvantaged people in the global south, Escobar argues that it was the creation of a discourse of development in the post war period that began to posit that lack of development as a problem. This is what he refers to as the ‘problematization of poverty’. Through classification, the discourse of development created the problem that it aimed to solve. One of the key means of problematizing poverty was the creation of income thresholds, below which all people will be designated as being impoverished. This very same technique was later used to

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10 Escobar remains somewhat equivocal on the point of what deprivation may have looked like prior to the spread of global capitalism. He says, for example “Whatever these traditional ways [of dealing with poverty] might have been, and without idealizing them, it is true that massive poverty in the modern sense appeared only when the spread of the market economy broke down community ties and deprived millions of people from access to land, water, and other resources (Escobar, 22). Yet in this statement Escobar is idealizing pre-capitalist societies as uniquely capable of solving the problem of poverty. For a thorough critique of Escobar and other post-development scholars’ romanticization of pre-capitalist society see Gidwani (2002).
designate special poverty alleviation counties in China (as will be discussed in Chapter 3). Once people were classified as being impoverished, they became the object of action to ameliorate those problems. The solutions to the problems of poverty came from these same discourses of development, which posited a unilinear path towards industrial society for all peoples of the developing world. Escobar argued that this discourse of development structured relationships between the global north and global south, placing the global south in a permanently subordinate position. As a result, Escobar argues that those concerned with the impoverishment of the developing world should jettison the idea of development, with all of its associated baggage, and look for new ways to empower local communities.

Ferguson’s (1994) work has contributed to our thinking about development by arguing that such discourses of development present solutions to problems of material deprivation as being technical rather than political in nature. Development actors, for Ferguson, identify problems based on the solutions that they are able to provide. These solutions tend to be technical and apolitical. In the process, questions of under-development are depoliticized. Ferguson likens the development apparatus to an ‘anti-politics machine’ that would depoliticize everything that it touches. Additionally, Ferguson presents a clear case of how the discursive object of development can be misaligned to actual social conditions. In his study of Lesotho, the problems of poverty were presented as arising from an aboriginal economy, based on traditional livelihoods, that was bounded within the nation-state. In reality none of these conditions were met. Lesotho was deeply tied to a modern capitalist economy through labor migration to South Africa. The continuing herding traditions in Lesotho’s highlands were a means of storing wealth accumulated through labor in a capitalist system, rather than a means of creating wealth de novo.
as development planners assumed. Despite these actual economic conditions, Lesotho was constructed in development discourses as a primitive pastoral state that would be developed if only domestic herding could be improved through technical means. Similar patterns of idealizing an economy as remote have been seen in Mitchell’s (2002) study of Egypt, and I will argue have been used to represent western China.

The post-development literature has been critiqued on several grounds. First post-development scholars (this critique is aimed most clearly at Escobar) present development as a monolithic discourse that is everywhere the same. As Wainwright describes, “…development” has often been reduced to a singular, monolithic discourse, devoid of any contingency. Ironically, in their effort to displace “development,” the post-development critics have often implied that development is essentially singular, and that it has been so since its inception” (Wainwright, 2008, p. 9). Similar critiques have been made by Hart (2001), Gidwani (2002), and Lehmann (1997). Postcolonial scholars have added that this vision of development is not only monolithic, but also Eurocentric and makes little account for the variations that may exist within development in the global south (Gidwani, 2002). Second, Lehmann (1997) has argued that the post-development critique tells us little beyond what dependency theory already has expressed. In this view, post-development is a rehash of dependency theory with a post-modernist window dressing. Finally, by assuming that development is everywhere a negative force, the post-development critique loses sight of the real (rather than merely discursive or categorical) poverty that is experienced by residents of the global south.

In spite of the critiques, there is something to be gained from the post-development approach. First, this dissertation will take from the post-development perspective an attentiveness to the role of categorization in development (on this issue see also Pigg (1992)).
Second, the post-development literature has contributed to our understanding that development is a discursive construction. In this way, development, like the nation, is a framework or way of seeing the world. I will examine one particular discourse of development in the name of national integration that has been presented domestically about poverty and development in western China. Yet I will take issue with a central point of post-development theory that development is a process that has been centrally organized by global powers. I hope to demonstrate that development in China has been far more varied, and has served domestic state power and national identity as well as global powers. To understand how development has reinforced state power I will turn to post-colonial development approaches.

2.1.2.2. Post-Colonial Development
The post-colonial perspective argues that development is a way of ordering the world that has displayed continuity from the colonial to post-colonial period. This continuity is structured on the continuing telos of modernity, as Gupta writes “(t)he faith in development, active in the period after independence, had in common with colonialism a narrative of the telos of the nation-state” (1998, p. 23). That telos of the nation state in this case is modernity. The post-colonial perspective differs from the post-development perspective in several productive ways. First, while the post-development critique has emphasized development as a global power structure with a univalent and Eurocentric form of modernity, the post-colonial perspective argues that there may be multiple spatial and temporal forms of modernity (cf. Gupta, 1998; Gidwani, 2002). Second, while the post-development critique argues that development is everywhere and always a negative force, the post-colonial critique argues for examining local specificities to examine how development actually plays out in particular places (Gidwani 2002). In this view, development will always have winners and losers, but certain groups may improve their lot through development. Finally, post-colonial scholars focus on the role that development plays in
creating identities. Discourses do not simply exist as global power structures, but also influence the ways that the identities of individuals and nation states are created.

Post-colonial development scholars have critiqued post-development scholarship for a tendency to locate modernity, the goals towards which development aims to progress, as a Eurocentric concept. According to Gidwani, this does not leave space for different types of modernities in non-European settings, such scholars “[n]ever entertain the possibility that modernity, managerial rationality, historicism, and institutional practices that we collectively and commonsensically anoint as the constitutive elements of ‘development’ may (...) exist in the plural, in geographically and temporally varied form” (Gidwani, 2002, p. 4). Gidwani was interested in the ways that bureaucratic rationality existed in India prior to the colonial encounter, and that bureaucratic rationality interacted with forms of modernity that arrived through colonialism. The modernity envisioned by those who aim to develop China or India may be quite different than modernity as it actually exists in the ‘developed world.’

Second, from the post-colonial perspective development should not be viewed as unambiguously detrimental to the lives of those who it aims to develop. While post-development scholars argue that the notion of development should be jettisoned, Wainwright has argued that development is something that we “cannot not want” (Wainwright, 2008, p. 10). What he means by this is that the goals of development, of lifting people from poverty and securing peoples’ livelihoods, are moral imperatives that cannot be ignored. Development as practiced by the global north (what Wainwright calls development qua capitalism) has failed to achieve these goals, but that does not make the goals themselves unimportant. Similarly Gidwani (2002) argues that post-development theorists err in viewing development as unambiguously ‘bad.’ This is not to say that Gidwani views development as good by definition, but rather that he views the
results of development as being dependent on the situations in which they occur. Gidwani takes a slightly different approach to this, grounding his evaluation of development in the particular case study of his research and evaluating it in terms of the capabilities approach (Sen, 1999): “I maintain that development is always anchored to a moral geography of place-making (...); and that its evaluation is, therefore, inseparable from the freedoms that it either enables or curtails” (Gidwani, 2002, p. 5). Gidwani demonstrates in his case study of irrigation development in India that certain castes were able to benefit from development and move up relative to others, whereas other castes and types of laborers lost relative standing within the community. Development should not then be examined only for its role as a source of power, but also for the actual effects that it has on people’s lives.

Third, postcolonial scholarship of development allows us to see how development has come to define identities at both the national and individual levels. As Gupta writes “‘development’ is about the economic position of a nation-state relative to others, but it is also crucially a form of identity in the postcolonial world” (1998, p. 11). This position is made around the notion of the “West.” Drawing on Stuart Hall (1992), Gupta argues that “the West” refers less to a geographic location than it does to a specific way of viewing the world. The West is modern, while the rest is not. In this way the West is a construct that is historical, rather than spatial, as it places different countries, and their inhabitants, along a teleological axis in which the West is viewed as the most modern, and all other places as being insufficiently modern. Gupta writes:

In speaking of “The West,” I refer to the effects of hegemonic representations of the Western self rather than its subjugated traditions. Therefore, I do not use the term to refer simply to a geographic space but to a particular historical conjugation of place.

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11 Gidwani’s use of the capabilities approach is somewhat unique within post-colonial development studies. While much of the post-colonial development literature has emerged from the perspective of post-colonial Marxism (Wainwright, 2008) the capabilities approach is grounded in a philosophy of Rawlsian liberalism (Nussbaum, 2000).
power, and knowledge. The “modern,” the celebration of Western progress, civilization, rationality, and development came to be instituted as a global phenomenon through colonialism. (. . .)After the formal demise of colonialism, one of the chief mechanisms by which this self-representation has been promulgated has been through the discursive formation known as “development” (Ferguson 1990; Escobar 1995). Development is a discourse that rehearses, in virtually unchanged form, the chief premises of the self-representation of modernity: the belief in teleological narratives; the idea that “progress” occurs along a single path; the conviction that “Western,” industrial countries have already arrived at the telos (although it would be more accurate to say that they were always already there) (Gupta, 1998, 36-37)

Development then is the way that the world is classified to separate those countries that have moved closer to the telos of modernity (which is, in the view of Duara, also the achievement of nationhood) and those that have not. But this identity as backwards is not merely ascribed to the nation by others, it also becomes part of the frame of national identity that citizens of India use to make sense of the world. This inscribes the postcolonial frame with which the world is seen as being “inferior, backward, subordinate, deficient in capital and resources, (and) an inadequate member of the national community” (Gupta, 1998, p. 40). From the post-colonial perspective development is the ordering that creates a hierarchy of the international community, but it is also a central part of the framing of national identity that residents of ‘developing’ states acquire.

Gupta’s parenthetical statement that western countries have always already arrived at the telos is significant and deserves further elaboration. This statement is correct insofar as a structuring of power is concerned. Insofar as modernity is less “an empirical referent than a self-representation of the West” (Gupta, 1998, p. 36), states associated with the West have always already arrived at the telos of modernity. Yet it is insufficient (and indeed incorrect) with reference to the ever-incomplete internal logic of development. While states may become developed vis-à-vis less developed states, there remains a constant insecurity about development even within apparently developed states. One need look no further that the current anxieties
about American decline (see for example Luce, 2012; The Economist, 2012), and the numerous local development authorities that exist throughout the United States and Europe to understand that even paragons of developed nations remain fundamentally insecure about their own development. Thus, while a nation may be developed, in the discourses of development, it is only so temporarily, and a nation’s status as developed is always contingent. Development then is a way of ordering the world. Powerful polities within the international system have always been already developed, but that development is a status that they may lose. Indeed, the recognition that nations both advance and decline in the international hierarchy of states was one of the central themes that differentiated Wallerstein’s world systems theory from previous dependency theory (Wallerstein, 1974). Thus, while Spain was a core state at the beginning of the capitalist period, it fell into a sharp period of decline during the 18th and 19th century, such that by the early 20th century there was a strong impetus for new development in the form of the regeneracionista movement (which has been the subject of several studies of the social nature of water c.f. Bakker, 2002; Swyngedouw 1999, 2007). This constant contingency and worry about development illustrates that development is fundamentally an ever incomplete and comparative process. It is a way of structuring the world around an axis pointing toward the telos of modernity, but that telos is never reached. Development remains always a process still underway. In this way we can speak of development as having two moments: first, development as a categorical variable rank orders countries and establishes a global hierarchy which separates the West from the rest (Hall, 1992); simultaneously development is a process that is never complete, and states continue to strive towards the ideal of modernity even when they have achieved development in the sense by being categorically labeled as developed.
Development and nation then share much in common. Both are teleological ways of seeing the world that take modernity as their telos. Both are fundamental discourses that frame the world. Development and national identity both rely upon processes of classification, some official and some unofficial, to identify where different people and places fit into a discursive ordering. Finally, both of these ways of seeing the world fundamentally structure individuals’ identities, that is to say, they are cognitive frames through which people structure the world.

2.1.3. Development and the Nation
National identity is a way of seeing the world, and central to this perspective on the world is the role of categorization (Brubaker, 2004). People, behaviors, objects and economic processes are categorized by whether they belong to the nation or not. This categorization is discursively constructed as the national group in contrast to another national group, which is then the constitutive other. For example, Paasi’s (1996) study of the territorialization of national space in Karelia, Finland was made largely in contrast to the categorical constitutive other of Russia. Yet, in the discourse of national development leading to modernization, the other also appears as an atavistic form of the national self. For nationalism as a way of seeing the world, not only are spatially external others categorically contrasted against the national self; the historical roots of the national self are similarly contrasted insofar as they are insufficiently modern. This historical self is particularly visible through certain types of populations, particularly peasants. Development is then a way that the state, as trustee of the nation, acts upon those others and moves them towards the telos of modernity.

Mitchell (2002) has argued that the peasant is the constitutive other of the nation. The backwardness of the peasant that must be ameliorated through modernity is constitutive of the larger process of nation making. Drawing on Bhabha’s notion of the nation as pedagogy versus
the nation as performance (Bhabha, 1994). Mitchell identifies self-othering as an essential stage in the creation of modern national identities:

In the performative making of the nation, on the other hand, otherness plays a constitutive role. The nation is made not out of a process of self-awareness, but out of encounters in which this self is to be made out of others; or rather, is to be made by making-other. The nation is made out of projects in which the identity of the community as a modern nation can be realized only by distinguishing what belongs to the nation from what does not, and by performing this distinction in particular encounters. Unlike conventional accounts of the emergence of the nation as pedagogy, our understanding of such encounters cannot be governed by the consciousness of a collective subject that produces the meaning of the nation; this collective subject, the nation, is not the author of the performance, only its occasional effect. (Mitchell 2002, p. 183).

In Mitchell’s case study of Egypt, the object that is othered is the peasant. It is through identifying the peasant as backwards and deviant with respect to the modern nation that development processes can come to work on the peasant to create modern nation. Much of the efforts to declare the peasant outside of the nation and frame the peasant as the other against which the modern nation must strive were based upon categorizing peasants as backwards and uncivilized. According to Mitchell, “the performing of the nation required that every one of its rural inhabitants be declared outside the nation, uncivilized and unhygienic, so that in rendering them civilized and clean, the nation could be made” (Mitchell 2002 p. 192). Mitchell examined how this making of the nation occurred through the construction of new model villages in the early post-war period that were based upon an idealized “national” architecture selectively derived from local vernaculars in the Egyptian past. Existing villages were classified as being ‘unhygienic’ and ‘uncivilized’ and were targeted for replacement. In the process of building new villages, the new nation was to be made, and peasants were to be transformed into new national subjects. Unsurprisingly, this process was not welcomed by the peasants who were classified as

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12 I will not delve into Bhabha’s notion of the nation as pedagogy versus the nation as performance beyond Mitchell’s use of the terms. This distinction can be summarized as the nation as pedagogy resembling the notion of
being backwards and deviant. This form of other-making is domestic, but it is marked temporally. The uncivilized, unhygienic peasant is a relic of the past that must be acted upon to unfold the telos of modernity for the nation. Yet, the past is also the source of identity for the nation, it is what makes the nation different from external others. But the past that is identified is, in Mitchell’s case, a highly stylized one; it is selected as an architectural icon of the nation. Moreover these peasants had not existed in a timeless, traditional space, but had been recently impoverished by the expansion of commercial sugarcane agriculture. Thus, for Mitchell the process of creating national identity, as undertaken by state actors, relies upon the categorization of the rural peasantry as backwards and in need of intervention to become fully modern, fully Egyptian, citizens.

There are clear parallels between Mitchell’s image of the village, and the New Socialist Countryside program that is being undertaken in China today (Perry, 2011). While the New Socialist Countryside program has only a peripheral relationship to the present study, I will draw on Mitchell’s work to understand the process of categorization of the peasantry as an internal other on a teleological, temporal axis structured by modernity. Chapter 3 will illustrate that regions and population in China are identified as backwards and in need of development as part of a larger project of realizing the enframing vision of the nation as a modern space.

### 2.1.4. Development and Nation in China

Development has been associated with national identity in China in two distinct ways. The first has been a general concern with development as a standard against which China is judged relative to the rest of the world. This form of national identity surrounding development resembles Gupta’s post-colonial theorization of development constituting the nation in India, and

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the nation as an autochthonously unfolding object without reference to other groups. The nation as performance, in contrast, is created through contrasting the self against a constitutive other.
is based upon the categorization of nation-states in the global order. The second is associated with development as a form of internal teleological progression towards modernity and homogenization of national space. While the former has received much academic attention, the latter will be the focus of the next chapter of this dissertation. Both of the associations of development with the nation-state arise from China’s transition from an imperial polity to a nation-state. In the later Qing period (the 19th century) a series of unequal treaties were imposed upon the Qing which provided evidence that the Chinese polity, despite its rich history, had fallen behind the West and Japan in terms of technological and economic development. This has led much of the study of Chinese nationalism to focus on its anti-imperialist roots (Zhao, 2004) and ongoing anti-foreign sentiment (Gries, 2004) with respect to apparent underdevelopment vis-à-vis the West. Internally, as Chinese nationalist politicians and thinkers attempted to forge a nation-state out of the remains of the Qing polity, they were confronted with the heterogeneity of the territory and population that they sought to govern (Leibold, 2007). While the struggle of figuring out how to fit the nation together has most often been associated with problems of ethnicity and borders (Leibold, 2007; Mullaney, 2011), creating an evenly developed country has also been a central concern of Chinese state actors since at least the founding of the PRC. While the development gap with Western powers as a driver of nationalism in the post-reform period has been widely identified (Gries, 2004; Zhao, 2004), the role of development as a process of homogenizing national spaces has not been widely studied, and will be a central concern of Chapter 3 of this dissertation. Both of these forms of development as a driver of nationalism in China may be linked to a post-colonial approach to development, which locates a development gap as a central form of identity.
2.1.4.1. Catching up and Surpassing

Modern Chinese national identity is often framed as being a response to the ‘century of humiliation’ during which China came to interact with the West. Central to this oppositional nationalism has been the notion that China is ‘backwards’ or ‘less developed’ than the west. Such a basis of nationalism in backwardness can be seen from at least the late imperial period. During the self-strengthening movement of the late 19th century China’s backwardness was identified vis-à-vis the West. During the Republican Era (1911-1949) the May Fourth Movement embraced a nationalism based on seeking parity with the West through modernization and democratization. Mao’s early autarkic national development program was based on a program of ‘catching up and surpassing’ the west, specifically Britain and the United States. In each case a national self was framed insufficient relative to the West, and in need of remediation through development. These discourses bear the mark of post-colonial nationalism in which the national self is presented as being insufficient relative to a Western other.

Through a series of unequal treaties during the Qing dynasty, the Chinese state was placed in a disadvantageous trade and diplomatic position vis-à-vis the west. This notion of ‘catching-up’ and China being paid its due by international actors, particularly in the West, has been a common strand throughout China’s development. The Century of Humiliation was constitutive of China’s nascent sense of national identity as it was occurring, and remains a central theme of popular Chinese nationalism to this day.

One of the earliest examples of Chinese nationalists placing development as a central concern of the state vis-à-vis the international system, particularly the West, was the Self-Strengthening movement of the late Qing Dynasty. Led by Prince Gong, the Self-Strengthening movement emerged in the aftermath of the opium wars. The goal of the self-strengthening movement was to identify the causes of China’s defeat in the Opium Wars, and to modernize
elements of the Qing state to meet the future threats from the West. Leaders of the self-strengthening movement identified China’s losses to the West as having their origins in falling behind in “political, economic, social, and cultural development” (Zhao, 2004, p. 53). While many of the policy elements that have been emphasized in the May 4th movement involved technology, particularly military technology, the intellectuals who laid the foundations of the Self-Strengthening movement sought to learn not just the technology, but also “the way that produced the technology” (Feng Guifeng, cited in Zhao, 2004, p. 53). In this way development was not concerned merely with improving society, but also in reshaping Chinese society by adopting modernization while attempting to preserve Confucian Values. Thus from the very origins of Chinese nationalist thinking, Chinese national identity was framed in response to a perceived external shortcoming of development.

During the early Maoist period, “catching up” with the West was a significant way that the national economy was enframed. The slogan of “catching up with and surpassing Britain within 15 years” (shiwunian ganchao yingguo) became a major slogan of the Great Leap Forward period following a speech by Mao on November 18, 1958 (He, 2001). This discursive slogan made its way into material practice as rural communities shifted from agriculture to backyard steel furnaces in an attempt to overtake Britain in steel production (Naughton, 2007). The failure of this program is well known and often cited as an example of the excesses of central planning (Naughton 2007). However, the notion of catching up and surpassing is also interesting as an expression of the role of development in post-colonial nationalism. In this case the strength of a nation was defined by development, and defined in a way that progress of the nation could be very specifically measured. National strength was reduced to the numerical
variable of steel production (obscuring, for example, differences in the quality of steel), and the target was set to developing this sector of the economy to surpass the developed world.

In both the self-strengthening movement and the catching up and surpassing of the Maoist era, Chinese national identity was a cognitive frame that was based upon a relationship of inferiority with the West ordered along an axis of development. This has been the most commonly studied role of development in national identity in China: a focus on the role of inferior development vis-à-vis an external other in framing of Chinese national identity. The next chapter of this dissertation will examine another role that development has played in framing national identity. In this case development frames the nation internally by simultaneously creating both a new national space that is even in its development, and new national subjects who, like Mitchell’s (2002) peasants have been transformed by the state into modern Chinese national subjects.

This first section of literature review has shown that development and national identity are deeply intertwined phenomena in the post-colonial world. Both development and national identity are cognitive frames and can be thought of as ways of seeing the world. Development and national identity are similarly teleological in that both seek an end in modernity. Finally, both development and the nation are framings of the world that call for constant progress insofar as the telos of modernity is never fully achieved. The following section of this literature review will focus on the state as the actor that aims to realize the telos of both development and the nation.

2.2. The State and Security in China

If the nation is the vehicle through which the telos of modernity is striven for in China, the state is the driver. Development, as it is discussed in this dissertation, is a politico-economic process that is actively sought by the state, and as a result it is important to consider what I mean
by the state. Here I hope to present how I conceive of the state in China, and draw attention to the ways that the state is changing during the Reform and Opening Period. A central tension that will emerge from this discussion is that the state is not a monolithic entity, and that local and central state actors are often at odds. I will then engage with Foucault’s notion of apparatuses of security, and examine how state power has changed in China from this Foucauldian perspective.

To begin, however, I must disentangle three key concepts to make sense of how the state has carried out development in China: the state, policy, and governance. First, there is the state, which I will treat as the operational bureaucracy of the People’s Republic of China (PRC). In general I will try to speak of state actors, or those who act with the authority of the state, rather than the state as a monolithic entity capable of action on its own. In this way I aim to remove the agency from the state as a centralized object, and focus instead on how state authority is used both by different individuals and organizations within the broader structure of state-based organizations. It should further be noted that the Communist Party and the government are separate, but deeply intertwined entities in the People’s Republic of China. The party and government operate in parallel structure, and while it is at times important to distinguish between party and government (for example in the areas of village elections and enterprise), for the purposes of my present analysis of agriculture and rural development they may largely be treated as coterminous and both parts of the state.

The second concept, which is closely related to the first, is that of policy. I use policy to mean deliberate action undertaken by state actors to achieve a specified goal. There are three points of clarification to this definition. First, policy, as I treat it, is a specifically state-based process. While there are clearly policies that occur outside of the state (e.g. corporate policy), my use of the term throughout the dissertation connotes a state-based strategy and action—that is to
say actions undertaken by state-based actors. Second, policy is deliberate and aims towards a specified goal. While there are clearly cases where programs backed by state actors have incidental effects, I will treat something as policy only if the outcome is related to the goal. As a concrete example, I will examine a group of policies meant to ameliorate variability in agricultural water through the introduction of potatoes. I treat these as policies because they were undertaken with the deliberate goal of managing agricultural water: the shift to climate appropriate cash crops that occurred was not incidental to the aims of state actors. Finally, the ends of policies are based on broad guiding principles, the implementation of which may vary as goals are filtered down through local state actors. Policy is constructed discursively both by actors who are officially charged by the state with carrying out the policies (i.e. government leaders), and by academics and thinkers who propose solutions that are then adopted for wider use.

A final term—governance—has been applied in the environmental field to illustrate the increasingly diffuse nature of environmental management. Governance includes the functioning of the state, but also refers “to the relations among government, quasi-governmental, and nongovernmental actors” (Perreault, 2008, p. 836). Governance is then a broader domain than policy. Whereas policy is specific and limited to state-based actions, governance includes an array of institutions that broadly influence the overall management of a resource. As I treat governance, it also includes the interactions and relations between entities that are outside of the state with state actors, while policy is bounded within the actions of the state. To return to the concrete example of agricultural marketing, the local state may present a policy of agricultural market promotion that fits into a broader goal of governance of agricultural water based on cash crops that reduce water demand. The policies are actionable items that various state actors may
undertake, while governance is the broader management of the human-agricultural water relationship, including market actions that lie beyond the state control, but are nudged by state policies.

I will focus my conceptualization of the state on an analysis of the Maoist state, and the state in the Reform and Opening Period, in terms of Foucault’s approach towards understanding the exercise of power. Particularly, I am interested in the contrast Foucault makes between sovereign, disciplinary, and governmental forms of power. I hope to illustrate that much of what reforms of the state have accomplished during the Reform and Opening Period is a shift from spatial expressions of power based upon discipline towards spatial strategies of governance based upon security. Despite this shift, the institutional structure of the Chinese party-state bureaucracy, which is charged with exercising that power, remains based upon a disciplinary territorial exercise of power. I hope to demonstrate that this contrast between forms of power illustrates a central tension between the state as implemented by central and local state actors. I will first examine two existing theories of the state in China, Fragmented Authoritarianism (Leiberthan and Oksenberg, 1988) and the cellular state (Shue 1988). The FA framework was developed to explain the implementation of policy early in the Reform and Opening Period. As such, this theory of how state actors generate policy finds the origins of policy process in the architecture of the state. Thus, in contrast to the Foucauldian approaches that examine how power is exercised broadly, the FA framework will be used to explain how decisions are made and how policy is implemented. The second theory of the state in China, the cellular state model, was used to explain the relationship between the state and society under the Maoist period and early Reform and Opening Period. I will use this model to explain the role of apparatuses of circulation (Foucault, 2007) in promoting changes in the nature of state power early in the
Reform and Opening Period. This approach will be used in Chapter 3 to explain a series of efforts aimed at national integration through the promotion of trade.

### 2.2.1. Existing theories of the state in China

I will begin by considering two existing theories of the state in China that are relevant to my discussion: fragmented authoritarianism and the cellular state model. The fragmented authoritarianism (hereafter FA) model of the state first proposed by Lieberthal and Oksenberg (1988) was created to explain the Chinese policy process in terms of state structure. Consideration of the fragmented authoritarian model is useful for three reasons. First, the FA model has been perhaps the clearest articulation of the relationship between the state and policy in China. Second, the FA model has been a central paradigm applied to the management of water resources in China. Finally, the FA model has come to underlie much of thinking about the structure of the state in rural China, even for those scholars who do not directly draw upon it (c.f. Smith, 2010). The second model, the cellular state proposed by Vivian Shue (1988) seeks to understand two sets of relationships, that of the center to the local state, and that of the state to society. I will primarily examine the former relationship, by looking at how reconfiguring commerce affects changing state structures, and how these structures have exemplify changing relationships in state power. The cellular state model is relevant insofar as the territorial isolation that it posits, and the breakdown thereof, is central to the notion of nation-building through national integration of western China.

It should be noted that I am not engaging with several geographical theorizations of the state in China, most notably Hsing’s (2010) model of the urbanization of the local state. While this model provides an important view of the changing role of the state in urban areas, it is
inappropriate to analyze the rural areas examined in this dissertation because the capital generating potential of land is quite low in the study area.\textsuperscript{13} For these reasons I will work with the above models of the state derived from political science, while adapting them with a Foucauldian approach discussed at the end of this chapter.

\textbf{2.2.1.1. Fragmented Authoritarianism}

Lieberthal and Oksenberg’s (1988) FA model was intended as an alternative to previous policy making models in China that had emphasized either rational choice or high level personal politics. They explained the policy process in China instead in terms of the bureaucratic structures of the Chinese state. The fragmented authoritarian model emphasizes that while China is an authoritarian state, multiple and often competing bureaucracies lead to a decentralized decision making process. Particularly important are the tensions that exist between the vertical \textit{tiao} or functional bureaucracies and the \textit{kuai} or horizontally organized territorial administration. The tiao are vertically organized functional bureaucracies that stretch from Beijing to the local level. For example, the Ministry of Water Resources has a coordinate provincial department of water resources, a prefectural water affairs office, and a county level water bureau. The kuai in China meanwhile represents the horizontal organization centered on territorial units of government. For example Gansu Province, Dingxi Prefecture and Anding County are examples of kuai. A functional bureaucracy at the county level (e.g. the county water bureau) will report both along its \textit{tiao} to the level of functional bureaucracy above it, and across its kuai to the local government (e.g. the County government).

\textsuperscript{13} Hsing’s model examines the role of land development as a way that the local state seeks rents. As an illustration of the low value of land in my research area, non-irrigated land in my study area generally could not be rented for money. Farmers would allow others to use their land, but charge no rent because no one would pay for non-irrigated land.
The organization system is further complicated because each unit has a rank, and government units of the same rank have no authority over each other. Ministerially-ranked central government organizations (e.g. the ministry of water resources) share an equal rank with provinces. Generally, local functional bureaucracies remain ranked lower than the local government (zhengfu) in each area, and for many units of government, the tiao and kuai to which they must report share the same rank. Additionally, different levels and ministries also have different levels of activity. For example, in the area of water resources, the prefecture level water affairs department plays a relatively smaller role than the county water bureaus.

The central concern of Lieberthal and Oksenberg (1988) was how this fragmentation of authority affected the implementation of policy in China. Their goal was not so much to construct a theory of what the state was, as to construct a theory of how the state implemented policy. Nonetheless, their emphasis on bureaucratic fragmentation has also allowed scholars to study how different elements of the state relate to one another. During the Maoist and early post-Mao period the kuai was the slightly more powerful than the tiao, however due to a series of centralizing efforts made during the 1990s which have been called “soft centralization” by Mertha (Mertha, 2005) the tiao has in many bureaucracies become more powerful. However, this has not resulted in a uniform strengthening of the central state. The means through which strengthening of the kuai system has occurred have dealt primarily with cadre promotion and decision-making surrounding the allocation of funds for personnel (which determines the ultimate size of a bureaucratic organization) (Mertha, 2005). Both of these functions have been consolidated upwards to the provincial level. The result has been a significant strengthening of the relative power of provincial level authorities at the expense of prefecture and county level authorities. However, this strengthening of provincial level authorities has also empowered
provinces in relation to the center. While partially intended to reduce corruption, the results of this system have not been entirely positive, as tiao agencies are increasingly separated from the areas in which they work, decreasing their effectiveness. Moreover, some functional agencies have been centralized while others have not, with those focused on questions of financial affairs increasingly controlled by provincial level departments (as opposed to county-level bureaus), while those that deal with other affairs remain under the auspices of the prefecture or counties.

This soft centralization has extended down to the village level of governance as well through what scholars have called the “hollowing out” of the township level of government (which is the lowest formal level of the Chinese state, though party organization continues down to the village level) (Kennedy, 2007; Smith, 2010). This hollowing is most often associated with a series of reforms associated with the elimination of agricultural taxes in 2006 (Kennedy, 2007). However, Smith (2010) shows that this hollowing is actually part of a broader set of processes. In addition to the elimination of agricultural taxes that has starved local governments of revenue, this includes the centralization of some functions of the township government to the county level, a situation akin to that centralization of some county responsibilities towards the province (Mertha, 2005). Added to the loss of control of certain responsibilities to the kuai system, local township government officials have also faced increased pressures to replace lost revenue through increased investment, and to submit to increased inspections from upper levels of government.

Three important points are revealed by this examination of the soft centralization of power in the first decade of the 21st century. First, there has been an ongoing, if uneven, movement towards centralization from localities towards the provincial government of the core functions of the state since the mid 1990s. Second the FA framework has broad applicability outside of its origins in the policy sphere, and can be used to understand the substantive nature of state organization as
well. Finally, contemporary scholarship continues to draw heavily on this framework to make sense of the state, particularly at the local level.

An additional change in the fragmented authoritarian framework during the past decade has been the recognition of an increasing cacophony of groups seeking to influence state decision-making. This has occurred first through changes in the relative fortunes of different ministries (the promotion, for example of the Ministry of Environmental Protection from a state agency to a ministry, for example). However policy making now also receives greater influence from outside of the state. Mertha (2008), for example, examined through the rubric of dam building how new policy entrepreneurs, including journalists and NGOs, are not only resisting state policies, but also actively seeking to be involved in policy making. This constellation of groups seeking to influence policy calls for examining the role of the state through the broader domain of governance, rather than the narrower domain of policy.

The FA framework has been frequently applied to the management of water in China. The Three Gorges Dam was one of the case studies applied by Lieberthal and Oksenberg (1988), and has since been employed by several others (c.f. Boland, 1998; Mertha, 2008; Nickum, 2010). The central bureaucracy traditionally involved in water resources has been the Ministry of Water Resources. In the past decade state owned hydropower corporations have also been involved (Magee, 2006) and in recent years the Ministry of Environmental Protection has played an increasingly prominent role (Mertha 2008). The case of water management provides an example of one important way that state authority becomes fragmented: through the ambiguous definition of the functional limits of each tiao. For example, both the Ministry of Water Resources and the Ministry of Environmental Protection claim jurisdiction over water quality monitoring and
regulation (the responsibilities have not been thoroughly delineated), resulting in both organizations undertaking duplicative monitoring and planning efforts (Nickum, 2010).

A central contribution of this dissertation will be to apply the FA model to a broader understanding of the aleatory governance of water (detailed in section 2.3 below). This approach of viewing water through the Foucauldian apparatuses of security detailed below moves discussion of water in China from questions of management or policy and towards questions of governance. When water governance is conceived of in terms of hydrosocial relations as the governance of humanity’s relationship with water (see below), rather than as the access to and allocation of the biophysical resource of H₂O, a whole new gamut of functional bureaucracies become involved in the governance of water. Nor is this governance limited to state actors; these policies often promote the operation of market mechanisms to accomplish their policy goals. While the Bureau of Water Resources remains the central actor, local governments and agricultural bureaucracies that promote drought-resistant crops can also be seen to be engaging in water governance.

2.2.1.2. The Cellular State

The FA model says much about the structural form of the Chinese state bureaucracy, but to understand the role of the local state actors and their relationship with that structure I draw on Shue’s (1988) cellular model of state authority in China. The cellular state model, like the FA model, emphasizes different units within the state. Developed to account for the form of the local state during the Maoist period and its immediate aftermath, the cellular state model holds that local units of the state are largely self-contained, forming a honeycomb of state authority with each unit of local government largely walled off from other units of government. These groups experience great power of policy negotiations vis-à-vis centralized authorities. The local state
has the role of mediating between central state authorities and the local populace, sometimes enforcing state directives, sometimes modifying them, and sometimes behaving in a rent-seeking way. Many of the policies promulgated by higher authorities, including the water and agriculture ministries and central poverty alleviation offices that will be central to this dissertation, are implemented by township and village governments. This leaves substantial room for local leaders to negotiate state directives with local interests. Shue (1988) argues that this honeycomb pattern had long-standing roots in Chinese politics, but was intensified during the Maoist period. In the reform period the centralized state has endeavored to weaken the power of the local state while increasing the power of the central state by opening up more channels for lateral connections between units of local government, particularly through the market sector. This study will show that such a breakdown of the honeycomb society of the Mao (and earlier) eras had the effect of not only increasing central state power vis-à-vis the local state, but also heightening national integration. The means by which local peasants have become Chinese state subjects is largely through national market integration. Such a policy of national integration through market penetration was not incidental to efforts to extend state power. As section 3.2.2 will demonstrate, market integration was framed by academics concerned with regional integration during the 1980s quite explicitly in terms of being a project of national integration. In the Zuli Valley this policy has been implemented through the integration of cash crops detailed in Chapter 5.

2.2.2. The State and Security

Foucault’s notion of governmentality has been widely adopted in many facets of academic study including environmental governance (Agrawal, 2005; Birkenholtz, 2009a; Rutherford, 2007; Yeh, 2005, 2009) and development studies (Li, 2007; Watts, 2003). Foucault defined governmentality as “the ensemble formed by institutions, procedures, analyses, and reflections,
calculations, and tactics that allow the exercise of this very specific, albeit very complex, power that has the population as its target, political economy as its major form of knowledge, and apparatuses of security as its essential technical instrument” (Foucault, 2007, p. 108).

Governmentality has often been described as the “conduct of conduct” (Li, 2007) and is aimed at creating and shaping the desires of the population to meet the goals of the state. Foucault traces how government moved from other realms, particularly the government of the family and religious pastoral power, to be a form of power through which the state acts (Foucault, 2007). Government in this sense is the ‘proper disposition of things’ making sure that things work well through management. Most of the existing work on governmentality is based upon Foucault’s famous governmentality lecture presented on February 1, 1978, which has been available for many years (Elden, 2007b; Foucault, 1991). Only in recent years, however has a full translation of the course of lectures in which the concept of governmentality was developed been published, presenting governmentality in relation to Foucault’s related notion of security (Elden, 2007a; Elden, 2007b; Foucault, 2007). Here I am interested in examining one of the ideas that led to Foucault’s thinking about government: the expressions of power in apparatuses of security. For Foucault, apparatuses of security were the technique of power through which governmentality was expressed.

Foucault distinguished apparatuses of security from previous expressions of power by their emphasis on calculation, probability, and holistic thinking about the problems being governed. Apparatuses of security move away from defending the territorial integrity of the sovereign, and look instead at the security of the population from famine, plague, and other maladies. The population becomes the target of power, rather than the individual, as was the case under disciplinary power. Two elements of how apparatuses of security function will be examined in
detail here. First, for securing the population from such maladies a central notion depends on calculation and probability. In the following section of this chapter, I will examine how notions of chance and risk, in Foucauldian terms the aleatory, may be brought into the study of political ecology. For the remainder of this section I will focus on a second point of emphasis in Foucault’s conceptualization of apparatuses of security: an emphasis on circulation as a spatial expression of power. The promotion of circulation forms a central part of apparatuses of security, and circulation is an important point of departure for a geographic analysis of apparatuses of security because circulation represents a fundamentally spatial attribute of the expression of power.

It is worth considering the spatial operation of security through circulation in contrast to two previous modes of power that Foucault has discussed: sovereignty and discipline. These latter expressions of power are most clearly laid out in Foucault’s (1977) work Discipline and Punish. Sovereignty was a mode of power that relied upon the application of rules and law to maintain the sovereign’s power; this involved clearly establishing borders and defending borders (Foucault, 2007). Discipline shifted the target of power to the individual, and found its expression in three ways. First the spaces were created to be more open and more visible to those in positions of power allowing those with more power greater knowledge of the activities of subalterns. Second, discipline classified spaces according to where activities should and should not take place. Finally, discipline controlled individuals by limiting interactions within space (Foucault, 2007).

Security as a technique of power operates antithetically to each of these premises. Security emphasizes the movement of peoples, goods and ideas between places:

...we see the emergence of a completely different problem that is no longer that of fixing and demarcating the territory, but of allowing circulations to take place, of controlling
them, sifting the good and bad, ensuring that things are always in movement, constantly moving around, continually going from one point to another, but in such a way that the inherent dangers of this circulation are canceled out.— (Foucault, 2007, p. 65)

As a concrete example, Foucault argues that the ideal urban form for disciplinary power was modeled on the barracks—a space that is legible, ordered, and controllable—while urban planning under security was based upon promoting interaction between the town and its hinterlands, as well as trade with other towns. Circulation, the movement of things, populations and ideas, is the central means through which power is obtained, and that power is obtained to a different end. The expression of power is no longer focused on the safety of the sovereign and his territory, and instead focuses on the security of the population from the unpredictable vicissitudes of life. In addition to security promoting the spatial operation of circulation, as opposed to enclosure, Foucault identifies one other spatial metaphor through which security operates. Discipline operates in a centripetal way, through protection and enclosure. Security, in contrast, operates centrifugally: the operation of security is constantly expanding, enrolling new elements in “allowing the development of ever-wider circuits” (Foucault, 2007, p. 45).

While these forms of power—sovereign, disciplinary, and security—are presented in a roughly chronological order, Foucault takes pains to clarify that one has not superseded the others. Rather, state actors exercise each of these types of power at different times and to different ends. Foucault summarizes the objects of each form of power “sovereignty is exercised within the borders of a territory, discipline is exercised on the bodies of individuals, and security is exercised over a whole population” (Foucault, 2007, 11). In this scheme, aberrant cases, such as prisoners, are still treated by the disciplinary function of the state, while power over the population as a whole is exercised through apparatuses of security. The state might operate primarily through discipline in some state spaces, while operating through apparatuses of
security in other regions. In the following section, I will examine the changing form of the Chinese state in terms of these methods of understanding Foucauldian power.

### 2.2.3. Disciplinary Power and the Maoist state

During the Maoist period, the Chinese state instituted a reorganization of the countryside based upon a locally autarkic model of development that deployed a territorial strategy of power that can be described through Foucault’s model of discipline.\(^\text{14}\) Beginning in the mid-1950s, the central state in the PRC emphasized the role of the commune as the building block of the rural economy, and aimed for each commune to be largely self-sufficient and produce as much of its own materials internally as possible (Naughton, 2007; Shue, 1988). The result was a pattern of local units, particularly at the commune and township levels, that were isolated from one another and only reported vertically to the center: a pattern Shue (1988) has called the honeycomb of the cellular state. While the political structure of a local elite mediating between the central state and a local populace predated the PRC (Shue, 1988), the emphasis upon local reliance and self-sufficiency that was promoted during the Maoist period exacerbated this trend, and reframed a form of political control into the economic sphere. PRC policies also cut off existing trade networks between places, favoring instead increased self-dependence within each territorial unit. Indeed, during this period self-dependence came to be a valorized trait of each commune. This pattern of reducing inter-regional trade can be seen in the case of Eastern Gansu. While often presented as being timelessly isolated from other regions of China, during the early 20\(^{th}\) century, for example, Eastern Gansu was integrated into a broader economy through the opium trade

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\(^\text{14}\) Foucauldian approaches involving discipline have most often examined the effect of discipline upon individual bodies. In the case of China a particularly useful study of the Chinese state from this perspective is Dutton’s (1992) study of policing. Similarly studies of governmentality have generally focused on individuals, several studies including Yan (2008a) and edited volumes by Jeffreys (2011) and Zhang and Ong (Zhang & Ong, 2008). In the section and the one that follows I will examine the changing nature of state power in China from the perspective of Foucault’s analysis of the spatial dimensions of the exercise of such power presented in Population, Security, Territory (Foucault, 2007).
(Cressey, 1934) and Hui warlords played an active role as late Qing loyalists (Lipman, 1997). While opium cultivation in Gansu was a particularly noxious example, the policies of the PRC in the early Maoist period encouraged rural areas to be cut off even when their local specialty products were less illicit.

The closed nature of the local state was not limited to economic and political control. Through the Hukou system the closed nature of the Chinese state extended to the population as well as the trade. The Hukou bound peasants to their place of origin, making it quite difficult to move between rural areas. One notable example of the social consequences of this closed off model was the increase of endogamy within Chinese villages, breaking long-standing patterns of exogamy in rural China (Shue, 1988). Shue further describes that during the Maoist era young men from rural communes would volunteer to join labor teams sent by communes to construct irrigation projects because it was one of the only ways for peasants to leave the village.

This cellular model of the state exercised power from the center in a disciplinary fashion. Foucault identifies the territorial exercise of disciplinary power being one of gridding, separating, and visibility. Foucault describes the spatial exercise of disciplinary power as being the “…constitution of an empty, closed space within which artificial multiplicities are to be constructed and organized according to the triple principle of hierarchy, precise communication of relations of power, and functional effects specific to this distribution, for example ensuring trade, housing, and so on” (Foucault 2007, 17). In the Maoist era, rural spaces were demarcated into an administrative hierarchy, with each territorial unit occupying a specific place in the hierarchy of the Chinese state. Communication and trade between spaces at the same level (whether commune, township, or county) was sharply limited, with the expectation that all communication would travel vertically. The relationships of power within this hierarchy were
clearly laid out. Finally, the state juridically oversaw the distribution of most materials and goods, including food, housing, education, and medical care.

The central state enforced its power over local units of the state in two techniques associated with disciplinary power: statistical reporting and inspection visits. I argue that these forms of disciplinary power have persisted even as the central state has adopted a territorial apparatus of security as a fundamental economic paradigm. First, regular statistical reporting from local cadres up to higher authorities was required as a means of control. The fact that statistics were originally the science of the state has often been pointed out (Elden, 2007a; Foucault, 2007). Communes and work teams were given production quotas of products, particularly grains, a certain portion of which was to be sent upwards to higher units of government. Information about such production was to be provided by local government leaders who were themselves being evaluated. It should be no surprise that in a system wherein those who are evaluated by statistics are also those responsible for reporting statistics, incentives were in place for local leaders to fudge their numbers. The clearest and most tragic example of this occurred during the Great Leap Forward of 1958-1962 (Naughton, 2007), during which in an attempt to catch up and overtake Britain in steel production in 10 years an estimated 25-42 million people died from famine even as officials reported record harvests (Dikötter, 2010; Naughton, 2007). Indeed, according to Naughton (2007), the misrepresentation of statistics was a central cause of the famine because it encouraged central leaders to deploy resources away from agriculture and towards industry. By the later post-reform period local state officials learned to be more circumspect in their fudging of official statistics, recognizing the bounds to which they could underestimate agricultural production (Oi, 1989; Shue, 1988). The errors built into such compound reporting of statistics have come to be such that even the central levels of government
do not trust locally produced statistics. This distrust is so prevalent that vice-Premier Li Keqiang, who is widely expected to become the premier in the fall of 2012, has said that he considers Chinese GDP figures (upon which lower level cadres are evaluated) to be fabricated and therefore unreliable (Rabinovitch, 2010).

Statistical evaluation remains a central concern today, as is readily evidenced by the propensity of official announcements by local state actors to be filled with numerical data (cf. Hu, 2009). In the Reform and Opening Period, statistical reporting remains central to the operation of the rural Chinese state; however, the nature of the statistical targets has changed. During the Maoist period most reporting of targets was related to grain production, which was a central instrument of power and center-locality relations in rural areas (Shue, 1988; Oi, 1989). These grain quotas were then used to calculate taxes and grain extraction from rural areas. As recently as 1999, the collection of taxes was considered a priority of 95% of township officials in a 2006 survey by Smith (2010), a figure that had dropped to 0% following the rural tax reforms of the 2000s. In contrast today, the central concern of local state actors (and the basis upon which they will be evaluated) is the creation of economic growth through foreign direct investment. The emphasis on tax collection has been replaced by an intense focus on GDP growth, controlling population growth, and minimizing disturbances.

The second major disciplinary technique through which state power is operational in rural China is inspections from higher units of government (Oi, 1989; Smith, 2010). Because of the propensity of local leaders to dissemble their superiors through reporting, leaders often come to undertake inspections on the ground. The ritual role of these inspections in creating a symbology

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15 Another illustration of the low regard with which locally generated GDP statistics are held comes from a Chinese colleague (whose anonymity I will protect) who is an economist. He believes that local government GDP statistics are more accurate than they are given credit for. While I will not delve into his reasoning, what is interesting that that he considers putting faith in local government GDP statistics in China to be a heterodox opinion.
of state power will be discussed in greater detail in Chapter 3, but here I would like to focus on inspections as a type of disciplinary technology. Inspections were intended, like statistics, to provide the center with a clear view of what was actually happening in localities. Inspections were intended as a way for higher ups to confirm that local leaders were actually doing what they had reported doing. In her study of the Maoist period, Oi (1991) explains that inspection teams were most likely to check on those units that had become exceptional. Those local units of government that were considered poor or backwards, consistently failed to meet their grain production quotas would be inspected, and those units which exhibited exemplary production were also likely to attract inspection. Inspections during the Maoist period could take two forms: investigative work teams charged only with reporting, and intervention work teams charged with changing how management was completed. Regardless of the visibility created by work teams during the Maoist era, penalties for those committing transgressions remained fairly light (Oi, 1989), with sanctions being determined by the offender’s direct superiors. Thus the role of inspections was disciplinary, but limited. According to Oi “(as) a rule, state control was not based on surprise inspections and objective outside investigations. The bulk of regulation was through routine reports augmented with spot checks” (Oi, 1989, 102). Those local cadres who could keep their reports to the central state within broadly acceptable limits were unlikely to solicit spot inspections.

During the Maoist period state power relations between central and local state actors were conducted through Foucauldian apparatuses of discipline. Spaces were classified and statistically measured. Reporting requirements were created to make the local state visible and legible to central state actors. This legibility was created such in a way that local state actors would know that their actions were being monitored, and self regulate accordingly. The central
task of the state in rural areas at this time, the extraction of grain, was carried out in a way that is quite similar to Foucault’s description of disciplinary apparatuses for grain management in early modern Europe as “a series of controls on prices, storing, export, and cultivation” (Foucault, 2007, p. 32). Specific targets were set for each work unit of the local state for production. Grain was prized above all other crops, and various forms of discipline were instituted to ensure that such grain was indeed produced (Li, Wang & Jia, 2011). State units were expected to be self-sufficient, and grain and other goods were to circulate vertically (both from rural units toward centralized units, and from centralized units to cities and disaster areas), never between horizontal units (Shue, 1988). With the Reform and Opening Period, the economic policies of discipline would be displaced with ones of security via circulation, while the disciplinary nature of the state structure would remain.

2.2.4. Circulation and Apparatuses of Security in the Post-Reform Period
While the organization of the party-state in China remains based on disciplinary mechanisms, the implementation of policy has largely shifted from apparatuses of discipline towards those of security. The liberalization policies of the Reform and Opening Period have entailed many things, but one of the central features of the reform and opening was a shift of the economic sphere from expressions of power based on discipline through the constriction of movements towards operations of power based on circulation. One definitional feature of apparatuses of security is their promotion of circulation, in contrast to closure that characterized apparatuses of discipline. Foucault gives the examples of the promotion of trade both in early modern urban planning, and in the implementation policies to prevent famine through grain trade. What is important in both cases is that power was implemented through the movement of goods, ideas, and peoples. If disciplinary power had been achieved through the constriction of movement, governance was achieved through the cultivation of circulation.
In the post-reform period Chinese strategies of rule have focused largely around the promotion of circulation. These circulations have involved food, finance, and human populations. Perhaps the clearest example of the promotion of circulation in the Reform and Opening Period can be seen in the early economic policies that were intended to open up agricultural production in the countryside. These policies allowed for the first time trade between different localities for essential produce. Shue describes the change from a rural structure based on local autarky to one based on circulation:

*These old cell-like communities and bureaucratic units are now being overridden by new systems and organization that are urged to spread and sprawl, free-form and web like, as they follow the “natural” networks of commercial exchange between city and countryside. Small companies and corporate business entities, scanning the horizon for opportunity and profit, have been formed out of what before were inward-looking and fairly self-sufficient brigades, communes, or counties.* Shue 1988 pp. 131

The policies of the central state in the post-reform period encourage commerce between localities and specialization within places and trade between them. Perhaps the clearest example of this shift can be seen in the case of the management of food in rural China, which can be placed in direct conversation with Foucault’s analysis of apparatuses of security that took as a central example the regulation of the production of food of the Physiocrats. As described above, prior to reform and opening, China’s policies towards food management bore an uncanny resemblance to the disciplinary apparatuses used to maintain food price stability discussed by Foucault: quotas on production, grain taxes in rural areas used to subsidize urban populations, control of storage and distribution, limitations on trade in food outside of the state, and prohibition on non-grain food crops. The food security policies of the PRC in the Maoist era (which had roots far deeper in imperial history) closely resembled the politico-juridical apparatus described by Foucault.
One of the central impetuses of the reform and opening policies was China’s rapidly increasing grain imports in the late 1970s, and a realization that constraints on agricultural production were to blame for these. Grain imports grew from 5.69 million tons in 1977 to 10.69 million tons in 1979 (Li et al., 2011). Two reforms were introduced to address this problem. First, a process of gradually relaxing the grain purchasing system to allow for more grain to be sold to the state at prices above those officially set by the state (Li et al., 2011). The second reform was the introduction of the household responsibility system, which contracted plots of land to families to farm. What is clear from the origin of the Reform and Opening Period, however, is that it was born of a crisis. This crisis had much to do with food production, and was fundamentally centered in the rural areas, thus the earliest reforms in the Reform and Opening Period were focused around agricultural production and increases in circulation.

The Reform and Opening Period has been marked by a gradual reduction in the role of the state in controlling of grain. In fact, some of the first policies of the Reform and Opening Period were a series of technical changes to how grain was procured (Li et al., 2011). These changes were followed throughout the Reform and Opening Period by a series of policy steps to liberalize trade in grain; however, these changes have not been unidirectional. During both the 1980s and 1990s, policies to liberalize the staple food system were made, only to be rescinded at the first bad harvest (Li et al., 2011). By the final set of reforms in 2004, the state had settled on a primarily market form of grain distribution (though the state maintains a role in purchasing and storing grain). By 2006 the millennia old agricultural production tax (which was initially a means by which the state appropriated grain) was eliminated (Kennedy, 2007). Each reform in this series of reforms represented a move towards relying on apparatuses of security that were based upon circulation to provide sufficient grain. The logics involved were similar to those presented...
by Foucault, namely that allowing markets to increase prices would encourage work teams, and later farmers, to plant more grain. Each of these reforms has paralleled the logic that Foucault uses to describe the Physiocrats, promoting trade between places and the movement of grain to allow for ‘natural’ processes to take their course.

Beyond the cultivation of grain, agricultural policy in the Reform and Opening Period has encouraged different locales to specialize in locally unique or appropriate crops. Mechanisms of trade between different places will then lead towards rural development. This specialization in agriculture has lead to a decrease in the percentage of cultivated land planted to grain from 80.3% to 68.3% between 1978 and 2008, with specialty crops expanding correspondingly (Alpermann, 2011). Chapter 5 will examine this process in greater detail in Dingxi, but it should be clear that specialization of agricultural production into locally unique products relies upon the promotion of circulation as a means of economic governance. Each region is expected to specialize, and those things that it produces will then circulate throughout the country. The state has supported this circulation, both through the reduction in control of economic production, and through the promotion of means of circulation, namely transport infrastructure. This encouragement of local specialization at the township level has gone beyond agriculture to include small-scale industry, which led to the proliferation of township-village enterprises (TVEs) that drove much of the economic growth during the 1980s. As Huang (2008) has pointed out, these enterprises accounted for the most significant source of economic growth during the early 1990s. Oi (1992) has characterized the expansion of TVEs in the 1990s as an example of local state corporatism, which she used to mean “the workings of a local government that coordinates the economic enterprises in its territory as if it were a diversified business
corporation” (Oi, 1992, pp. 100-101). The role of the local state under this model of local state corporatism was to promote the production of materials by the local state that could then be used to circulate to other regions of China and the world more broadly. The local state was not responsible for overseeing such circulation; rather this was the role the local state was to assume in the new make up of national power (Oi, 1992). The political logic that supports TVEs and supported increased specialization and trade between places was quite explicitly one of circulation. Wealth and prosperity to aggrandize the state were promoted through increased movement of goods. Chapter 3 will show that during the 1990s such policies were widely viewed as a way by which regions of the west could be integrated with the rest of China. This vision for rural governance is quite the opposite of the autarkic, disciplinary grain regime that characterized the Maoist period.

If the means through which the central state exercised power over the polity of China shifted from apparatuses of discipline during the Maoist period to apparatuses of security during the Reform and Opening Period, the means through which the state actors related to one another displayed a remarkable continuity. The different levels of state functioning continue to operate through the disciplinary methods of legibility that have existed since the Maoist period. Township leaders continue to chafe under the reports filled with metrics that they must send to their superiors (Smith, 2010). If anything, the threat of inspection visits from higher levels of

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16 It should be noted that Oi and Huang present a slightly different picture of vision of the nature of TVEs. Oi’s approach reflects the widespread opinion in literature that TVEs were primarily owned and operated by the local state (if often to the benefit of local leaders). Huang’s analysis of a data set of TVEs kept by the Agricultural Bank of China shows that 10 million of the 12 million TVEs established during the 1980s were owned privately (Huang, 2008). This discrepancy, however, does not change the central analysis that the role of central state actors acted to promote circulation.

17 Local state corporatism arose during a period of fiscal decentralization. While the purpose of these reforms was to reduce the fiscal burden on the central state, they emerged in the context of promoting entrepreneurialism at the local level. Fiscal decentralization occurred contemporaneously with the reduction in limitations on trade between localities. In this way fiscal decentralization should be seen as part of a broader process of moving state power from disciplinary mechanisms to apparatuses of security.
state organization has only become more serious in recent years, and local officials are as adept as ever at responding to and evading such scrutiny. Thus, the disciplinary apparatuses through which state power emanates from the center to the locality are little changed from the Maoist period. Yet the policies that it introduces have switched largely from those that are disciplinary, to those that rely upon questions of security.

Even at the local level, state actors have come to be held responsible for promoting circulation. For example, starved of local tax funding through the tax-for-fee reforms of 2006, local governments now spend more of their time courting investment (Kennedy, 2007; Smith, 2010). This illustrates that state actors relate to one another through different apparatuses of power than those through which they relate to society. Power is expressed between state actors through ongoing disciplinary mechanisms, whereas power is expressed over society through mechanisms of security. This marks a change. During the Maoist period discipline was the central means through which the power was both diffused from the center to local governments, and how local rural governments related to society.

The disciplinary technique of power used by the early Maoist state are perhaps not surprising given the military origins of the Communist Party’s organizational structure. The military has been one of the central institutions identified with discipline (Foucault, 1977; Foucault, 2007). The organization of the CPC was based on a military model; the use of the words cadre to describe those who do the work of the party-state indicates this affiliation. During the Maoist period there was not a distinction between the party-state and society: the entire polity of China was governed through a common disciplinary structure. During the Reform and Opening Period a separation has emerged in the disciplinary structure of the state. While the state power continues to be expressed internally through discipline, the apparatuses of security are
what separate the state from society. In this way the governmental forms the basis of the division between the state and society. For the purposes of the present study this distinction will be useful in understanding the distinction of how power operates on state actors in contrast to society at large. As a concrete example, Chapter 4 will illustrate how the elements of a rainwater harvesting program made it particularly attractive to local officials who needed to show accomplishments to their superiors within a two year timeframe, but the operation of power of this program over project recipients was more diffuse and operated through the governmental effects of development.

While it should be clear that apparatuses of circulation secure well-being for the population, such changes must also be understood in the context of the shifting power relations between central and local state actors. The promotion of circulation and the breakdown of the autarkic, cellular model of the state was intended at least in part to weaken local state actors vis-à-vis the central state (Shue, 1988). For this reason Shue argued that the liberalization of the Chinese economy must be understood as in fact being a means of centralizing state power. Indeed it is perhaps telling that those portions of the state that first experienced “soft-centralization” beginning in the late 1990s were bureaucratic organizations charged with promoting commerce (Mertha, 2005). In other words, those state actors charged with promoting orderly circulation were the first to be centralized towards the provincial level.

This section has shown that the Chinese state is not a unitary thing acting in the world, but is rather an assemblage of actors acting with the authority of state power. These actors do not always share common goals, and often act at cross purposes to one another. In particular a tension exists between local (county, township, and prefecture) state actors and those of the central state. I have further argued that the Reform and Opening Period has effected a profound
shift in the mechanisms through which state actors express power. While in the Maoist period power was characterized by a disciplinary apparatus that extended power in a disciplinary form from the central state to the lowliest peasant, in the post-reform era the central state has adopted strategies of security based around circulation. When expressions of power by state actors based upon security versus discipline are employed, these result in the creation of a separation between state and society. The changing nature of these expressions of power has particularly been clear in the control of grain supplies, a problem that illustrates the aleatory, towards which this chapter will now turn.

2.3. Aleatory Political Ecologies of Water

A third and final vein of literature to which this dissertation contributes is the political ecology of water. In this dissertation I hope to show how an engagement with Foucault’s understanding of the aleatory—that which arises through the management of chance and scarcity—might inform our understanding of the political ecology of water. The biophysical nature of water as a resource upon which humans are intrinsically dependent and therefore acutely sensitive to shortages and variability makes this a particularly fruitful vein of research. I will begin by analyzing some of the existing literature on the political ecology of water. I will argue that much of this fits into what I call an access and allocation paradigm. These studies have focused on who controls access to water, how water is allocated, and how that access and allocation is both affected by and affects larger power relations. Studies of access and allocation have revealed the role of water in state-building (c.f. Mitchell, 2002; Swyngedouw, 1999; Worster, 1992), examined the distribution of water as a common good (Ostrom, 1990), explored how changes in agricultural water access have changed the relative fortunes of different social groups (Birkenholtz, 2009b; Dubash, 2004; Gidwani, 2002), and emphasized social equity and
struggles over water provision (Perreault, 2005; Swyngedouw, 2004). But research on access and allocation has not treated merely the political economy of water distribution. Budds (2009), for example, has examined how scientific discourses surrounding irrigation water were constructed to serve specific actors in Chile, while others have examined the role of water allocation institutions and policies in producing scales (c.f Budds, 2009; Budds & Hinojosa-Valencia, 2012; Norman & Bakker, 2009). Similarly, several scholars have tried to illustrate the ways that water is a hybrid entity that is both the venue and outcome of power struggles over access (cf. Bakker, 2002; Kaika, 2006; Swyngedouw, 1997; Swyngedouw, 1999; Swyngedouw, 2004; Swyngedouw, 2007). I do not wish to claim that these studies have been merely about access and allocation as many studies engage such concerns in unique and different ways. Rather I wish to emphasize that access and allocation has been a central organizing theme in the literature on the political ecology of water in general, and the political ecology of agricultural water in particular.\footnote{There are, of course, several examples of political ecology of water that does not focus on access and allocation. Two notable examples are Jamie Linton’s (2008; 2010) deconstructions of hydrological sciences and Prudham’s (2004) study of water pollution in Ontario.} I hope to turn this thinking ninety degrees and examine the political ecology of water from a perspective than emphasizes the aleatory—the unpredictable and contingent. The study of the aleatory was a contribution of Foucault’s biopolitical writings that has not yet been applied to political ecology. In this way instead of asking as Perreault eloquently has “how decisions about water resources are made, by whom, at what geographical scales, and to whose benefit” (Perreault, 2008, p. 835), I ask how the shortage and unpredictability of water are governed, by whom, at what scales, and to whose benefit? This is not to say that questions of scarcity have not been studied before; there are many excellent studies in which the role of chance and the potential shortage have played a role (cf. Bakker, 2002; Birkenholtz, 2009b;
Budds, 2008). But while these studies have considered the role of the aleatory, it has not been the central concern of these studies. In this dissertation I will take the aleatory as the central organizing principle by which I will study water. Engaging with the aleatory allows the examination of water governance under situations of uncertainty. This approach is particularly useful in addressing situations where climate plays a significant role in water governance, such as semi-arid environments, and has the potential to address questions of water availability under conditions of increased climate uncertainty.

Some conceptual definition is in order to understand the different strands of thought around water resources. Much of the work within the political ecology of water has been based on a materialist critique that draws on Smith’s (2008) work on the production of nature through capitalist circuits of power (Bakker, 2002; Kaika, 2006; Swyngedouw, 1999; Swyngedouw, 2004; Swyngedouw, 2007), and often adds approaches based on actor-network theory and hybridity (cf. Furlong, 2010; Linton, 2010; Swyngedouw, 1999; Swyngedouw, 2004). Acknowledging the social meaning that has come to be borne by water has resulted in water taking on two unique meanings best stated by Bakker’s (2002) contrast between H₂O, the chemical, and water, a material product that embodies social, cultural, and economic relations in addition to H₂O. This distinction between water as a socially embedded material tends to take as a starting point Illich’s (1985) *H₂O and the Waters of Forgetfulness* (Bakker, 2002). In this monograph Illich argued for exploring the history of water with its local social imbrications. Viewing water as a historically disembedded thing, as merely H₂O, loses sight of the various social meanings historically associated with water. As I use the terms in this particular case, ‘water’ will refer to the chemical H₂O as used, transformed, and imbued with social meanings by humans. I will use the term ‘biophysical water’ to refer to the chemical substance of H₂O largely
stripped of those meanings, as well as those programs that affect primarily this biophysical resource. In this way when I speak of humans’ relationship with water, I mean water as a broader concept including social factors. In contrast when I speak of the management of biophysical water, I refer to the disposition of the chemical H₂O. This distinction will be important as many of the types of water governance activities that I mention do not involve directly allocating, managing or transforming the biophysical resource of water itself.

2.3.1. The Aleatory and Hydrosocial Governance

Foucauldian approaches have received relatively little attention in the literature on the political ecology literature of water (Ekers & Loftus, 2008), despite a great interest in Foucauldian governmentality approaches in political ecology more broadly (Agrawal, 2005; cf. Rutherford, 2007; Yeh, 2005). Though not the first to engage with governmentality in the management of the environment, Agrawal’s (2005) volume Environmentality is perhaps the clearest example of this engagement with Foucauldian approaches. Most of the writing on green governmentality has been based upon the earlier publication of Foucault’s Feb. 1978 Governmentality lecture (Foucault, 1991), as the full course of Foucault’s lectures on biopolitics were not available in English until quite recently (Elden, 2007b). Earlier in the biopolitics lecture series Foucault had much to say about how he viewed the relationship between ‘nature’ and government, a theme that I will explore below. The previous section of this chapter discussed Foucault’s notion of apparatuses of security that emerged as an early form of government. Such apparatuses emerged largely to address problems that were aleatory in character.¹⁹ The aleatory

¹⁹ Elden (2007a), and Holden and Elden (2005) have pointed out that there are significant parallels between Foucault’s use of the aleatory and Althusser’s calls for an aleatory materialism in his later work. Notably, both engagements with the aleatory arose from their respective author’s engagements with the writings of Machiavelli later in their careers. Give the strong influence of materialist thinking in political ecology, Althusser’s call for an aleatory materialism provides another potentially fruitful venue for political ecological research, though one that lies beyond the scope of this dissertation.
is as defined the “chancy, the risky, the contingent” (Elden, 2007a), and is fundamentally that which is left up to chance or unpredictable. Apparatuses of security, in contrast to apparatuses of discipline, acknowledged this chance and sought ways to work within and around it. While the role of the aleatory in Foucault’s work on biopolitics and governmentality has begun to receive some attention within human geography (Elden, 2007a; Elden, 2007b; Holden & Elden, 2005), to the best of my knowledge there has not yet been an engagement with this work from within political ecology. I will argue that the aleatory forms a significant part of what constitutes ‘nature’ for Foucault in his Governmentality Lectures (2007). To be clear, the reading I will present of Foucault clearly places ‘nature’ as something that is socially produced. Yet, in identifying what various political actors naturalize, Foucault reveals an inclination to see the contingent aspects of governance as those things that are assigned to the realm of nature. Examining the aleatory in Foucault’s description of nature will allow us to think through government of the environment in new ways. The 17th century shift towards expressions of power based upon security represented a new willingness to work with phenomena such as population and milieu that were considered natural, and to engage with the contingencies, conjunctures, and uncertainties that accompanied this naturalness. I will present this through two examples. First, Foucault’s discussion of how population is ‘naturalized’ and second Foucault’s idea of the milieu. This equation of the aleatory with the natural then opens a space for thinking about the role of the aleatory and mechanisms to control it in political ecological thought.

2.3.1.1. Nature and the Aleatory in Foucault
Foucault’s linkage between the natural and the aleatory in his 1978 lectures, Security, Territory, Population can be seen in how population is made to seem something ‘natural’ by Physiocrats writing about the governance of population. Much of Foucault’s discussion of how
the Physiocrats associated population with ‘naturalness’ when it emerged as an object of
governance focused on the unpredictability or variability of population. Foucault identified this
‘naturalness’ of population as appearing in three ways:

1. Population varies with myriad factors that cannot be changed by mere
decree. This is not to say that population cannot be changed, but to do so requires
making changes beyond the scope of the object of power (i.e. population).
2. Population is made up of different individuals whose behavior cannot be
predicted. However, what all these people share is a common drive of desire.
3. Despite the variances between individuals in the population, there is a
generalizable “constancy of phenomena”.

Each of these three descriptions of ways that population is a ‘natural’ phenomenon
emphasizes the inherent contingency and variability of population. Questions of variability,
chance, and conjecture dominate Foucault’s description of population as a natural phenomenon.
His first explanation of naturalness emphasizes the variability of population according to
multiple different factors, and these factors are too many to be known or directly controlled.
Population is then natural because it cannot be predicted. In his second and third explanations of
naturalness, the individual is too complex to be predicted. In each, the exercise of power over
population as a ‘natural’ object must work with and shape to its own ends this very
unpredictability. The task of government is to figure out how to manage, rather than overcome,
this variance. What I hope to emphasize here is that the ‘nature’ in population for Foucault is
based upon the aleatory. In each case that Foucault presents to explain why population was
viewed as natural by the Physiocrats he has emphasized the imprecision with which the behavior
of individuals within a population can be known. The population is then like other natural
phenomena, with inherent qualities, but also unpredictable and not directly governable by the
sovereign. The shift from discipline to government was ultimately a shift from trying to directly
control such nature, to trying to manage it, interact with it, and work with it.
2.3.1.2. **Foucault’s Milieu and Nature**

The second way that we can see the idea of nature in Foucault’s discussion of security is through his discussion of the concept of ‘milieu’ in reference to 17th century urban planning.\(^{20}\) Foucault described milieu as the “determining factor of nature” (Foucault, 2007, p. 23), and milieu in some ways resembles the notion of ‘environment’, but is also both a space of conjuncture and the arena in which apparatuses of security are played out. Nature, in Foucault’s milieu was concerned with events and chance, but was also an object that the sovereign could aim to shape to the ends of state power. In some ways Foucault’s descriptions of milieu are remarkably similar to the notion of environment, as, for example, when he describes the milieu as being “a set of natural givens—rivers, marshes, hills—and a set of artificial givens—an agglomeration of individuals, of houses, etcetera. The milieu is a certain number of combined, overall effects bearing on all who live in it” (Foucault, 2007, p. 21). In this description, milieu seems quite similar to the notion of environment: a medium that humans live in that contains both natural and human constructed elements. Yet as noted above, a central feature of this environment is its aleatory character. The space that makes up a milieu is similar to the notion of environment, but constituted by a series of uncertain and possible events. Foucault also describes milieu as a “space in which a series of uncertain elements unfolds” (Foucault, 2007, p. 20), Foucault goes on to describe many of these events as “quasi natural” (Foucault, 2007, p. 21).

Natural, here as in his description of the naturalization of population, means aleatory. Similar notions of unpredictability as were seen in the naturalization of population, due at least in part to a wide-ranging number of variables that act upon milieu, make milieu something that cannot be as effectively controlled through disciplinary power. Yet, like population, milieu is an object upon which the sovereign can act, and through which the sovereign can directly exercise power

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\(^{20}\) This discussion of milieu takes place primarily in Foucault’s lecture on January 11, 1978.
over the population. It is worth quoting Foucault’s description of this new role for the sovereign at length:

...but the sovereign is no longer someone who exercises his power over a territory on the basis of a geographical localization of his political sovereignty. The sovereign deals with a nature, or rather with the perpetual conjunction, the perpetual intrication of a geographical, climatic, and physical milieu with the human species insofar as it has a bond and a soul, and physical and a moral existence; and the sovereign will be someone who will have to exercise power at that point of connection where nature, in the sense of physical elements, interferes with nature, in the sense of the nature of the human species, at that point of articulation where the milieu becomes the determining factor of nature. This is where the sovereign will have to intervene if he wants to control the human species... (Foucault, 2007, pp. 23 emphasis mine).

There are a few interesting points in this passage. First nature is closely associated with conjuncture, or the aleatory. Second, the sovereign is someone who creates the milieu through his governance of the connection between biophysical nature and human nature (the inherent characteristics of humans). Finally, that exercise of power over the connection between human and physical natures is how governance of humans is ultimately expressed. Thus shaping (though not transforming wholesale) the environment through milieu is a significant way that governance of populations is accomplished. The milieu is then an expression of nature through the aleatory, but also a central medium for the governance of populations.

In both the Foucault’s examination of how the Physiocrats naturalize population, and his discussion of milieu, we see nature as centrally connected to the idea of the aleatory in Foucaults work. This connection is not exclusive. Things may be aleatory that are not natural (such as the behavior of invading armies) and Foucault would likely identify elements of ‘nature’ that are predictable. For the purposes of government as a technique of power, Foucault would likely be uninterested in the former, as those things that can be fully predicted (for example the sunrise) require none of the calculations that go into government. The former (unnatural things that are
aleatory) are in the language of government often naturalized. For example, central tendencies and predictability are found in the behavior of people in reacting to famine. Nature, for Foucault, then refers not only to the biophysical world and the unpredictability inherent therein, but also to the central tendencies and predictability that emerge out of variation among human phenomena.

2.3.1.3. Governing Nature

If governance of the population is to be achieved through the manipulation of the milieu, the sovereign must act to govern it in two ways: first, the sovereign must act on a wide range of factors that seem far removed from the central object of governance, whether that object is urbanization, grain, or disease, the sovereign will act on phenomena that appear remote from the object of governance; second, the sovereign must not act against nature, but instead must work with it. The first holistic approach to governance can be seen in Foucault’s discussion of encouraging the growth of population “…one must act on a range of factors and elements that seem far removed from the population itself and its immediate behavior” (2007, p. 72).

Population is the focus of a web of interrelated social and environmental processes that interact to affect the population. Government involves the identification of which variables may be altered among the constellation that within problems related to population exist. Factors that affect the rise and fall of food prices include the price of food in the countryside, the cities, and foreign countries, the weather, and juridical state actions to control food markets. Apparatuses of security then involve taking a holistic view of a problem such as the management of food security, identifying connections that are not directly tied to the object itself, and aiming to act upon those indirect forces.

In addition to thinking through the object of power holistically, the sovereign must also look for ways to work with nature, rather than against or above it. In describing the birth of population as a form of nature, Foucault writes of:
“...the entry of a “nature” into the field of techniques of power, of a nature that is not something on which, above which, or against which the sovereign must impose just laws. There is not a nature and then, above nature and against it, the sovereign and the relationship of obedience that is owed to him. We have a population whose nature is such that the sovereign must deploy reflected procedures of government within this nature, with the help of it, and with regard to it. (Foucault, 2007, p. 75)

Nature (in this case population, but equally milieu) is not something that governmental techniques aim to alter. Rather apparatuses of security aim to work with nature, taking account of it and using nature to achieve governance. When considering the role of conjuncture or the aleatory, in making nature, this means that apparatuses of security embrace and work with elements of chance. In Foucault’s study of grain and population, this meant accepting that high grain prices would lead to localized grain shortage, but would also induce the planting of more grain. In this case embracing “natural” patterns of grain production allowed the governance of the population as a whole.

There are parallels to be seen between Foucault’s discussion of how grain shortages were governed in 17th century France and the management of water. Most notably, both water and grain (as a primary food) are central to human life, and have few substitutes.21 Both of these cases of government involved the mitigation of the probability of an event of scarcity. The dearth in grain (la dissete) that Foucault examines is not exactly famine, but instead is widespread present shortage (Foucault, 2007, p. 30). The governance of grain through apparatuses of security then emphasized reducing the probability that the event of a dearth of grain would arise by working with those parts of the system that were believed to be ‘natural.’ This framework of managing dearth through probabilities and working with ‘natural’ parts of a broader system may also be applied to the management of water. Much of the provision of water is based around the

21 One significant difference between grain and water lies in their fungibility. While grain is perhaps the most easily commoditized object (Cronon, 1991), water is among the most difficult to commoditize (Bakker, 2003).
prevention of a dearth of water. In agricultural water, and rural water supply more broadly, such a dearth may arise on an annual basis (as in monsoon climates) or an inter-annual basis (drought). The Zuli River valley examined in this case study experiences both of these trends, experiencing both high inter-annual variability and a distinct monsoon pattern through which approximately 60% of its rainfall falls between the months of July and September (Wei et al., 2005). This research will illustrate that state actors in the Zuli Valley have, like the Physiocrats in Foucault’s analysis of food security, recently attempted to govern water by working with nature, rather than against it. These policies have tried not so much to eliminate the occurrence of drought as to minimize their impacts when they do occur. Like the physiocratic management of grain, these policies have made this change by taking a holistic view of the problem of water scarcity, identifying variables that influence water scarcity that are distant from the immediate problems of drought. Water governance then must look beyond the management of the biophysical resource of water, to consider human-water relationships within a broader set of social processes. I will now turn to some of the existing literature on political ecology and outline how the exploring the political ecology of water from an aleatory approach might further our understanding of water.

2.3.2. The Political Ecology of Water

2.3.2.1. The Biophysicality and Materiality of Water
A central contribution of recent work on the political ecology of water has been an emphasis on the particular material properties of water. There are at least three traits of water that make it different from other resources (of course, most types of resources have unique physical properties). First there are no known substitutes for the uses to which water is put in human life (in this way water bears some similarity to grain which will be discussed below). Water is essential to human life. Secondly, water is a flow resource: it is a fugitive resource that can
escape being appropriated, but also provides a means of externalizing pollution (Bakker 2002). Finally, water is heavy. This has led to the characterization of water being difficult to transport, but easy to store (Bakker 2002). A slightly more nuanced view of the consequences of the weight of water is that water is fairly inexpensive to transport after an initial high capital investment, and ongoing investments in maintenance. In other words water has high initial capital costs combined with low marginal costs. Bakker (2003) has argued that these attributes have made water particularly difficult to commoditize. While water has successfully been privatized (run by private companies instead of state actors) and commercialized (operated according to market or market-like principles), it has never been fully commoditized (become an exchangeable good) because of its unique biophysical properties that make creating redundant water systems uneconomical and place additional political pressure on water providers due to its uniquely central role in human health.

One biophysical attribute of water that has been rarely directly considered as part of its materiality is its aleatory nature. This is not to say that studies of humans and water have not considered how the unpredictability of water interacts with humans (cf. Bakker 2002; Birkenholtz 2009; Birkenholtz in press; Budds 2009; Truelove 2011), but rather that they have not focused on this as an element that is central to water’s material uniqueness. While water is not the only resource that has an aleatory nature, the specific aleatory nature of water is unique. Water resources, particularly in arid and semi-arid environments, are often characterized by both seasonal and inter-annual variations in water availability (Jones, 2010). Such variations occur whether water arrives through rainfall or from riverine sources. The chance or contingent aspect of water tends to show up through an event of a water shortage or inundation. To understand that the aleatory nature of water is rooted in its biophysical nature it can be compared to another
resource, minerals. While discovering minerals may be a matter of chance, once discovered, mineral resources rarely disappear on their own. Water, in contrast, is a flow resource that inherently requires work to capture and is dependent on uneven rainfall. There are two biophysical reasons why water is a particularly aleatory resource. First, as others have identified, water is a flow resource that will, in contrast to minerals, often disappear on its own. Thus water in riverine sources is a fugitive resource. Second, usable freshwater arrives in the form of precipitation, which can vary intensely between both seasons and years. Thus much of human control of water resources is dedicated to averting such events and making water availability more predictable. Thus one way that the materiality of water interacts with social and economic institutions that support it is through its frequent and unpredictable absence. To be clear, not all water management is designed to ameliorate the problems of water shortage; piped drinking water, for example, can equally be seen as a labor saving device. But many of the investments that are made, particularly in irrigation systems, can be seen as ways of mitigating the effects of both seasonal and inter-annual variation.

2.3.2.2. Biophysicality and the Access Allocation Paradigm

Studies of the role of water in interacting with society are often traced back to Wittfogel’s Oriental Despotism (1957) that, drawing on Marx’s notion of the Asiatic mode of production, argued that the extensive labor required to maintain irrigation systems in Asian countries led to a natural tendency towards despotism. While the theory of Oriental Despotism has not been empirically sustained, it is perhaps a classic case of the access allocation paradigm. Wittfogel hypothesized that certain types of water provision required extensive social organization that led to despotic states. Wittfogel’s central point about irrigation management as the catalyst of authoritarian states lies in one particularity of the material nature of biophysical water: its heavy and flowing properties require infrastructures that demand high levels of investment and high
ongoing maintenance costs. To make water resources usable requires heavy investment in physical infrastructure—be it tubewell and tank irrigation in India, or irrigation based on canals in China and the Andes—before a resource can become productive. In studying irrigation as a form of commons management, Mark Baker (2008) has pointed out that irrigation is unique in that the resource does not exist in a usable form until a community makes the investments necessary deliver to it. While particularly true of irrigation, this is a trait that applies to lesser degrees to drinking water as well. The high level of infrastructural investment related to water development, high pay-offs to making investments in water, and the high level social organization (in various forms) that accompanies that development, has led water resources to become a particularly viable form of power container.

The complex nature of water resource control can be viewed through Ribot and Peluso’s (2003) theory of access, which reconceptualizes access as a web of power relations (in contrast to the long-standing notion of property as a bundle of rights). Two fundamental elements of the theory of access are: mechanisms to control access, that is, limiting who may benefit from a resource, and mechanisms that maintain access, that is mechanisms which keep a resource viable and accessible. Because mechanisms to maintain access to water resources are relatively cost intensive, incentives for control are also relatively high. This is perhaps a central reason why access to water has been associated with state power by Marx and Wittfogel, but other types of social institutions can use water as a form of power container as well. The result of demand for high levels of infrastructure has been that water resources in general, and irrigation in particular, have required extensive social systems to support their management. However, contra Wittfogel, these social systems need not be state based. Scholars have noted four general types of actors that gain power over and through water resources: state institutions, community institutions,
commercial institutions, and religious institutions. For the sake of brevity, I will limit my
discussion to the first two.

Much of the theory of water management has focused on state institutions in water
management (c.f. Bakker, 2002; Wittfogel, 1957). Theories of water as a basis for despotic
power have been replaced by theories that treat water as a medium for power of the modern,
scientific state (Boland, 2006; Kaika, 2006; Swyngedouw, 2007; Swyngedouw, 2009; White,
1996). In these cases, water allows the state to gain power through rational scientific calculations
that are underwritten by an ideology of modernity. Boland (2006) has illustrated how as a
medium of state power water has been intimately involved in the mediation of state in society.
Delivery of water in urban China has illustrated the changing relationship between the state and
society through the mechanism of law. This case illustrates that the biophysical nature of water
requiring complex organization for distribution also mediates the state’s changing relationship
with society in terms of laws.

In cases where water management is carried out by state actors, recent research has shown
that processes of state management are far more variegated than prior treatments (e.g. Wittfogel)
would suggest. Mertha’s (2008) study of dam building in China illustrated that even the most
capital intensive and centralized form of water management in China involves complex
mediations between different organs of the state, as well as those outside the state. Magee’s
(2006) study of hydropower development in Southwestern China similarly illustrated that state
construction of dams was not achieved in a unitary fashion, but involved negotiations between
different regional branches of the state. Similarly, Zimmerer’s (2000) historical study of
irrigation in Bolivia illustrates that different forms of state power can have quite distinct forms of
social organization around irrigation.
One approach to critiquing the state-centric view of water management presented by Wittfogel has been an emphasis on the often-successful role of communities in managing water (cf. Baker, 2008). However, many have challenged the apparently simple, local power associated with community irrigation systems. Mosse and Sivan’s (2005) study of irrigation in Tamil Nadu demonstrated that such local systems always interfaced with other forms of power, particularly religious institutions and the state. Rather than purely community-oriented systems, tank irrigation in Tamil Nadu functioned as an everyday linkage between the community and larger forms of power through Hindu and state hierarchies. Thus community irrigation, while locally managed, was a power container that brought the influence of the pre-modern state and religious institutions to the local level. Water was the basis of political and religious rule. The notion of ‘community’ irrigation has been further problematized by Perreault’s (2008) study of political mobilizations surrounding irrigation in Bolivia. In this case while mobilizations for water rights vis-à-vis the state were made in the name of ‘traditional uses’ and ‘community’, the outcomes of these mobilizations benefited very specific irrigators, who were themselves a higher-level substrata of peasants. Similarly, studies of tubewell irrigation in India by Dubash (2004) and Birkenholtz (2009b) have illustrated that changes in water technologies have exacerbated intra-community inequalities. Thus, while delegating power of water to communities may appear normatively preferable to control by state or commercial actors, the internal dynamics of ‘community’ are also quite power laden and inequitable.

2.3.2.3. Hybrid Natures
An additional vein of literature has considered water through the rubric of hybrid natures (Swyngedouw, 1999, 2009; Bakker, 2003; Linton 2010; Budds 2009) and used the heuristic of the hydrosocial cycle which Bakker describes as “a complex network of pipes, water law, meters, quality standards, garden hoses, consumers, leaking taps, as well as rainfall, evaporation,
and runoff” (2002, p. 774). Echoing the distinction between water and H$_2$O, the heuristic of the hydrosocial cycle contrasts with the asocial notion of the hydrological cycle by considering social processes in the construction and disposition of water. Drawing on wider literatures on the social production of nature (Smith, 2008), these studies emphasize that nature and society are co-produced. Water does not exist, as we know it, without transformations undertaken by humans. For example, piped water relies upon the biophysical resource of water, the technology of water mains, the political organization of the state, and the economic organization of capital to flow from the tap. Reflecting the materialist origins of this thinking, early examples of this literature called for engaging with the materiality of water (Bakker, 2002; Swyngedouw, 1999), which has led this vein of literature to focus, even while engaging with the social, on the biophysicality of water. For example, Swyngedouw writes: "[w]ater is a 'hybrid' thing that captures and embodies processes that are simultaneously material, discursive, and symbolic" (Swyngedouw, 2004). Speaking of water as the embodiment of social process prioritizes the biophysicality of water by emphasizing the corporeal or physical aspect. While biophysical water may be an embodiment of material, discursive, and symbolic processes, these hydrosocial processes can also be analyzed independent of such embodiment. We can study the governance of humanity’s relationship to water without focusing on the thing of biophysical water itself. That is to say, hydrosocial governance need not be limited to the governance of biophysical water.

Engaging with the aleatory nature of water requires thinking through humans’ relationship with the absence of biophysical water. To understand the co-construction of water and society in the absence of water, I will use the rubric of hydrosocial governance, which I define as the political mediation of human-water relations. To understand aleatory political ecologies of water I will examine hydrosocial governance under situations of shortage and variability.
Conceptualizing water governance as the political mediation of hydrosocial relations, rather than the political and social factors that affect the distribution and allocation of biophysical water, allows us to consider how human-water relationships may be governed under a broader set of circumstances, particularly situations of water scarcity. This dissertation extends the hydrosocial paradigm by examining how humanity’s relationships to water are co-constructed in the absence of the biophysical resource of water and how the variability of the resource of water is constituted by its biophysical nature. This focus on the aleatory provides a useful extension of the hydrosocial paradigm in two ways. First by examining the governance of chance in human-water relationships this study will illustrate additional ways that a Foucauldian approach towards governance can be made. Second, by not examining the absence of water and risk of water shortage this approach removes the lingering effects of the allocation distribution paradigm that leave many studies still focusing on the political dimensions of hydrological engineering. While most past studies have focused on what people do with water, by examining arid area agriculture, I instead examine hydrosocial relations from the perspective of what people do without water. I argue that governance practices, such as drought-resistant crop varieties that obviate the allocation of biophysical water through state engineered projects, nonetheless constitute hydrosocial governance.

2.3.2.4. Pre-Modern Water and the Aleatory
One of the most significant works to emerge from the hydro-social paradigm is Linton’s (2010) deconstruction of modern water management, What is Water? Central to his argument is the notion of modern water, which is a quantifiable and interchangeable object. Any unit of modern water may be interchanged with any other unit, as they are chemically the same. Linton demonstrates how modern water emerged through the construction of chemistry and hydrological science in the 19th and early 20th centuries. However, the notion of modern water
necessitates thinking about the existence of pre-modern water. Pre-modern water for Linton, were “heterogeneous entities exhibiting different properties and qualities” (Linton, 2010, pp. 75.)

What made pre-modern water different from modern water? According to Linton it was the recognition that different waters had essentially different qualities to them. Well waters were not substitutable for river waters. Each type of water was unique. Linton examined three ways that waters in the pre-modern western world were viewed as being different and unique (Linton 2010). First, in classical natural history and philosophy different waters were viewed as having different essences, enough so that Roman aqueducts were designed to carry waters from different places that were believed to have different qualities in separate conduits, despite the inefficiency of doing so. Second, Linton examined the role of waters in both folk religion, and organized religion (a theme to which I will return briefly). Finally, Linton examined the qualities of the curative properties of mineral springs. Each of these ways that water was viewed as being essentially different were erased when water came to be viewed as H\textsubscript{2}O, with each type of water reducible to its chemical nature and interchangeable with other water sources.

I would add to Linton’s description of pre-modern waters their aleatory nature. My discussion here will be limited to China, but this pattern likely can be observed in other areas as well. If different waters have different qualities, one significant quality of water that has not yet been regulated by modern hydraulic apparatuses is its unpredictability. For those who live in places where rainfall is unpredictable, stream flow uneven, or the arrival of water vendors capricious, the instability of water is one of its essential qualities. If modern water is that which will predictably come from the tap, pre-modern water is that which varies. The role of the aleatory nature of water can be seen in China through the existing literature on water in pre-modern China. Snyder-Reinke (2009) has written about the role state rituals surrounding the
unpredictable nature of rainfall in providing state legitimacy in the late Qing period. Similar to Linton’s (2010) discussion of the role of religion in differentiating water, local officials would in eastern China during the late Qing dynasty conduct rites at specific springs to bring the rainfall. These rites were part of an elaborate set of rituals associated with state rain making that extended from the local yamen to sacrifices by the emperors at the Temple of Heaven (Snyder-Reinke, 2009). Organized, state backed rainmaking was an example of pre-modern religious relationship with water. But it was a relationship with one specific aspect of water: the unpredictability with which it would come. The scarcity of rain was only one side of the aleatory nature of water in pre-modern China: flooding provided a second instance through which water became aleatory. The history of flood management by the state is long in China, dating back to the mythological Yu the Great who was charged with securing China against floods. Flood control in the lower Yellow River basin was a preoccupation of emperors for many dynasties (Chang, 2003; Elvin, 2004). Both flooding and drought illustrate that historically one of the features of pre-modern water in China that has made it unique and different from modern water is its aleatory nature—the constant uncertainty of having too much or too little water.

Water’s arrival was unpredictable, and when rains did come, often resulted in floods. A significant part of making water modern—measured, abstract and interchangeable—has also been a process of making water predictable. Modern water engineering has aimed to control the aleatory nature of water, removing the element of chance, and ensuring that water is always there when the tap is turned.

### 2.3.3. Using Aleatory Political Ecologies

This dissertation will examine interventions in water resources conducted in the Zuli Valley from the point of an aleatory political ecology of water. This shifts the framework of who controls water, how, and to what ends, towards questions of who controls the risk of water
shortages, how, and to what ends. This aleatory approach to political ecology must recognize that under certain circumstances the human production of water shortages can exacerbate water inequalities, and that water shortage, like water availability, can be used as a political tool. For example, deliveries by water tanker are often tremendously profitable for their owners because they create an artificial shortage of water in purchasing communities (Swyngedouw, 2004; Birkenholtz, in press). My analysis of tanker delivery in the Zuli Valley in Chapter 4 will show that water markets with tankers have largely been a positive force in providing water stability to households in the Zuli Valley, but this has been because they have served to stabilize water supplies, reducing the unpredictability of water rather than increasing it as has been the case in other locations. In this case the political relations surrounding water shortage have been different from previous case studies.

Similarly, Chapters 5-7 will examine the role governance approaches to the problem of aridity. By focusing on cash crops that require less water, state actors have not only governed the risk of water shortages, but have also enrolled peasants into new economic relations that further goals of national integration. This has shifted the scale of their economic relations from the locality, towards the nation state. In this way the management of the aleatory nature of water was used in the creation of new types of subjects, ones that were economically integrated with the broader national polity. These two case studies presented in this dissertation will illustrate the central analytic of an aleatory political ecology of water: how is the shortage and unpredictability of water governed, at what scales, and to the benefit of whom.

Ekers and Loftus (2008) suggested that political ecological studies could do more to engage with Foucauldian approaches, and this is an important way that aleatory political ecologies may contribute to our understandings of water politics. Foucault (2007) posited that the
consideration of the aleatory was a central step in the introduction of forms of power based on government. Considering how power is expressed around and through the aleatory then becomes a central way of understanding forms of governmentality surrounding nature. Government involves the estimation and mitigation of chance events. Government then involves intervening in processes far from the direct events to effect change. In terms of water governance this may mean looking at government policies with little apparent connection to water that have nonetheless been part of governing water. Government also functions through diffuse means of power, working to cultivate desires rather than promulgate prohibitions. Little previous research on the political ecology of water has examined the production of desires or subjectivities surrounding water.

Aleatory political ecologies of water differ from previous political ecological studies of water in several ways. First, aleatory political ecologies put questions of risk and chance events at the center of political ecological analysis. While others have examined questions of shortage before, it has rarely been a centrally organizing theme of research. Aleatory political ecologies consider questions of risk and chance as central organizing principles. Variation is how risk and vulnerability are distributed are central concerns in aleatory political ecology. Second, aleatory political ecologies of water examine the role of elements far removed from biophysical resource of water. Chapter 5 of this dissertation will examine how marketing programs have attempted to manage the risk of water shortfalls by creating alternative cash crops. Although scholarship engaging with hydro-social relations (cf. Swyngedouw 1999, 2004, 2007; Kaika 2006; Budds 2008; Linton 2010) has examined water as broadly co-constituted with society, rarely have scholars looked to governance approaches far removed from the biophysical resource of water.
I will not connect aleatory political ecologies to the neoliberalization of nature in this dissertation, but connections between the aleatory and processes of neoliberalization also hold the potential for fruitful future research. Foucault’s study of governmentality has received great interest in recent years due in part to its applicability to studying questions of neoliberalization (Elden 2007a). The governmental forms of power proposed by Foucault, which decenter power away from state actors and consider the role of market actors and non-state actors in both the expression of power. The role of such non-state centered actors has also been a central focus in changing control of water under processes of neoliberalization (Bakker, 2002, 2005; Perreault 2005; Prudham, 2004) in other contexts. I do not engage with neoliberalism in this case study because the institutions involved in the direct management of biophysical water resources in Dingxi have do not bear the marks of neoliberalization (though the promotion of agricultural trade as a form of water management could be seen as such), and this case is then not directly comparable to the widespread examinations of the neoliberalization of nature in other contexts (c.f. Bakker 2002, 2005; Perreault 2005,2008; Prudham, 2004). The examination of governmentality under conditions of neoliberalization is, however, a vein of research for which aleatory political ecologies hold potential.

2.4. Conclusions

This chapter has introduced the central debates to which this dissertation contributes. First, this dissertation will contribute to our understanding of the connection between development and national identity by illustrating that in the Zuli River Valley development has often been framed in terms of contributing to the creation of national identity. This has been the case because development and the nation share a common telos of modernity, yet both concepts are ever-incomplete processes and remain in a
constant state of progress towards modernity. In this case study such creation of national identity through development has been undertaken by state actors. However, this literature has demonstrated that such actors should not be considered as a cohesive ‘state’ but rather as a group of actors acting with the authority of state power. The mechanisms through which state power has been expressed in this study have largely been apparatuses of security as described by Foucault. This engagement with Foucault’s discussion of apparatuses of security also allows us to consider the cases presented here through an aleatory political ecology of water that focuses on the contingency and shortage of water.
Chapter 3. Being Poor, Nationally

*Gansu is not the poorest province in China, but we are the most backward.*

- *A cadre in Dingxi County*

I was shocked when a local cadre told me this statement one afternoon. Chinese officials are known for their superlatives, and this cadre was almost beaming with pride in describing his home area’s backwardness. Yet, as I thought about this cadre’s statement, it started to make sense to me. While peasants of Gansu were manifestly materially deprived, they were also quite aware of their position as a poor and backwards part of China. That is to say, they were not merely recognizably poor, but were recognizably part of a *category* of being impoverished. That category of impoverishment was made in reference to the nation-state of China. The more I dealt with local state actors, as well as peasants themselves, the clearer it became that poverty and backwardness were central organizational feature by which Dingxi and its inhabitants related to the larger polity of China, whether expressed through financial relationships, visits from state leaders, or cultural production. Ultimately peasants in Dingxi are not merely poor and backwards, they are *nationally* poor and backwards. This is to say, poverty is an important part of how peasants in the Zuli Valley create an identity vis-à-vis the Chinese polity.

Poverty is one instance of a broader pattern of categorizing spaces within China as backwards or modern, and other examples of such scaled hierarchies include *minzu*, westernness, and urban/rural. While these tropes of backwardness have been most clearly examined in reference to ethnic identity (Gladney, 2004; Schein, 2000) I will argue that each of these forms of classified backwardness is central to the project of creating a frame of Chinese

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22 A cadre is an office holder in the PRC, and these positions are generally associated with both the local government and the Communist Party. At the local level cadres are responsible for carrying out government and party policies, and represent the government and party in local level villages.
national identity. Areas and populations that are classified as backwards are the substrate on which the state operates to create a modern nation. Mitchell (2002) has argued nations are partially forged by defining some populations (in his study peasants) as the constitutive other of the nation whose backwardness must be ameliorated through development. In a similar way, regions and populations of China that are defined as ‘backwards’ are the atavistic self that creates a constitutive other of the post-colonial Chinese state.

This chapter proceeds as follows. First, I examine the role of uneven development in theorization of national identity, arguing that we must consider uneven development, and the resulting need for development, as a constitutive feature of contemporary Chinese national identity. Second, I examine four forms of spatial hierarchy that have been used to categorize Chinese political space: ethnicity, East/West, poverty, and urban/rural. Each of these is discursively constructed, but also exists as a de jure form of categorization in China. I argue that each of these forms a particular instance of a generalized spatialized hierarchy of backwards/modern. In Part 3 I turn to understanding how non-ethnic identities of difference originating in the discursive and de jure spheres are actualized as local identities through the rubric of peasants being interpellated as impoverished by a national discourse of development.

3.1. Towards a Theory of an Internal Hierarchy of the Nation

Literature examining the role of spatial inequality in modern China has shown that uneven development is a central feature of modern Chinese society (Chan & Wang, 2008; Fan & Sun, 2008; Fan, 1995). In this chapter I argue that such spatial unevenness of development is not incidental to the development of the modern Chinese state, but rather central to the modern conception of China as a territorial whole. The division of spaces between areas that are more

23 Minzu is closely related to the idea of nationality or ethnicity, and will be defined in greater detail below.
developed and less developed is a central feature of the internal hierarchy of modern national Chinese identity. This is not to say that Chinese state actors keep western regions and rural areas of China deliberately under-developed. Quite to the contrary, the Chinese state spends vast sums of money on developing western, rural, and poverty-stricken regions. However, it is through these programs, and through the construction of western China as different and underdeveloped that Western regions of China are imagined into the national consciousness. In an era where development serves as the raison d’être of the Chinese state, being poor is one important way that eastern Gansu, and western China more broadly are territorially imagined into the nation.24

3.1.1. Internal and External Differentiation and the Category of the Nation

This dissertation takes as a starting point for a theory of nationalism Brubaker’s (2004) observation that ethnic and national identities are fundamentally forms of categorization that are enacted through political projects. Such political projects aim to create internal consistency within the nation, and external difference between nations. In this chapter I will examine how internal hierarchical categories can be created within a national identity to further the goals of that identity. Studies of national identity often focus on the role of categorization in creating a common identity out of a heterogeneous substrate. Political actors attempt to find commonality among people through the invention of history, the creation of mythology, and the creation of national culture (Gellner, 2006; Hobsbawm, 1992). In this way political actors aim to achieve homogenization within a national category. While political actors engaging with nationalism also aim to homogenize a country, they invariably do so vis-à-vis other national or ethnic identities.

24 There are of course multiple ways that Gansu relates to the Chinese nation. It is presented as a place rich in resources, a reserve of authentic culture (through sites such as Dunhuang), and a place of natural beauty. Yet each of these other imaginings of Gansu falls short in Dingxi. The notion of China’s west as rich in resources tends to be applied to broad geographical areas, such as “the west” (xibu) or a province such as Xinjiang. But it falls short when identifying an individual place. Similarly, while iconic places such as Dunhuang are viewed as a reserve of traditional culture, Gansu more broadly is associated with tradition’s doppelganger: backwardness.
through a process of othering (Bhabha, 1994; Brubaker, 2004; Mitchell, 2002). In this way political actors accentuate differences between categories in an attempt to turn those categories into political groups. Nations are assumed to be similar within the category (e.g. all Chinese are alike) and dissimilar between categories (i.e. Chinese differ from Thai). Political projects are then undertaken to realize both the internal consistency and external difference of the category of the nation—actors promoting national identity look for both commonality within their group and differences from other groups (Brubaker, 2004).

Yet these forms of categorization vis-à-vis other populations are only one way that the nation is enframed. Simultaneously, the nation is posited as being a modern political entity, which is also categorized with respect to its own past. In addition to groups outside of the nation forming a constitutive other, the atavistic self of the nation also forms a constitutive other as presented in Mitchell’s (2002) study of Egypt detailed in Chapter 2. Thus certain parts of the nation are also constituted as being outside of the nation. They are not outside of the nation entirely, but only outside of the nation as a modern entity. These groups must then be brought into the nation through *development*. This leads to the ongoing formal *differentiation* of people within a national framework. In classifying populations and territories into groups, national categorizations are made, but so are sub-categorizations. Such sub-categorizations of national identity serve to illustrate the traits that are held up as national ideals.

Nation-building is not simply about showing how people are the same, but also how within that similitude, differentiation occurs. Creation of national identity is about both making people the same, but also different within bounds of the nation. This relatively understudied facet of national identity has received some attention within Geography. Paasi’s (1996) seminal study of the creation of the Finnish border illustrates the role that a sub-region can play in the creation of
national identity. More recently Johnson and Coleman have illustrated the role that an internal other plays in creating national identity, as something that differs from, or may be antithetical to, a national ideal (Johnson & Coleman, 2011). Johnson and Coleman illustrate that in European contexts such othering has been applied to regions within a nation, and that it is often based upon the competing notions of backwardness and modernity. In Johnson and Coleman’s case studies of Germany and Italy, such regional differentiation comes directly from uneven processes of development. In examining internal differentiation of China we must focus on how several types of classifications and binaries have been politically used. These include the obvious case of ethnic (minzu) classificatory schemes. Minzu, in China has been interpreted as a form of internal orientalism (Gladney, 2004; Schein, 2000), wherein traits of primitiveness are placed on certain ethnic groups. However, it calls for similarly examining how other forms of categorization within the Chinese nation have been politically employed. The most prominent of these forms of classification are “wealthy/impoverished” “backwards/modern”, “traditional/scientific” and “western/eastern.” In China these classifications have been territorial in their application.

An additional thesis that has considered questions of uneven development in the production of national identity is the perspective broadly associated with the idea of internal colonialism. Internal colonialism was posited by Hechter (1999 originally 1975) as an alternative to the model of integration, which assumed that over time regional economic disparities within nation-states would even out and regions would become politically more integrated. Hechter argues that such differences may be ossified leading to an internal colonial relationship between a central region and its internal periphery. This ossification of uneven development would then lead to the formation of alternative ethnic and national identities based on a cultural division of labor. Hechter applied this model to explain the rise of ethnic movements in the Celtic fringe of
Great Britain (a similar argument has been made by Nairn (2003, originally 1977). Scholars have argued that China’s actions towards its peripheral spaces bear the marks of internal colonialism (Goodman 1983; Gladney 1994; Oakes 1995) while others have argued that China’s relationship with its peripheral spaces such as Xinjiang do not share the traits of internal colonialism (Suatmann, 2000). I have not engaged with approaches to nationalism based on internal colonialism for several reasons. First, these models have been most clearly developed in the British cases (Hechter 1999, Nairn 2003), and the Chinese example is not directly comparable. While ethnic mobilization has occurred in Xinjiang and Tibet, in other areas peripheral spaces where regional identity played a prominent role rivaling the Qing state as a locus of national identity in the early Republican Period, most notably Hunan and Guangzhou (Duara 1995, Platt 2007), no rival national identifications emerged. Second, my concern is primarily with national integration rather than the origins and formation of rival ethnic and national identities. Therefore theories of national separatism are not germane to my research approach.

Brubaker’s (2004) call for a new study of nationalism and ethnic identity emphasizes a focus on separating categories of practice from the categories of analysis that we use to understand such phenomena. In Brubaker’s formulation categories of practice are those vernacular forms of categorization that are already present in the world. He believes that trouble arises when those who study ethnicity and nationalism adopt such categories of practice as categories of analysis. In Brubaker’s critique such a transmission is generally unidirectional—vernacular categories of practice are too often adopted by scholars without sufficient scrutiny. Scholars of nationalism, in other words, take nationalists at their word that nations exist. The relationship between categories of practice and categories of analysis is somewhat more complicated in the case of China for both ethnicity and poverty programs. The categorization of peoples as poor was
initially done through categorization by outside actors from the central state. The categorization of poverty assigned to a place was then taken up by those to which it was assigned. In other words, categories of analysis became categories of practice as local people identified the categories of poverty that had been assigned to them. This has occurred to the point that people in the Zuli Valley now identify themselves primarily as poor when relating to the larger nation of China. Thus, as opposed to Brubaker’s formulation of categories of practice being adopted as categories of analysis, in Dingxi categories of analysis are adopted by local actors as categories of practice.25

3.1.2. Problematization of Poverty Global and National

Chapter 2 detailed some of the work that has emerged from the Post-Development school of thinking on development. The focus of most post-structuralist work has been on the global dimensions of the problematization of poverty. Escobar’s work focuses on how the construction of poverty creates a set of global power relations that places the developing world in an inferior position (Escobar, 1995). While Ferguson has focused on the role of development in extending the power of the national state, the discourses that led to the production of such knowledge in Lesotho were produced primarily by outside actors from the global north (Ferguson, 1994). The discourses that problematized poverty in Lesotho were based on the notion of a global peasant that was everywhere the same and untouched by capitalist production. While state actors in Lesotho have become more powerful through the development projects that classification wrought, they were not the agents of classification that created categories needing intervention. Such classification was conducted by a global development complex of aid agencies, donors, and

25 This phenomenon is not, of course, limited to the present case study. For an examples of how minzu categorization that merged together disparate groups in China came to be embraced by members of those groups see Kaup (2000) and Litzinger (2000).
specialists. In China, in contrast, poverty has been problematized as a notion *within the nation-state* by domestic state actors.\textsuperscript{26} The discourses of poverty in China do interact with global constructions of poverty, but contra the post development school, poverty in China is largely a problem that has been conceived within the bounds of the nation state by state and academic actors who enframe poverty as being a national problem. Post-development scholars emphasize the construction of poverty as a global phenomenon by international actors (Escobar, 1995; Ferguson, 1994). Escobar (1995) emphasized the role of global institutions in establishing a standard against which poverty would be measured. Ferguson (1994) examined how international donors constructed the people of rural Lesotho to be idealized pastoralists stripped of local context and largely interchangeable with any other pastoralist in another country. Chinese state development actors construct subjects as idealized *Chinese* peasants, whose poverty is a distinctly Chinese problem. This national construction of poverty is similar to Gupta’s (1998) examination of how agricultural development in India was framed as a distinctly Indian problem. But these peasants are not believed by development actors to be the same as peasants everywhere else. Rarely does one see poverty in China compared to the poverty of other countries, whether in official discourse, or in informal conversation.\textsuperscript{27} The poverty of places within China, however, is readily compared, as will be detailed below. Moreover, China’s politics towards poverty alleviation are largely inward looking, focusing on domestic solutions.

\textsuperscript{26} China is not alone in this problematization within a domestic place. Lyndon Johnson’s War on Poverty in the United States, for example, was largely focused on Appalachia. However, this can be contrasted with the post-development scholars who locate such change in global institutions. I wish to emphasize that the domestic nature of development discourses in China are a question of degree, rather than absolute contrast with other regions of the world. In all countries development is presented as a national problem.

\textsuperscript{27} There are, of course, exceptions to this. In the area of drinking water, China has adopted the Millennium Development Goals related to drinking water security, as will be detailed in Chapter 4. Second, when discussing Dingxi an FAO report (which I have been unable to locate) from the 1980s that stated that Dingxi is uninhabitable is often cited. In this latter case, however, most mention of this report use it as a form of validation of how poor environmental conditions in Dingxi are (cf. Gansu Provincial Television, 2009).
rather than examining what is being practiced in other countries. The Chinese state has been largely oblivious to the suggestions of the global development institutions, including the World Bank and IMF, which wield so much power in Escobar’s model of development.\textsuperscript{28} While international lenders continue to finance projects aimed at development in China, few international actors that characterize the discourse described by Escobar exist in China. Trucks marked GTZ and USAID and their technician inhabitants that are so prevalent in other developing regions are nowhere to be seen in rural China. Indeed, when China does compare its poverty and development to other countries, it is through the provision of development aid to other countries. The Chinese state has, since the Mao period provided assistance to other developing countries to help them learn from China’s experience. Dingxi is a prime example of such a place. Dingxi serves as a training center where international training in the rainwater harvesting techniques discussed in Chapter 4 is provided to visitors from other developing countries.

Thus, China’s problematization of poverty fits into global discourses of development in several ways. Through classification, China has created the class of impoverished people that development aims to solve. Yet, for all these similarities to global discourses of poverty, China’s problematization remains different insofar as it is the internal problematization of poverty, and is largely an inward focused enterprise.

\textsuperscript{28} This is not to say that the World Bank is not active in China. It is. But the PRC has not been forced to accept its conditionalities with its loans in the way that other countries have.
3.1.3. Categorization, State Territorialization and National Territorialization

Vandergeest and Peluso (1995) have introduced what is among the most thorough theorizations of the connection between the state power and internal territorialization.

*All modern states divide their territories into complex and overlapping political and economic zones, rearrange people and resources within these units, and create regulations delineating how and by whom these areas can be used.* (Vandergeest and Peluso, 387.)

Central to their study is the notion that spaces within a territorial state are classified and differentiated based on territorial function. Furthermore, such differentiations must be communicated to be clear. However, Vandergeest and Peluso’s analysis was concerned primarily with access to resources. Here I hope to demonstrate how such classification and differentiation is similarly used to achieve the territorial consolidation of national identities and populations. That is to say, processes of internal territorialization not only divide the state’s territory based on uses and resource extraction, but also in terms of how populations fit into a national polity.

Different spaces and territories within the nation have gained differing roles in how people imagine the nation as a whole. Such roles are created by top-down state discourses, advocated by local government leaders, and emerge through other cultural understandings. A clear example of this can be seen in literatures on national capitals. National capitals are imagined in a variety of ways as the central spaces of the nation. The central spatial nature of capital cities is often defined through the use of modernist, and highly symbolic architecture. For example, leading up to the 2008 Olympic games in Beijing the discourse surrounding the construction of the Bird’s Nest stadium projected an image of China as a modern nation to a global audience (Ren, 2008). However, the symbolism of the Bird’s Nest also does significant ideological work in presenting the image of China as a modern nation within China. So ubiquitous have images of the Bird’s
Nest become that it's now one of the most common images of Chinese modernity in state propaganda in the countryside (Figure 3-1).

![Image of a propaganda sign in Dingxi featuring symbols of national strength. The sign reads, “Organize to initiate advancement, Party members strive for excellence, the masses gain advancement.” Photo by Author, July 2012]

If the spaces of Beijing and Shanghai, for instance, within China are to be modern spaces, other areas also create regional identities that differentiate them from other areas. For example, the city of Xi’an has identified itself with Chinese tradition by remaking an entire area of the city, the Qujiang district, into a symbol of the Tang dynasty. While the development of the Qujiang district has been partially driven by tourism, it is not exclusively dedicated to tourist activities. Rather, being a symbol of the Tang dynasty (which is remembered as a period of prosperity in China) is a way that provincial leaders in Shaanxi have made a regional space for Xi’an within the nation. The regional identity sought by leaders of Shaanxi plays on its role as the historical capital of China during two periods seen by many as golden ages in China—the Qin Dynasty, which was the first unified empire in China, and the Tang Dynasty, which is remembered as a cultural high point. By associating the space of Shaanxi with these two time periods of Chinese glory a provincial identity is forged which is also directly constituent of a larger Chinese national identity. Similarly, leaders in Guangzhou have, in the Reform and Opening Period, begun to promote the virtues of distinctly Southern Chinese culture and history,
through the excavation of the tomb of the King of *Nanyue* (Lary, 1996), and the promotion of distinctive Lingnan styles of architecture. Both of these cases in Shaanxi and Guangzhou illustrate that provincial leaders endeavor to create territories that were associated with Chinese national identity, while simultaneously supporting the uniqueness of the individual places in supporting a larger Chinese national identity.

Since the 1990s there has been a renewed academic interest in understanding the varied identities of China’s provinces. While a simplistic scalar notion of identity would argue that the rise of provincial identities is likely to come at the expense of identities formed around the scale of the nation state (as, for example, the case of Celtic identities in Great Britain, c.f. Hechter, 1999), in the case of China this has proven far more complex. Oakes (2000) has illustrated that in the post-reform era interior Chinese provinces culturally redefined themselves in terms of authentic Chineseness as a strategy of capital accumulation. Such regionalism selectively drew on historical periods illustrative of Chinese virtues to frame these regions as the true bastions of traditional Chinese culture in the face of rapidly westernizing Eastern areas. Importantly, this regionalism took place at the scale of the province. Goodman (2002) has illustrated that identities that contribute to national identity can occur at scales of the county, as well as the province. The province, in Goodman’s analysis, was a mediating scale through which national identities interacted with regional identity, rather than as a rival power centers.

These cultural and regional forms of differentiation differ from the forms of territorial differentiation discussed by Vandergeest and Peluso in one important way. While the classification of state space by state actors was largely a top-down process driven by state actors

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29 The Lingnan style of architecture is a distinct style local to Guangdong, and other southern provinces south of the Nanling Mountains and centered around the Pearl River Delta. This region has long been cultural distinct from North China, and the expression of provincial identity has been resurgent since the Reform and Opening Period.
(if resisted, co-opted, and modified by local actors), the process of differentiation of national space has been relational and promoted by a variety of actors for different purposes. As will be discussed below, national-scale actors have classified space based on backwardness, but local state actors have also classified space as part of the nation. What different state actors share is finding a way to make their region or province unique while still making a claim that the unique element formed, in some way, an important element of Chinese national identity. That is, regional identities were constituent parts that contributed to national identity.

Each of these examples illustrates that like state space, national space is territorially classified. Such territorial classification emerges from the interaction of top-down and bottom-up processes. In the section that follows, I will review formal, mostly top-down territorial classification in China that emerges from uneven development.

### 3.2. National Categorization And Hierarchies

Within China at least four distinct spatialized forms of hierarchy have emerged, *minzu*, Westernness, poverty, and urbanity. While each of these differ slightly, they are all valences of a common hierarchy of modern/backwards. What stands out about each of these forms of hierarchy is that they have all been territorially fixed through a *de jure* process. While ethnicity is perhaps the least relevant to my study, it is likely the most thoroughly theorized, and as such makes a good point of entry into China’s spatial hierarchies.

#### 3.2.1. Minzu

Internal differentiation of national identity is already quite clear based on one categorical feature of identity within China: minzu. The meaning of minzu has changed over time, and it is a word for which no exact English translation exists. Originally used as a translation for the German *Volk* or people, minzu arrived into Chinese via the Japanese *minzukou* (Leibold, 2007).
In the early Republican period Sun Yat-Sen focused on tensions inherent in governing the former Qing Empire as a new Chinese national state (Leibold 2007). He posited the existence of a Zhonghua minzu of which all other ethnic groups in China were part. Although the Zhonghua minzu was initially conceptualized by Liang Qichao as being synonymous with Han Chinese, the term was later reconceptualized by Sun to include Han, Manchu, Tibetan, Hui, and Mongols (Leibold, 2007). Arriving through the German social science tradition and in the late 19th century, the term minzu initially referred to large groups of people who would contest for dominance in the world. In this way minzu was a good approximation of the word nation. Only later, in the 1920s, did shaoshu minzu, literally ‘small numbered minzu’ (i.e., minority nationalities) come into use. Yet this represented a change in the use of minzu as it allowed much smaller groups to also be called minzu. This change was driven by the Comintern, which insisted that the Communist Party of China (which was then allied with the Guomindang), acknowledge minority groups (Leibold 2007). Thus, much of the modern meaning of the term minzu emerged with the rise of communism. Minzu is generally translated to mean ‘nationality’ in English. This arises from the associations between minzu and the Russian word natsia that arose during the 20th century. However this translation is problematic because the minzu, as generally used in China today, does not include the notion of a right to sovereignty.\footnote{Early notion of minzu would, however clearly be associated with polities that possessed sovereignty. This further illustrates the changing meanings that the term has been through.} Similarly, a translation of ethnicity falls short insofar as there are several unrecognized ethnic groups in modern China (largely as a result of the ethnic classification process that will be discussed in greater detail below). Because of these difficulties, throughout I will leave minzu untranslated.
There are several features of minzu identity that I hope to show can be used as models for understanding other types of hierarchical classification in China. First in China minzu exist in a scaled hierarchy, with some groups occupying a subordinate position to others. It should be noted that despite the hierarchical and teleological nature of minzu, the structure of minority minzu provided a way for minority groups to have a stake in the nation. Second, because of the close links between minzu and national identity, minzu identities are quite closely linked to the idea of Chinese nationality. Third, minzu identities are often explicitly spatialized. To be clear, minzu identity, while present as a factor in the area where I work, is not a central concern in imagining Dingxi within China. Rather, I use minzu identity as an entree into other forms of categorization that contribute to national identity that have been less thoroughly studied. I also consider minzu as a model for other forms of spatial classification because it chronologically preceded other forms of classification. Most minzu classification was conducted in the 1950s, while other forms of classification examined here occurred later in the 1980s.

3.2.1.1. **Hierarchy and Nationalization**

Ethnic identities in China have long been organized into hierarchical categories, with Han civilization posited to be at the top. The nature of these hierarchies has changed over time. Initially this hierarchy focused on degrees of similarity to a Confucian ideal (Harrell, 1996). Barbarians were classified as being ‘raw’ or ‘cooked’ based on the degree to which they had adopted Han Chinese civilization. During the 19th century, under the influence of western Christian missionaries hierarchies focused on closeness to God (Harrell, 1996). Finally, during the ethnic classification project of the 1950s (minzu shibie), minzu classification was nominally based on a Stalinist hierarchy that focused on mode of production. While such hierarchies have
antecedents in Chinese society before the PRC (Harrell 1996), such an approach also fits with Stalin’s theory of great and small peoples who were culturally more and less developed respectively. Ethnic groups were placed in a hierarchy based on which stage of Marx’s progression of modes of production they fell into. In practice such ethnic classification had little to do with actual means of production, and under all of these schemes, classification was as political as it was based on official categorizing criteria (Mullaney, 2011). In each case ethnic groups were placed within a scaled hierarchy. Some groups are considered to be closer to an ideal Chinese ethnic group, the Han, while other are seen as more distant. The Manchus fall into the former, while the Uyghurs and Tibetans are further. There are a few features worth considering about such hierarchy. First these hierarchies have always been teleological—groups are not ranked arbitrarily, but rather in terms of how close they are to some ideal, be it Confucianism, God, Socialism or Hanness. Second, there has always been the nominal notion that groups have the ability to move up through the hierarchy. As ethnic groups advance along the teleological axis (e.g. means of production) they will become closer to reaching the top of the hierarchy. Under the Confucian ideal ethnic groups had the potential to make progress towards Chinese civilization (laihua). Similarly, under the Stalinist classificatory scheme, minzu groups will progress as they move through modes of production eventually reaching a modern socialist stage.

While the hierarchical nature of these categories has long been identified, Mullaney’s recent (2011) work on the Minzu Shibie (minzu classification) project has shown exactly how Stalin’s category of natsia was altered in China. According to Stalin’s criteria, a natsi, should feature a common language, territory, mode of production, and culture. Local party operatives in Yunnan
believed that only under advanced capitalism could a group meet those conditions. Ethnographers sent from Beijing, partially drawing on preexisting ethnic classificatory schemes arising from their own work during the Republican Era, proposed a compromise. Those groups that had the potential of reaching the capitalist (and ultimately communist) mode of production and becoming full-fledged natsia should be recognized as minzu groups in Yunnan. This solved a problem of reconciling the desires of social scientists tasked with making such arrangements and the cadres charged with handling the project, but it also created a teleological hierarchy geared towards production that stratified Chinese society. In practice, the distinction of having the potential of becoming a natsia was largely a rhetorical approach, as the ethnic categories that were adopted closely resembled earlier classificatory approaches undertaken in the 1930s. The point of being an ethnic group qua ethnic group under PRC classification was to move towards becoming more modern in economic organization.

The need of ethnic minorities to modernize is a theme taken up explicitly by Fei Xiaotong in his *Towards a People’s Anthropology*:

*To close the gap between the nationalities, further social transformations—basically the transformation of backward social systems—are necessary. In doing so, however, account must be taken of the characteristics of different minorities’ present state of social development. Methods applicable to the Hans are not applicable to minority societies still in the pre-feudalist stage. All China’s nationalities are out to reach a socialist society, but they must be allowed to do so on their own feet and in their own ways.* — Fei, 1981, pg. 83

Fei identified the difference between ethnic groups in China as being both in their “socio-economic make-up”, those factors of production identified by ethnic classification era ethnologists, and in their “ethnic characteristics” or cultural traits (Fei, 1981, p. 84). Fei believed that efforts should be made to modernize the former. Any changes in the latter will emerge autochthonously from fundamental economic changes. Thus, the inferior status of ethnic
minorities was based not on any cultural traits, but rather on their “backwardness” in means of production. Fei believed this backwardness could, and should, be ameliorated through modernization, a theme that shows up in other forms of spatial classification as well. The development, or modernization, of ethnic minorities is identified by Fei as a central project of Chinese national identity. Like national identity more broadly, this project is teleological and seeks to make ethnic minorities into more modern people.

Fei also spatialized ethnic minorities as living predominately in the western periphery of China (Fei, 1981), which is a common trope in China. However, his view of the interactions of minorities and the periphery is somewhat more nuanced. He acknowledges that ethnic minorities live throughout China, but in the more inaccessible and mountainous areas, in this way recognizing that locations near centers of power may be quite remote if they are located in difficult terrain. The classification, hierarchization, and spatialization of ethnic minority status that Fei presents in this 1979 essay (published in Fei 1981) are important, as a mere 6 years later he applied the same categories to Han inhabited regions of China that are similarly backwards.

Yet, if ethnic classification placed ethnicities in a hierarchy, the formal classification was also a means by which ethnic groups could become more equal with one another. This equality appears among ethnic groups in two ways. First, as categories minzu groups are officially equal. Officially China is a multi-national state in which each of the 56 minzu have formal de jure equality, if not de facto equality. In sets of 56 minzu dolls as much energy is dedicated to the Lhoba doll representing 5000 people as the Han doll representing 1.2 billion (Mullany, 2011). Second, through the very notion of the teleology there is the idea that all of these groups will be equal in the future. The multinational state is viewed as a means through which de facto equality
in social development can potentially occur. By identifying and classifying ethnic groups, these minority groups could be protected from Han chauvinism (Mao, 1956).

It is worth considering the ethnic classification project in light of Brubaker’s analysis of ethnicity. As noted above, Brubaker differentiates between categories of analysis and categories of practice. Official ethnic classifications were intended in the Minzu Shibie project as categories of analysis. Using criteria determined by a Stalinist hierarchy, social scientists sought to categorize social conditions as they existed (that is categories of practice) in a formal way. And such categories certainly did exist: the Hui, for example, existed as a cohesive identity prior to categorization, and had been involved in frequent conflict with the Han during the late Qing (Lipman, 1997). However Hui identity was derived not from ethnicity, but rather was used to describe those who practiced Islam, and more accurately reflected members of clans that shared this trait. Yet, after being adopted, such categories, even if constructed, came be used by ethnic entrepreneurs. The case of Chinese ethnic identification project problematizes the neat division Brubaker presents between analysis of categories of practice and categories of analysis. Specifically social scientists working on behalf of the state served as both analysts, and practitioners in creating these categories (Mullaney, 2011). Yet, although these categories were created by social scientists, as Kaup (2000) has argued, they went on to become real categories which ethnic political actors have mobilized.

Similarly, Brubaker’s emphasis on the role of framing in making ethnicity allows us to consider how social variation has been ethnicized in China. In China’s ethnic classification scheme levels of social and economic development were enframed as being ethnic in character. Thus, nomadism was framed as a trait of minority ethnicity. One could not be a Han pastoralist. By the same means, modernity was enframed as Han. One can be a modern, urban Hui, but if
one is, few are likely to identify her with being Hui. Choosing to identify ethnically is marked as a form of backwardness. Finally Brubaker emphasizes the role that ethnicity plays as a form of cognition. If, as Brubaker argues, ethnicity, race, and nationhood “are not things in the world, but perspectives on the world” (Brubaker, 2004 pg. 17) minzu classification that envisioned China as a ‘multi-national’ state was a way of reconciling the varieties of people in China with the purported singularity of the nation. Differences in ethnicity became a way of thinking about being Chinese. As we shall see, other types of differences based around modernity similarly allow thinking about being Chinese.

While minzu identity is immutable in China, it may or may not be ignorable. Minzu classification is immutable because it is a type of classification borne by citizens of the PRC over which they have little control. Minzu categorization is marked on the identity cards of citizens of the PRC, and this status is something that rarely is changed.\footnote{31 There was, however, a wave of reclassification in the 1980s (Gladney, 2004).} Depending on the minzu and situation, this may or may not be something that members of minority ethnic groups are able to ignore on a day-to-day basis. When I have met Manchus their ethnicity is always something of a matter of curiosity that they bring up, rather than an actual form of identity. I have asked Manchus how they differ from the Han, and while there may be jokes about being able to drink more, they usually settle to the answer that fundamentally they are not much different. Similarly, many Hui in Lanzhou choose to blend into the Han population, and often do largely successfully, with minzu status being an afterthought.\footnote{32 My experience with such Hui who have ‘blended in’ in Lanzhou has mostly been in within educational or academic settings, where there may be pressure to conform to seeming Han. On one instance I went to lunch with a group of other basketball players, and on the way to a restaurant someone remembered that one of the players was Hui, and a hustle to locate a suitable Halal restaurant ensued. The Hui player in question had not mentioned anything, and seemed that he would have been happier had his ethnic classification not been brought up at that time.} In my observation those Hui who have “succeeded” in education or certain types of commerce by the standards of modern, urban China, choose to
minimize ethnic identification in public. Those Hui and Manchu who do not emphasize their ethnicity are urban and educated. According to means of production, the hierarchical system of ethnic identification upon which ethnic identity is assigned, these Manchu and Hui are indeed, more like the Han, but this is a change that has occurred on an individual basis. Other Hui in Lanzhou remain quite distinct from the Han, choosing to wear white hats that mark them as Hui. Ethnic identity may also be used in certain types of commerce. Ethnically Hui entrepreneurs control certain elements of the economy in northwest China, most importantly most of the trade in beef and lamb. This control of the meat trade extends further upwards within the lamb and beef sector, with most people who raised cattle and lamb reporting that almost all of their products were sold to Hui traders. Informants in one predominately Hui village told me that most sheep are transported to the Hui center of Linxia for ultimate sale. Additionally several types of specialty restaurants, including those serving the dishes most clearly associated with Lanzhou—hand pulled noodles and hand grabbed mutton—are exclusively Hui owned. Similarly, some differences were reported in the jobs that young Hui men would take when they left the village to work. While many did work in the same construction trades that dominate migrant labor among other men from villages in Dingxi, young Hui men also went in large numbers to work in hand-pulled noodle shops. Thus trade in specific types of meat are a specific form of economic activity unique to the Hui in Gansu, but not all Hui choose to ethnically identify by joining these trades. While Hui are engaged in certain modes of production associated with their ethnicity, this is not deterministic. Although Hui minzu exists as a form of categorization, it may or may not be

33 This is something that several meat vendors, both Han and Hui, have told me. I have never found beef or lamb in local markets in Lanzhou being sold by anyone who was not Hui. The only exceptions to this pattern are large grocery stores, which do sell beef and lamb, despite no clear Hui identification, and processed meat products.

34 Lanzhou style hand-pulled noodles are a local specialty and are sold throughout China. This information comes from interviews. No one was able to provide me information on what percentage of Hui men worked in noodles versus construction.
expressed depending upon the situation. Other ethnic groups, such as Uyghurs and Tibetans, cannot escape being ethnically identified if they try. While some members of these groups have integrated into Chinese state structures, they remain always marked as Tibetan or Uygur through appearances and surnames. What is important here is that ethnic classification in China, which exists in a scaled hierarchy, cannot be changed, but can be ignored depending on the ethnicity and the situation. Ethnicity, which is formalized as a category of analysis by state policy makers, may or may not be a category of practice used by people in their everyday lives.

**3.2.1.2. Spatialization**

*Minzu* identity is a hierarchy that is both individual and spatial. Individuals are categorized into one of fifty-six minzu groups. There is little flexibility in choosing one’s minzu (although there is sometimes some flexibility in reclassification). Minzu identity is fixed at the level of the individual; however, spaces in China are also demarcated as being ‘autonomous’ minority minzu spaces. This demarcation can come at any level within China’s territorial administrative level, from the provincial-level autonomous regions of Tibet and Ningxia, to Autonomous Townships such as the Xiangquan Hui Autonomous Township located in Dingxi. Each of these territorial units of government spatially enframes *minzu* classification. All of the traits associated with *minzu*, such as backwardness or romantic simplicity, are then associated with those spaces.

There are direct effects of these policies. For example, southern Ningxia Hui Autonomous Region, which until the 1950s was considered a part of Gansu, is perceived to be more politically ‘sensitive’ than Eastern Gansu because it is an ethnically designated as Hui, despite the two areas sharing a similar mixed Han/Hui ethnic composition. In Dingxi, on the other hand, ethnic identity is relegated to the township level. The spatial designation of minority areas is concentrated in western China. Interestingly, many of the ethnic groups that were not classified
as being categorically ethnically separate, including the Danjia, Subei, and Hakka, are located in eastern China. As we will see below, the spatialization of ethnicity in China often intermixes with other forms of spatialized identity in China.

It should be noted that these are *de jure* spaces of minzu identification. Spaces are legally demarcated as being associated with an ethnic minority. However, not all minority minzu live in these spaces, and many of these spaces have far more Han than their purported minority inhabitants. Of China’s five provincial-level ethnic minority areas, only in Tibet does the ethnic minority constitute more than 50% of the population. Thus a problem emerges with spatial classification of minzu: the substrate people who would later emerge as minzu groups were not necessarily segregated into distinct territories, and their territorial classification would later become problematic. The heterogeneity of population of minzu groups has been compounded by Han immigration to ethnic minority areas.

I have presented minzu identity as the first form of categorized hierarchical space because it is perhaps the best known example of hierarchy applied to Chinese space. Minzu classification, has little bearing on the villages where I have conducted research, however, the broad similarities between Minzu and similar spatialized hierarchies of modernity make minzu an appropriate model to think through spatialized difference in China. The teleological categorization of ethnic identity is clearest in the case of ethnicity. Below I will argue that several other forms of spatialized categorical hierarchies are similarly influential in modern conceptualizations of China. While *minzu* classification was determined in the 1950s, other forms of classification, particularly ‘western’ and poverty counties were created as formal territorial classes in need of remediation during the 1980s during a period of concern about rising inequality in China.
3.2.2. East-West

It is not coincidental that the minority minzus tend to be categorized as living in China’s West. Many of the traits associated with ethnic minorities, particularly backwardness, are transferred onto the west as a whole. Indeed, Mao included in his prominent 1956 speech On the Ten Major Relationships both the relationship between the Han and minority nationalities and the relationship between the Coast and Interior (or East and West) (Mao 1956). It is well established through the literature on spatial inequality in China that eastern regions are wealthier than western regions of China (Chan & Wang, 2008; Fan & Sun, 2008; Fan, 1995). The origins of these differences lie both within pre-1949 patterns of spatial inequality, processes of capitalism that have unfolded in China since Reform and Opening, and in specific state policies that favored eastern development. Yet, West and East differ not merely in absolute level of wealth, but also in perceptions of modernity and backwardness.

The relationship between the East and the West became an issue of great concern in making sense of a unitary China during the Reform and Opening Period. While some went so far as to suggest that the economic imbalances between East and West could lead to political separatism in China (e.g., Wang 1999), most analyses were less extreme, but remained deeply concerned about the structural imbalances. Among the most prominent of the early works in this conceptualization of western China was Wang and Bai’s 1986 book The Poverty of Plenty (fū rào de pinkün published in English as Wang and Bai 1991). To Wang and Bai, the origins of the poverty in western China lay in the dependence of its residents on what they called the ‘natural’ economy in contrast to the ‘commodity’ economy of eastern China. In their view, the reliance upon the ‘natural’ economy for peasants in the West, as opposed to the commodity economy of peasants in the east is the direct result of “quality of human resources.” This is taken to mean education, but also entrepreneurial initiative and drive. The real source of economic stagnation in
the west, they say, is the backwardness of the people there. Moreover, the root cause of this ‘backwardness’ is itself backwardness: “the reason for backwardness is backwardness” (Wang and Bai, 1991, p. 23). Thus, for Wang and Bai the reason western China remained poor was a lack of integration with the national economy, and ‘backward’ attitudes of its inhabitants. The solutions then were two-fold. First, greater measures should be made to integrate western China with eastern China. Second, efforts should be made to improve the quality of people in western China to eliminate self-perpetuating backwardness through education and the introduction of modern material objects. Specifically, people in western China needed to reduce their self-sufficiency to engage more fully in the commodity economy: “only with the transformation of the existing state of self-sufficiency can there be enterprise activity and education geared towards production for exchange” (146). Moreover, further efforts needed to be made to move away from agriculture and animal husbandry, which were “the breeding grounds of poverty and backwardness in undeveloped regions” (156) and towards an increase in rural industry. If Wang and Bai’s analysis of Western poverty shared an emphasis on removing backwardness with Fei’s (1981) analysis of minority minzu group, there was a slight difference. Fei believed that the economy of minority regions should be transformed first, and the reduction of backwardness in culture would follow. Wang and Bai, on the other hand, did not believe that it was possible to change the economic structures of western China without first changing the people’s way of life:

In selecting the orientation of the economy in backward regions it is fundamentally recognized that any transformation of the quality of human resources begins with change in the indigenous population’s way of life and not initially in production methods. --163

The difference here is a fine one, but it is important: ‘indigenous’ has replaced minority as a signifier of backwards and earthbound. Indigenous here includes both the Han and minority minzu who live in the West. Divorced from the notions of Han chauvinism that accompany the
Han/minority hierarchy, Wang and Bai’s suggestion that changing culture should be the first step towards removing backwardness in the West becomes acceptable in a way that changing ‘backward’ culture was not in Fei’s minzu based formulation.

Many of these same ideas about the origins of backwardness in western China were contemporaneously applied specifically to Dingxi by none other than one of the architects of China’s minzu policies, Fei Xiaotong. Fei was perhaps China’s best known anthropologist, and after emerging from a political persecution that lasted from 1959-1979, Fei turned his energies again to making sense of Chinese society. Going back to his early work on understanding the structure of rural society and the role of rural industry in improving livelihoods (Fei & Chang, 1945), Fei became interested in why western China was poor, and this time he became particularly interested in questions of development in western China. Between 1980 and his death in 2005 Fei wrote 69 articles that mentioned Dingxi (of a total of 463 articles that he wrote during the period, Fei was a very prolific writer). Of these a much smaller subset, about 3, was directly about Dingxi, while the rest were about general questions of western China. Fei’s later writings applied many of the same analyses and categorizations to western China that he had earlier applied to minority minzus. These included: an emphasis on the “backwardness” of people’s thinking, and its effects on economic productivity; the importance of ecological preservation in development, while simultaneously exploiting under-utilized resources, and the political imperative of bridging gaps for the sake of national modernization and unity.

Fei contributed two specific concerns about how western China related to the East (Fei, 1985). First, similar to Wang and Bai, Fei was interested in understanding how small scale rural

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35 This is based on a search of the China Academic Journals database. This likely does not include writings in newspapers and some magazines, of which he was also a prolific author.
industry could help to bridge the gap between Western and eastern China. Specifically, he was concerned with improved animal husbandry and local industry. He advocated for the creation of TVEs as a model of modern economic organization from eastern China that could help western China advance (in spite of this Huang (2008) has argued that TVEs were actually slightly more likely to be founded in poor areas of China during the 1980s). Second, Fei was quite specifically concerned with the relationship between the East and the West. He believed that Eastern cities should make investments in the West and send their technical and scientific knowhow to the west. These ideas were largely adopted in early development programs for the west that targeted connections between Eastern regions and specific Western regions (Fan, 2004).

A final point of convergence between both Wang and Bai and Fei’s analyses was an emphasis on environmental protection. Both Wang and Bai and Fei identified environmental degradation as a source of poverty in western China, one that could be ameliorated through better, state-backed management of natural resources. In Dingxi this particularly means water resources.

It is worth considering the political background out of which Wang and Bai’s and Fei’s work emerged. Both these studies emerged from visits to Western Regions in the early period of Reform and Opening. Both were centrally concerned with what to do about the question of uneven development and the perceived backwardness of people in western China. Importantly both were not centrally concerned with minzu status as an identifier of backwardness. Rather, these works sought to explain how China, despite its deep economic differences, would fit together in the reform era. Following the end of mass campaigns both identified development as an apolitical terrain through which backwardness would be eliminated (Perry, 2011). If development hitherto had been a politicized series of mobilizations (such as the Down to the
Countryside Movement or the Third Front), it was now reframed as an individualized terrain focusing on improving the ‘quality of human resources’ and integrating regions with the commodity economy. Ameliorating backwardness in western China took on a central role in fitting the nation together post-collectivist era.

Once the West had been identified as an object of backwardness in need of intervention, intervention programs were planned, and Dingxi was among the first places in China to be targeted specifically for poverty alleviation (Cao, 2004). Dingxi was one part of the ‘Three Wests’ (sanxi) program. The three Wests were Xihaigu in Ningxia, and the Hexi and Longzhong regions of Gansu (Dingxi was taken to represent all of Longzhong, hence the third West). These areas were targeted for substantial fiscal transfers from the central state beginning in 1983 (He et al., 1983; Zhang, 1983 n.d.). Presaging a nation-wide anti poverty program that would emerge two years later, the goal of the Three Wests program was to eliminate poverty in these places. The poverty of these places was identified, and was often associated with a U.N. Food and Agriculture Organization report at the time that declared central Gansu and Ningxia to be uninhabitable.36 What is perhaps most interesting about the Three Wests was the identification of these three areas as a cohesive unit. Dingxi and Xihaigu are adjacent and share a common topography, the incised loess plateau, a scarcity of water, and similarly variable weather patterns. The Hexi Corridor, while similarly arid, is a much different region, both in terms of its physical geography and its recent industrial history. Irrigation water from the Qilian Mountains has made the region surrounding Zhangye in the Hexi corridor among the most agriculturally productive in western China. Several Third Front enterprises, most notably the Jiuquan steelworks, were

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36 This FAO report is something of an enigma. It is frequently referred to, but I have yet to find any official or original source from which this came.
located in the Hexi corridor, as are several critical military installations.\textsuperscript{37} While parts of the Hexi corridor are certainly impoverished, and the region is quite arid, it was very different from other regions. The ‘three wests’ then were an intellectual construction, linking two similar regions that were indeed quite poor (Dingxi and Xihaigu) with the Hexi region that, while also poor, was actually quite different from the other two. Discursively this linkage was made based on their common “aridity, poverty and backwardness” (Xinhua, 2008). Like the poverty programs to be discussed below, once the three Wests program came into being, it has proven remarkably difficult to get rid of. Although the counties involved have also come to be treated under the general anti-poverty programs of the Chinese state, the three wests program has been extended at least through 2015). Transfers were actually increased from 200,000,000 to 300,000,000 yuan per year in 2009 (Xinhua, 2008).

The construction of the West as an object in need of intervention was continued in the Open up the West campaign (\textit{xi bu da kai fa}) (Goodman, 2004). This policy, begun in 2000, aimed to remedy the differences in both social and economic development between the West and East. It is important to note that when speaking of ‘developing’ the west there have always been dimensions that are both social and economic. The goal of the open up the west campaign was never merely about improving economic performance of western China, but also included closer economic integration with the East (as called for by Wang and Bai and Fei), and general modernization. The existence of a program to specifically benefit the West creates a specific territorial construct of the West as backwards which is contrasted with the East that is viewed as

\textsuperscript{37} The Third Front was a program, begun in the 1960s, to move industry, particularly industry that was vulnerable to attack, from the coast to the Western Interior. Mao envisioned three lines of defense at the coasts, central China, and in the Western Mountains. The goal of the Third Front program was to have strategic industries located inside the third line of defense (Fan, 2004).
modern. Once inscribed in state policy, these cultural valences of modernity become territorialized.

The cultural valence of East/West as a signifier of modern/backwards has undergone de jure territorialization under the Open up the West Campaign, but during that campaign the geographical classification of ‘West’ has changed. Originally intended to cover 9 provincial-level administrative units, the policy was extended in 2000 to include 12 provinces, some of which had previously been included in the central, or even eastern region in earlier five year plans. In 2001 several autonomous counties and prefectures were added to the definition of the west used by the Open up the West Campaign, including Yanbian Korean Autonomous prefecture on the North Korean border, which is among the Easternmost places in China (Goodman, 2004). In Yanbian prefecture, being part of the ‘West’ does not signify its geographic position at all, but rather represents a spatialized understanding of the prefecture’s social position as marginal due to an association with its minority status. While officials acknowledged that it was in the East, Jilin provincial officials (at the behest of the prefecture) lobbied hard for its inclusion in the Open Up the West Campaign (Colin, 2003). West then has meanings that are both spatial and social. In addition to a geographic position in the Western portion of China, ‘West’ could also be indicated by being poor, and of having a significant ethnic minority population (Goodman, 2004). West, in other words, became a spatial signifier for backwards, in contrast to the modernity of the East. Thus the actual position of a place in the West was less important that its social positioning vis-à-vis the East.

Through the intellectual framing in the 1980s and 1990s, and state programs based on those framings that provided targeted development, the relative topological signifiers of ‘West’

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38 The Open Up the West Campaign was not the first time that the West was formally delimited. It had previously been so in the 7th Five Year Plan. See Fan (1995).
and ‘East’ have become social and political categories. ‘West’ and ‘East’ have become hierarchical signifiers for a region’s progress along the path to modernity. These ideas are both discursive, in that certain attributes are associated with the West, and formally territorially defined. As a result certain provinces, prefectures, and counties officially are classified as being Western, and in the process take on the meanings of backwardness, as well as receiving earmarked state development funds.

3.2.3. Poverty

One of the sources of backwardness associated with both the West and ethnic minorities is poverty. Anyone can be poor in China. Being officially impoverished, however, requires state designation. This designation comes through living in one of 592 “poverty alleviation counties.” While poverty alleviation targeting is common throughout the developing world, poverty alleviation targeting in China is particular because of its territorial nature (Wang, 2006). Those who live inside of poverty alleviation counties are deemed to require support to alleviate poverty, while those who live outside of those areas have historically been considered to not require support (Park, Wang & Wu, 2002).

The national poverty counties program began in 1986 with the creation of the State Leading Council on Poverty Alleviation (hereafter SLCPA). This inter-ministerial panel housed within the State Council was charged with both choosing counties for inclusion in poverty alleviation, and providing funds for those poverty alleviation programs. When the initial list of counties was assembled, the criterion for inclusion as a poverty county was a rural net income of 150 yuan per household or less for most counties (Park et al., 2002). Counties with significant ethnic minority populations or old revolutionary bases were subject to a higher criterion of 200 yuan, and ‘very important’ revolutionary base areas and some minority counties in Inner Mongolia, Xinjiang, and
Qinghai were subject to a 300 yuan criteria (Park et al., 2002). Thus from the beginning, poverty targeting overlapped with ethnic identification particularly in those areas with ethnic minority groups that were the most different. Poverty targeting also adopted a nationalist mantle by including counties that were historically important in the formation of the PRC.

When initially looking at a map of poverty alleviation counties, it is clear that such counties are disproportionately located in western China. However, Park et al. (2002) developed a probit model to evaluate which counties received poor county designation. They found that in western provinces, counties were actually were slightly less likely to be designated as poor, all other factors being equal. The cause of this was also political. While a great gap between Eastern and western China was clear in terms of wealth, the SLCPA was under pressure to include at least some counties from every province. Thus the decisions of designating which places would be considered poor were partially political with the goal of certain towns gaining political benefits.

Once designated as a poor county it proved politically difficult for the SLCPA to remove the designation, and political pressure increased for counties that were not initially designated to receive poverty county designation, resulting in a reevaluation that added counties in 1993. As a result, according to Park “Although the official poverty count had decreased from 125 million in 1985 to 80 million in 1993, the adjustment increased the number of nationally designated poor counties from 331 to 592.” (Park et al 2002 pg. 132). While it may seem strange that county leaders would lobby to have their counties designated as impoverished, the benefits were substantial in terms of special government allocations from three different programs: funds for infrastructure development, subsidized agricultural loans, and food for work programs. Because of the availability of these programs local governments find themselves in the position of positively identifying as being impoverished and lobbying for such a designation. In this way,
the local state comes to use poverty as a means of relating to levels of territorial governance beyond itself.

The identification of poverty as a spatial phenomenon, like the identification of individuals as members of an ethnic minority group, was an exercise in state backed territorial categorization. Like the ethnic categorization program of the 1950s, it aimed to do so on ostensibly objective economic groupings. Like the ethnic identification project of the 1950s, in practice this project proved to be largely political. Like ethnic classification, poverty classification was explicitly hierarchical, with some counties identified as being in need of modernity and development. The political nature of the project was both formal (in the use of higher income standards for counties that were considered old revolutionary bases) and informal (as counties lobbied their way into these designations). Like the ethnic classification program of the 1950s, which designated spatial units of administration for ethnic minorities, the poverty classification program was explicitly spatial, based in territorial units of government. In both case these forms of classification also affected how new classes of people related to the polity of China. By identifying a deficiency, poverty targeting programs identified spaces that needed to be made more modern. By addressing the gaps in modernity of spaces (as expressed by income) poverty alleviation designation created specific national spaces in need of intervention through development that would make them more modern, and thus more nationally Chinese. An important difference between ethnic classification and poverty classification, however, is that there is nothing telling that marks an individual as a resident of a poverty county. Unlike minzu classification, no marking on one’s state identification card will alert you to her origins in an impoverished county. Poverty is an identity borne by places, not people. In this way poverty differs from ethnicity.
While one resides in a poor county, that does not make one immutably poor. The identity of poverty is carried by the territory rather than the individual.

3.2.4. Urban/Rural
The difference between urban and rural territory and citizenship in China is well established (Chan, 1994; Hsing, 2010). All territory is classified as being either urban or rural in China, with fundamentally different territoriality and citizenship for the residents therein. I need not rehash the rich literature on Chinese urban geography (Chan, 1994; Hsing, 2010; Lin, 2009; Lin & Ho, 2005; Ma & Wu, 2005) demonstrating how the urban/rural administrative division interacts with the continuing role of the Hukou system to enforce inequalities within China (Chan, 1994; Chan, 2012). These inequalities are both spatial in nature, and territorial in execution. Land is classified as being either urban, which is owned by the state, or rural, which is owned by rural collectives (this distinction makes little difference in people’s actual access to land, but does allow local governments to profitably function as urban developers) (Chan, 1994; Lin & Ho, 2005). Like poverty, citizenship, meaning the rights to services residents derive from the state, is a territorially defined form of categorization in China, and the rights and responsibilities of the citizenry are tied directly to their formal territorial place of residence. Residents of the PRC are assigned agricultural or non-agricultural Hukou status, with the former providing the right to land, while the later during the Maoist period provided a grain subsidy (Chan, 1994). Because Hukou is tied to a specific place, access to state services, including education from kindergarten through university is associated with one’s place of residence. There are then clear reasons to have one’s Hukou in a larger city that provides better services. Through this spatial classificatory scheme, space in China is dichotomized. Like ethnic identity, this territorial classification of land as urban or rural can take place on a variety of scales, with land being designated as urban at the national level (e.g. Tianjin, Beijing) and every subsequent
administrative level down to the lowest level of politico-territorial organization in China. Thus one district can contain both rural village xiang and urban street jie. But all territory in China is either urban or rural, and the residents of those territories are accordingly classified, and their opportunities constricted or expanded by the nature of where their Hukou is located.

While the territorial categorization of land as urban/rural is binary, there are associated graduated hierarchies of urbanization that most Chinese would likely identify. Cities are ranked according to their place in the hierarchical level within the state: provincial, prefectural, or county (Hsing, 2010). While formalized by state actors during the PRC era, the notion of a hierarchical relationship between urban units in China has much deeper roots (cf. Skinner, 1964). Today there is a discernible hierarchy among cities based on the degree of desirability and modernity. Provincial-level cities are considered the most desirable places to live. Prefectural level cities themselves exist in a hierarchy, with cities such as Chengdu being far more desirable than those like Lanzhou. Many of my young colleagues at academic institutions in Lanzhou expressed frustration that they were at an academic institution in Lanzhou, a provincial level city far from the centers of modern culture, and were in constant search of ways to move to more desirable cities. This sense of frustration arose because most of them had, by any standard of Chinese society, been quite successful. They had earned or were studying for graduate degrees from China’s top departments in their fields, yet they were relegated to what they considered a provincial backwater. While urban areas around the world exist in similar hierarchies, the Hukou system in China makes these differences particularly powerful. Lanzhou’s backwater status shows that it is not simply the administrative level city that defines its status within China, but also Lanzhou’s location on the periphery. Yet as a provincial capital Lanzhou was considered far more desirable than prefectural cities, such as Dingxi. But even Dingxi was considered quite
desirable by peasant families. The wealthiest peasant families that I interviewed would find ways to live in the nearby prefecture level city if they possibly could. These were people who were successful as entrepreneurs within the village, and would purchase an apartment in the city. What is important to see about these hierarchies is that they structure the relationship among places, and while there are administrative channels that rank the importance of places, there are also less formal hierarchies of urbanization that make some cities less desirable than others.

3.2.4.1. Down to the Countryside Spatializing the Urban Rural Divide

The relative spatial positions of urban and rural spaces in China can be seen through the various campaigns to send items down to the countryside. The countryside is always a space to which one metaphorically descends. The best-known phrase to describe this, “to go down to the countryside” (xia xiang) has its origins in the rusticated youth movement of the Cultural Revolution (Unger, 1979 though antecedents of the movement date to the 1950s Perry, 2011), but the spatial metaphors of descent from central or urban areas to the countryside have far deeper roots. For example, when describing someone from an urban area of China they are generally described as being sent down from the center. I encountered this often myself. As a researcher in rural China, whenever I ran into problems with recalcitrant village level officials, my local contacts in the water bureau would remind these people that I was “sent down from the center” (zhongyang xialai de) because of my associations with the Chinese Academy of Sciences.

While initially concerned with the Cultural Revolution, the idea of going down to the countryside has taken on new valences, both positive and negative in recent years. As part of the Chinese state’s response to the global financial crisis in 2008-2010, a wide variety of subsidy programs were created to stimulate consumer demand in rural areas (Liu, 2008; Ministry of
Many of these focused on rural consumers under the guise of various “down to the countryside” programs. Such programs had dual goals. First, by stimulating demand for manufactured goods they could stimulate the Chinese economy at a time of economic volatility. Second, they accorded with the general approach of the 11th five-year plan that called for increased social spending on rural areas. Through these programs, household electronics, solar water heaters, cars and motorcycles all went down to the countryside. Perhaps most interestingly, agricultural equipment was also sent down to the countryside (nongji xiaxiang) though it is unclear where else it would go! In each of these cases the goal was to provide elements associated with urban modernity (cars, electronics, motorcycles) or modern economic organization (agricultural machinery to the countryside), through state intervention. Most worked similarly, with a set reimbursement of the purchase price (respondents and advertising reported that this was usually 13%) provided by the state (Liu, 2008; Ministry of Commerce of the People's Republic of China, n.d.). Other symbols of modernity go down to the countryside through state policy as well. While I stayed in Village 3 the movies came down to the countryside (dianying xiaxiang), through a program apparently arranged by the village committee. A projector and large screen were brought into the village and set up along the main thoroughfare, and a movie was played as trucks hauling rocks for a nearby highway construction project continued to rumble along one side. They showed Jinying, a Qing dynasty epic popular at the time. The goal of this program was to improve the lives of backwards people living in the countryside by bringing elements of modern urban life to the countryside.

As the movie played I talked to a 14 year old who was leaving the village to go to middle school in the local city the next fall. He said the movie was boring, so he was not watching it. He had seen plenty of movies through the DVDs sold in the village, and knew this one was bad. This
revealed the irony of this particular attempt to bring modernity to the countryside. Although local government wanted to bring modernity to this village through entertainment, modernity had already arrived in great enough quantities for a local teenager to critique the movie. Most families have TVs, and enough families have DVD players that movies are not a particularly foreign idea to this region. Each of these efforts to bring something down to the countryside establishes a relationship wherein modernity, whether expressed through household electronics, water heaters, or movies, is something that moves from a superior urban space towards a backwards rural space. This creates a spatial hierarchy of modernity between national urban spaces and national rural spaces. This movement of modernity is explicitly directional: modernity, in the state backed xiaxiang programs flowed downwards towards the countryside. The countryside, in such an imagining, is explicitly backwards. This theme can be seen in Figure 3-2, which was a cartoon made to promote the ‘electronics go down to the countryside campaign’ in its early stages. Here modern electronics literally march from the city to join two very backwards-looking peasants. The peasants in this drawing are presented as timeless and traditional, one squats on his haunches while watching modernity arrive. The peasants here are passive, watching as elements of modernity march into the countryside, literally propelling themselves.
Importantly, the notion of ‘going down to the countryside’ also includes the implication that the state is the agent of this transfer. When elements of urban modernity, be it televisions, automobiles, or DVDs, arrive in the countryside through the capillary action of capitalism (Hart’s (2001) little d development) without active state backing they are not said to xiaxiang. State backed xiaxiang programs are then a form of active state development to make the countryside more modern. Going down to the countryside then is a way of constructing a difference between urban and rural areas that is backed by the state. These differences may be real or perceived, but regardless, they create a spatial hierarchy between urban and rural that is based upon a teleological notion of modernity. Modernity is seen to originate in urban areas and spread, with the help of the state, to rural areas. Thus going down to the countryside is as much about establishing the position of the countryside as being metaphorically lower than urban areas.
as it is about delivering modernity. When modernity goes down to the countryside, rurality is categorized in an inferior position relative to modern urban centers.

The urban/rural hierarchy, like the hierarchies of ethnicity, East/West, and poverty has both a de jure politico-territorial element of spatial categorization and a discursive element hierarchically relating urbanity to modernity and rurality to backwardness. This discursive construction of rurality is teleological in that it allows for the possibility of rural areas becoming more modern and more urban. The de jure politico-territorial organization and discursive hierarchy largely, though not exclusively overlap. The cultural equivalence of urbanity and modernity was perhaps best stated by Fei Xiaotong, who described his evening walk from Kunming to its surrounding countryside as showing “(t)he whole process of cultural development—from the primitive head-hunters to the sophisticated and individualized city-dwellers” (Fei & Chang, 1945, p. 9). Fei described leaving Kunming, the center of modernity, as a progression back through time as he leaves the city. He compares an evening walk from Kunming as having gone from New York to Papua New Guinea in one day.

Each of these four forms of hierarchical categorization—minzu, East/West, poverty, and urban/rural, are valences of a larger hierarchy of modernity and backwardness. The progression towards modernity structured by each of these hierarchies establishes them as constituent parts of a larger Chinese national identity. In each case some national spaces are identified as being insufficiently modern in terms of a national ideal and in need of amelioration through development. The processes of development necessitated by each type of backwards spaces are how these regions are framed as fitting within a larger Chinese national identity. By being in-process of realizing national development through modernity, these spaces are imagined into the
nation. However, this imagination is does not simply originate in the center, it is also reflected in local actions.

The binary relationship manifest in these spatial categorizations of modern/backwards has similarly been discussed by Yan (2003; 2008) with relation to the concept of suzhi. Suzhi is something that is difficult to define, but means roughly quality, and is only used to describe humans. Yan argues that in the reform era suzhi has become a marker that differentiates between modern and backwards. Suzhi functions as a form of governmentality, by encouraging individuals to adopt subjectivities that are market based and encourage improving personal quality. Suzhi is generally marked on the individual, and individuals can aim to improve their own suzhi. While it is difficult to identify exactly what suzhi is, official discourses surrounding suzhi have identified where suzhi is low: in the west, in ethnic minority areas, in the countryside, and in poor areas (Yan, 2003). In other words, Suzhi is low in all of those places marked as backwards in official discourses discussed above. While my concern here has been with how certain places are marked by their backwardness, that marking extends to individuals as well. While the idea of suzhi did come up when I spoke with village leaders, particularly about education, I never encountered ideas of suzhi being discussed by peasants themselves. For this reason suzhi is a parallel discourse of modernity and backwardness with similarities to the forms of classification discussed here, but one with which this dissertation does not directly engage.

3.3. The Ritual of Poverty

In the fall of 2009 Gansu television created a multi-part series about poverty eradication efforts in Gansu, focusing on Dingxi County (Gansu Provincial Television, 2009). This mini-series opened with a shot of Hu Jintao visiting Daping village in Dingxi County during Spring Festival. In the clip we see him meeting with a rustic looking bearded peasant, deep-frying a
local delicacy in the peasant’s sparse home, feeding a boiled potato to a young girl, and stuffing dumplings (a common Spring Festival activity) with peasants. However, diplomatic cables released by Wikileaks explained in detail how this encounter was performed by a diverse set of actors (US Embassy In Beijing, 2009). The peasant was ordered not to shave to maintain his rustic (and backwards) looks. The house was not to have any modern electronics added to it. A stove, however, was added to fry the bread. Worried that Hu would burn himself, the fry oil was only heated to 70% of its normal temperature, and the bread that Hu fried was inedible (he was photographed eating bread that had been fried in advance). The young girl refused to eat the potato, initially claiming that they ate them all the time, and only after much cajoling agreed to the shot that was shown on the news. The local party secretary viewed this as a once in a lifetime opportunity to promote Dingxi potatoes, and insured that potatoes played a role. Dumplings were stuffed, even through people in Dingxi do not generally eat dumplings at Spring Festival. Instead this was seen as a general activity of peasants anywhere in China. In this staged event each actor played a role. The peasant was backwards and humble. He shared both the local specialty, and food recognizable to anyone in China with his down-to-earth guest, President Hu. This draws attention to the central role of ritual in understanding poverty as a basis of national identity in Gansu. Being poor in Dingxi may be an official act, but it is also a ritual act of ideological recognition. That is to say, poverty as a category of state action only comes into material being through the recognition of the role that each actor plays. In this case the category of impoverished space was created as a quite literal performance for national television, but many smaller scale daily acts also perform poverty. If the role of Gansu is to be impoverished, the identity of impoverishment is frequently reinforced through ritual performances by state actors, local officials, and peasants. Such ritual actions do not only happen when high ranking officials
visit the province, but whenever locals deal with outsiders of all levels: the people of Dingxi relate to those outside Dingxi by performing poverty.

Althusser’s theory of interpellation allows us to think through how impoverished subjects are created in Dingxi (Althusser, 1969). Althusser argued that interpellation was a means through which subjects of an ideology come to recognize themselves as such. Interpellation means literally to interrupt, and Althusser uses interpellation to mean the ‘hailing’ or interjection by an outside force through which the subject comes to recognize itself as such. Althusser gives the example of a police officer calling ‘hey you.’ By turning his head the subject recognizes his position and in that way becomes the subject. The idea of the subject for Althusser contains a double meaning. First, a subject is one who is capable of acting and is capable of doing. The second meaning is the subject that is inferior to a higher power. To Althusser these two ideas are compatible because it is through one’s own actions or recognition that one becomes subjected to an ideology (Althusser, 1969).

To Althusser, interpellation happens through ‘rituals of ideological recognition’ (Althusser, 1969). Such rituals occur in both day-to-day interactions and in less frequent highly ritualized occurrences. But in each case the interpellation is relational between the ‘ideological state apparatus’ that is doing the interpellating and the subject that is interpellated. One does not interpellate oneself alone, the process must be done with relation to a larger social force and is an expression of power by the ideological state apparatus over the individual. It is through these acts that the ideas which constitute ideology come to be materialized in the lived lives of individuals. In this way those who are categorized by development projects become subjects.

The particular ideological state apparatus that interpellates peasants, and officials, in Dingxi is that of national development. A key feature of an ideology, for Althusser, is that it appears
non-ideological. Thus, for development in China to function as an ideology it must appear natural and non-ideological. This naturalization is accomplished in the ideological apparatus of development by framing problems as solvable through solutions that are technical in nature, a process reflected in both Ferguson’s (1994) idea of development as the anti-politics machine and Li’s (2007) description of rendering technical. Problems of development are not ideological, but rather are mere technical glitches in a self-evident and natural path towards modernity. The idea of removing politics from questions of development can be seen in the Chinese state’s disavowal of the use of the term *campaign* in the post-Mao period (Perry, 2011). Campaigns were explicitly political in nature. If often serving goals of development, the campaign approach framed such problems in terms of struggle and sacrifice (as will be shown in my discussion of the Yintao project in Chapter 4). In the post Mao period such ideas have been eliminated and reformulated as questions of mere management. The poverty of Dingxi is officially described by state policies of territorial poverty alleviation. It is discursively adapted by state actors and non-state commentators who describe the poverty and marginalization of Dingxi. It is also interpellated through the actions of several actors. First, peasants are interpellated as impoverished subjects whose subjectivity is constituted by their classificatory status within the state apparatuses of development discussed above. Second, local officials as representatives of their villages are interpellated through their interactions with those who come to their villages. Finally, extra-local leaders (both central and provincial) place the region of Dingxi as being impoverished through inspections of poverty alleviation efforts in a ritual that draws in the inspection tour (*xunshou* 巡守) tradition of imperial sovereignty.

To be clear, interpellation does not materially impoverish people in Dingxi. Residents of Dingxi are already materially disadvantaged. Rather, through rituals of poverty in Dingxi
peasants are interpellated as subjects of the powerful state *category* of impoverishment with respect to the broader polity of China.

### 3.3.1. Rituals of Poverty in Peasant Households

The first level at which subjecthood as impoverished is interpellated in Dingxi can be seen in peasants themselves. Poverty and backwardness are how peasants in rural Dingxi have learned to relate to outsiders, and peasants have developed a set of ritualized responses to prying outsiders—including officials, engineers, and social scientists—that emphasizes their poverty. This is because under current relations with the provincial and central states, being poor is both an effective way to relate to outsiders, and the relationship that outsiders expect of local peasants. This is not to say that poverty is a totalizing identity for such people, indeed they may have a wide variety of other identifications that they adopt under other sets of circumstances, for example, when working in a city, or participating in a Muslim religious observance. Rather poverty is the primary form of identification as Dingxi-in-China people when dealing with outsiders in their villages.

An impoverished subjectivity is reflected in Dingxi through a series of expressions. One of the clearest of these arose whenever I asked people what possessions they had. People would often say “*shenme dou meiyou*” “I have nothing”. This denial of material wealth usually came up upon asking the respondent about the first item on a list. It was usually the response to the first couple of questions and seemed to be a way of illustrating to me that the respondent was impoverished. Interestingly, this insistence would die down after a few responses, and respondents would either demur on answering further question, or would return to answering as they had before. There were three interesting things about the performance of denying owning
anything. The first was the fixity of the expression: most everyone who denied owning things started with the phrase “shenme dou meiyou.” I did, at times, have people explain to me that they were poor in other ways, but starting with the expression “shenme dou meiyou” was by far the most common. The fixedness of this expression allowed interviewees to draw upon an immediate metaphor that was so common between people that I quickly came to recognize it. I quickly developed a shorthand notation for this statement, similar to the shorthand that I used to record statements about crops. The second element that stood out about this expression was the level of emotion and bodily enthusiasm that people expressed when telling me they had nothing. Respondents who had remained fairly calm throughout the interview would become far more animated raising their voices and making a distinct back and forth waving of their hands in telling me that they owned nothing. Performing poverty in this case was bodily, as well as verbal. Finally, whether people uttered the phrase “I have nothing” had little relationship to whether they were actually relatively well off or poor compared to their peers: saying that they had nothing was not particularly indicative of not actually having anything. I was told by the wealthiest families in villages that they had nothing, and by the poorest. I was even told that by one peasant that he had nothing, as he pointed out to me his numerous material possessions. Peasants saying that they had nothing was instead an act that reflected their interpellation by the classificatory hierarchies of being impoverished and backwards in China. When approached by people from outside of the community, many believed that the best approach was to emphasize one’s poverty.39 Quite simply, those who arrived in this designated poverty alleviation area generally came for the purpose of proposing some form of project or another, and for those

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39 Presenting poverty in rural areas is but one example of how local people, both officials and peasants, express suspicion of outsiders and those representing distant powers. This topic is thoroughly discussed by Oi (1989).
purposes, it seemed a good idea to emphasize how poor one was. But this response had become ingrained to the point that it was a fixed expression, which was also viscerally expressed.

This denial of material well being extended to people avoiding admitting that they owned things, or explaining away the things that they did own. One respondent denied having a DVD player that was sitting in front of us. In Village 5 every tractor in a courtyard seemed to be owned by the respondent’s brother. There was a practical reason for consistently understating one’s material wealth, and this was not an irrational act on the part of respondents; I was recording information about them. Performing poverty to outsiders is how rural northwestern China receives development money. The more impoverished a household appears, the more likely many believe it is to receive the benefits of development project, whether is a water cellar, housing subsidy, or seeds for crops. Although I assured everyone that my role was not to begin some additional development project, most people assumed that was precisely my role. In fact, the more I described to respondents that I was merely performing a survey the less they believed me. I ate lunch with one elderly lady in Village 5 who kept asking me what I had come to deliver to the village. She guessed houses (not a bad guess as the entire rural area is undergoing the New Socialist Countryside Construction Program). She did not believe that I was simply doing research and encouraged me to “zai fupin yixia” to “continue alleviating poverty.” In this case I, as an outsider, was the one failing to perform my prescribed role: to help with development.

Local peasants are interpellated as subjects who are not only part of a class of being impoverished, but also part of a category of being backwards. Backwardness came up with peasants in one specific way: how they thought about themselves as modern now. Several interviewees, when asked why they had begun to apply fertilizer to their crops, reported that in the past they were ‘backwards’, or that in the past they ‘did not believe in science.’ The notion of
believing in science is itself interesting. Those who said that in the past they did not believe in science consistently used the word xiangxin, a word for belief that is used to describe religious belief. Those who used this language to describe their farming were usually not the farmers that one would consider the most ‘scientific’ in their practices. They often did not know how much of various pesticides and fertilizer they applied to their lands. In contrast those who were more judicious in keeping track of their inputs and outputs described the intensification of chemicals in terms of gaining higher yields, instead of an increased belief in the general category of science. Thus the notion of believing in science truly is one of belief. Applying fertilizers and pesticides are rituals of modernity in agriculture, and through using pesticides and fertilizers these peasants perform their progression from backwardness. This is not to say that there are not material benefits to using modernized agricultural techniques. However, those who speak of the change in terms of ‘believing in science’ and ‘backwardness’ adapt these changes to direct changes in material identities, as well as changes in agriculture. This belief in the science of modernity is quite similar to the beliefs about science and modernity that Gupta (1998) has revealed among farmers in rural India. In this case, as in Gupta’s belief in science is one way that peasants are ritually connected to the modern state. These peasants are adopting the hierarchies of modernity, and finding ways to fit themselves within these hierarchies by using rituals of modern science to move themselves forward.

According to Althusser, interpellation calls subjects into being, but exactly what type of subjecthood is called into being by these rituals of peasant poverty? Peasants in Dingxi are interpellated by a national development discourse into the category of impoverished and backwards peasant. As with Mitchell’s (2002) study of peasants in Egypt, these peasant subjects then need to be acted upon through development to become fully modern. By embracing an
identity of having been backwards and being in the process of become more scientific this is exactly what these peasants have done. Moreover, they are calling into being the category of being backwards within the nation state. This interpellated subjectivity is based in an explicitly relational conception of poverty. Peasants in the villages make a performance of poverty to demonstrate that they are poor relative to those outsiders with whom they are interacting. This positioning of poverty is deliberately the inferior position within a hierarchy, thus those in poverty perform their way into a lower status. But performing that lower status is also related to the national polity of China. Thus the official discourses of categorical poverty have come to be embraced by peasants in rural China. The instances of poverty illustrated here interpellate peasants as impoverished in two unique ways. In the first instance, the performance clearly places the peasant in the subordinate position of being impoverished and backwards, which then calls for state intervention of alleviate their poverty. In the second instance, peasants are illustrating that they have begun to move forward through this teleology by becoming more scientific.

3.3.2. Local Cadres and the Ritual of Poverty

Local government leaders, as well as peasant households are interpellated by the discourse of national development. These government leaders are interpellated as representatives of the places they govern, and their interpellation has much to do with identifying their locality as being backwards. Over dinners, games of cards, and while inspecting their villages local leader after local leader would tell me about the poverty of their places. Like peasants, local leaders have adopted an emphasis on poverty as the primary means of relating to outsiders who come to their villages. While less programmed than the set phrases of peasant households, local officials still perform to outsiders a list of actions and descriptions that identify their regions with poverty.
In one village I dined each night with the local party chief, Secretary Liu. He was a boisterous man who wished to illustrate that he was central to this village and knew most everything about it. What he most emphasized was the poverty of where he lived. He described his village as ‘being rich in land, but without material things’ (di duo wu shao). He told two jokes about the poverty of people in his village that are illustrative of how state leaders use poverty to place Dingxi in China. The first, is that people in Dingxi only bathe three times in their lives, when they are born, when they marry, and when they die. This joke, common in northwest China, is intended to illustrate how little people in Dingxi use water, while more subtly poking fun and people from Dingxi as being unclean and backwards. What was interesting in illustrating the position of Dingxi within China was this cadre’s framing of the joke. When he told the story, bathing was the shocking discovery of a young person who left Dingxi to go to university. Thus what is a common saying in eastern Gansu, that bathing is something peasants will only do thrice in their lifetimes, became an act of interpellation by reframing the story in relation to the larger area of China and categories of modernity. Secretary Liu actively positioned the people of his village as being backwards and unclean relative to a national construction. This is a statement about the shortage of water and the general level of deprivation of the areas. Yet, this deprivation only became relationally established relative to a more prosperous and modern spaces and institutions of China through telling the joke. In the cadre’s telling, when a peasant from Dingxi is presented with modernity, by receiving a university education, they did not quite know what to do with it.

The second joke about a peasant was more elaborate, but ends with the punch line that only the peasant was left in the village, even his mule had gone to the city to work. Like secretary Liu’s first joke, this joke frames poverty in relation to other areas of China. In this case the joke
calls upon the urban/rural hierarchy to frame the poverty and lack of opportunity in Dingxi against urban areas. All opportunity was seen to be located in the urban areas while rural areas were seen to be backwards and without opportunity. The relative lack of opportunity in Dingxi is real and acute, but it is called into being as a category vis-à-vis greater China through the telling of these jokes.

In Village 2 I played cards with a group of cadres one afternoon. They came from the valley floor, and had just finished conducting a project in this mountain town. I spoke with a man two years my senior who had graduated from college the same year I had about how Dingxi fits more broadly into the nation. He said that although Gansu is not the poorest place in China, it is the most backwards (the epigraph that began this chapter). He thought that places in western Sichuan, Guizhou, Guangxi, and Yunnan were poorer. He said that this is because those places have stone mountains, and it is impossible to cut roads through, which leaves the people more out of touch and less able to develop. Nonetheless, he thought, people in Gansu are the most backwards, because they have the most backwards attitude and thinking. Those in the South have more open minds, but their physical environment doesn’t allow them to prosper. Thus development and backwardness existed to him as two dimensions of a national map. Dingxi’s poverty and its backwardness existed in a ranked hierarchy (although he didn’t know from where this hierarchy of backwardness came). Whereas development was related to topography, backwardness was related to people’s attitude. In the South people had a less backward attitude. South China, he said, was a beautiful woman born of a modest home (xiao jia bi yu). The North, he said, was just the opposite: of a prosperous background, but squandering it. This is what made Dingxi the most backwards place in China. This telling by a cadre shows an implicit awareness that other areas of China must not be so backwards. This cadre was interpellated as a resident of
Dingxi along two axes, one of poverty and one of backwardness. Faced with the conundrum that other places in China were poorer, and a possible explanation why (their mountainous environment) this cadre located Dingxi’s backwardness in the thinking of its people by deploying a different form of spatial reasoning, that the South China is more open, while the North is more conservative.

The theme of backwardness often came up when I asked cadres what was changing in the countryside in rural Gansu. One of the most frequent answers to this question was that the level of culture or education (wenhua shuiping) has been rising. This was often phrased in terms of education for children. Leaders in several villages reported that education is now far more heavily emphasized than in the past. Secretary Liu in Village 1 told me “10 years ago parents did not emphasize reading, today they do.” On another occasion he listed to me a litany of places where students from his village had gone to university all over China. He listed a few bigger name schools, Sichuan University and Xiamen University, but also less prominent schools if they were in a different part of the country. What he wished to impress on me was as much the variety and geographic breadth of schools where kids from the village had gone as the quality of the schools. Sending students to high power universities however, was also a goal. One student from Village 2 had matriculated to Beijing University (among China’s top universities) in 1986, a feat that was still talked about 25 years later. When I asked leaders in Village 2 the reasons for these changes in education they told me that there were two factors. First, as labor migration has increased peasants increasingly need to be able to read. An illiterate peasant who goes to work (da gong), the leaders told me, is like a blind man in the city. The second change is the increasingly ‘scientific’ nature of agriculture, particularly the use of fertilizer and pesticides. For local leaders this emphasis on education is often linked to notion of improving the quality (suzhi)
of the populace. Local cadres link this to having smaller families, and better education, and moving to more urbanized areas of the village.\textsuperscript{40}

There are occasions when the presentation of a village by local party chiefs is not dedicated to its poverty, but in these cases, the theme comes from the related issue of development and how successful they are at alleviating poverty. Village 3 is a clear example of this trend. The chief in this village was quite energetic in bringing development projects to the town. This was partially because this village had earned the designation of being a model village following a visit from Jiang Zemin in the 1990s (see below). However, the leader still had to compete to bring projects into this town (which administratively sat below Village 1), and he had succeeded. He would often tell me about all of the specific projects that this village had, vis-à-vis other villages in the valley. It had two of three large-scale sheep raising facilities. It had more chicken barns than any other town in the valley. It had more new houses (and ones that were qualitatively better) than other villages. Yet the performance of presenting this town remained linked to poverty. In each of these cases he hoped to highlight the successes of the local development state in these towns. There was no hope of bringing in outside investment. Rather he presented this town as being the best at alleviating the valley’s chronic poverty. Thus, even when describing his town’s success, he did so with reference to the category of poverty.

Each of these three village leaders or local cadres was interpellated by the discourse of national development that classifies Dingxi and its inhabitants as impoverished and backwards. The jokes, tours and statements made to me about poverty in Dingxi were each instances through

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\textsuperscript{40} Suzhi has received much attention as a form of governance in China (see Yan, 2008a). I do not expand upon it here because few peasants that I dealt with had much to say about Suzhi, and my only encounters with it came from village cadres.
which local leaders summoned their villages to fit into the broader polity of China through the ideological categories of development that had been assigned to them.

3.3.3. Central Leaders and the Ritual of Inspection.

“Historically Eastern Gansu has been famous for its suffering, that refers to Dingxi. In the last few years Dingxi’s social and economic development have had a joyous improvement. It has benefited from the return cropland to forest program, it has benefited from economic restructuring, and it has benefited from people leaving to work outside. But Dingxi still has too many people whose annual income does not reach 1200 yuan per year. It is still the entire nation’s poorest place. The party and the government have always been concerned about the people of Dingxi. I have visited Dingxi four times, and each time it seems that Dingxi’s situation is better. When I came in the 1980s, the dirt roads took half a day to traverse. Today the roads have been improved, the problem of children going to school has been solved, medical treatment has basically been solved, old age insurance is step by step being solved, this place still has a future, each year is better than the last. Most importantly, in the next few years the Yintao engineering project will begin, in the future there will be hope of solving the shortage of water, and making the common peoples’ lives better and better.” —Wen Jiabao, 2009. Quoted in (Li, 2009)

This statement, made by Chinese Premier Wen Jiabao during a 2009 visit to Dingxi, does many things. It establishes Dingxi as categorically poor, and categorically poor in relationship to the polity of China. It establishes how the central state relates to the peripheral place of Dingxi, through the means of care and development. It lays out what development for Dingxi will look like in the form of roads, education, medicine, and water. But most importantly these categories and relationships are established by the ritual and statements delivered by Premier Wen. Premier Wen’s visit was an important act that did not merely represent the relationship between Dingxi and the central state, but actually was constitutive of that relationship. Nor is Wen alone. The Zuli Valley has been visited by Hu Jintao, Jiang Zemin, and Li Peng, each of whom came to perform the ritual of state benevolence through development. While the role of the leader is to illustrate benevolence, the very act of visiting creates a set of relationships between places classified as the periphery and the center. Leaders come to villages to inspect (shicha) the situation on the ground. These visits constitute a performance of sovereignty over an area, but
also are deeply linked to notions of poverty. The notion of leaders coming out to the countryside for inspections arises from much older in Chinese ritual of political space: the imperial inspection tour or *xunshou*. While modern day tours of inspection differ markedly from their imperial predecessors, certain acts of continuity remain. Yet the ritual of poverty alleviation assigns new roles to these ritual visits to the countryside.

![Chinese Premier Wen Jiabao inspects reforestation efforts in the Zuli Valley. October 17, 2009. Such inspections are part of the ritual through which periphery relates to the center. Source: (Li, 2009).](image)

### 3.3.3.1. Imperial Tours of Inspection

Wen’s words in the Zuli Valley were largely boilerplate language associated with development across rural China. Rather than the content, the significance of his visit was in the very fact of this arrival. It is the coming of leaders to poor counties to say these words that is a performative act of state sovereignty. It is the fact that the leader departs the center of state
sovereignty and visits remote portions of the country that makes this a ritual act. In doing so, the act of visiting Dingxi draws upon an imperial era tradition of expressing sovereignty: the inspection tour. While today’s visits are not labeled as xunshou the ritual aspects of leaders visiting is largely familiar. These acts, following the imperial xunshou, call into being the relationship between the central state and peripheral areas.

The imperial inspection tour was a specific way that leaders moved through state space. The etymology of and use of xun, 巡 is telling of the particularities of that movement. Xun means to circulate, and the term that would become provincial governor (xun fu 巡抚) began in the late Ming meaning ‘circulating inspector,’ and initially was just that, an ad hoc representative of the central state sent to circulate through the province. Indeed xun continues to be used to mean ‘patrol’ in a military sense in the word xunluo 巡逻. The etymology of the character shou in xunshou, is also telling. In its earliest uses the second character shou 狩 meant to hunt with dogs and had distinctly martial overtones, suggesting that the military power of the state was never far away (Chang, 2007). By the Spring and Autumn period (771-476 BCE), the term xunshou 巡守 came to replace the previous phrasing xunshou 巡狩. This was a slight change, but according to Chang removing the dog radical from the character xun “reflected a subtle, yet clear differentiation between civil and military modes of governance “ (2007, p. 41). What is important in understanding this etymology is the clear roots of the tour of inspection in establishing state sovereignty in China, and that it was not divorced from the use of force. Although the tradition has waxed and waned in use as a political instrument by different dynasties, by the Qing dynasty, inspection tours had become central to the management of relations between the imperial center and potentially restive spaces in southern periphery of the Qing state. Chang (2003; 2007) has illustrated that the Southern tours of the Qing emperors were
central to mediating the relationship between the imperial center in Beijing and the region of Jiangnan, which had the potential to function as a rival power center. While much of the historiography of Southern tours of the Qing Kangxi and Qianlong emperors has emphasized the administrative function of these tours, according to Chang, the southern tours of the Qing Dynasty were “ideological exercises…a set of discursive and symbolic practices that generate specific meanings in the service of power” (2007, p. 8). It was through these spatial discursive and symbolic practices that Qing rule was made in the Jiangnan region.

The current peregrinations of leaders across the Chinese landscape are generally not considered to be a xunshou, but are described with language that similarly describes investigation. Most frequently the terms that are used are shicha and jiancha, which similarly means to investigate or inspect. The character xun has, however, at times been used in more recent discourse. For example, Deng Xiaoping’s Southern Tour in 1992, which was widely credited with establishing that in the wake of the Tiananmen Square incident economic reforms would be continued (Zhao, 1993), was referred to as a nanxun (Doar, 2007) using the same language that described the best known trips of his Qing predecessors.

3.3.3.2. Contemporary State visits and the tradition of imperial inspection

Certain elements were usually included in an imperial inspection tour. During these tours emperors would inspect public works projects, particularly roads and water works. They would enquire about local conditions. They would bestow honors and gifts on local officials. They would communicate with the common people, asking about the aged and infirmed. And quite importantly, they would be seen. Inspection tours were very much spectacles of imperial sovereignty. Many of these traditions have carried over into present day, and Premier Wen’s 2009 trip to Dingxi may be considered in terms of these elements. He inspected public works
projects, even going so far as to plant a tree and dig potatoes. He praised the future of water management in the area. He asked peasants how their crops were this year. He visited local units of government, and his picture now adorns their walls. He held babies and had sat with several peasants. His visit was very much a media spectacle: everywhere he went he was flanked by reporters, and even his most heroic photographs cannot quite escape including a microphone (Figure 3-3). Through these acts Premier Wen continued the ritual elements of state sovereignty associated with the inspection tour as he visits the Zuli Valley.

If visits by state leaders are tours of inspection, there must be an object of inspection. Historically that object has varied but has generally been those issues most pressing for maintaining state legitimacy. Early tours were often military in nature (if conducted under the pretext of hunting), and were intended to discourage military rebellion. Historically such tours often focused on visiting potentially restive tribute states and visiting religiously significant mountains, also important elements in maintaining political order (Chang, 2007). Perhaps the most thoroughly studied historical tours of imperial inspection, the Southern Tours of the Qianlong Emperor, had a two-fold purpose: inspecting waterworks in the lower flood prone Huai/Huang watershed, and culturally ingratiating himself with the Han elite of the Jiangnan region who were suspect of Manchu Qing rule (Chang, 2003). Both of these political imperatives were central to creating legitimacy for the Qing state. Inspection tours of Dingxi almost always focus exclusively on issues central to the construction of state legitimacy in western China: poverty and economic development. Elsewhere in the nation and province, inspection tours focus on other elements relevant to those locations’ role within the nation. For example, Wen’s 2009 trip also included an inspection of historic preservation work in Dunhuang in western Gansu, a site of national pride based on its history and art (Li, 2009). In Dingxi itself the focus of such
inspection tours is almost always poverty and poverty alleviation measures. On Wen’s 2009 trip he inspected a reforestation site, a potato farm, a potato development zone, and chatted with common people about how their lives were improving. In each of these sites, Wen’s focus was on questions of development. Similarly a visit by President Hu Jintao to Dingxi in 2007 also focused almost wholly on questions of development (Gansu Provincial Television, 2009). During each visit leaders from the central or provincial government will make visits to locations or elements through which the particular locality relates to China as a larger polity. By showing concern for poverty in Dingxi state actors are not simply responding to poverty, but actually making poverty the primary means through which Dingxi relates to the nation. Because the ritual of inspection of the periphery by the center focuses on poverty, poverty is so made the category through which Dingxi as a place relates to the greater polity of China.

Wen’s 2009 visit to Dingxi shares further parallels with the Qing Dynasty imperial inspection tours in that the performances of both the Qing emperors and state leaders visiting Dingxi has focused on the state’s management of nature for the benefit of humanity. Wen Jiabao planted a tree in Dingxi to contribute to controlling water management, and told residents of the future benefits of the Yintao project (Li, 2009). The Qianlong Emperor did not plant trees himself, but did order the planting of trees during a 1751 inspection tour to solidify the water works at the confluence of the Huai and Yellow Rivers (Chang, 2003). The inspection tours of both the Kangxi and Qianlong emperors have often been analyzed as being primarily exercises in the management of hydraulic engineering projects. However, insomuch as these inspection tours were indeed exercises in administering water resources, they were also political acts demonstrating the Imperial concern for water management in the lower Yellow River valley (Chang, 2003). The Qianlong Emperors visits did little to change the on the ground management
of water resources at the vital confluence of the Huai and Yellow Rivers; instead, his visits were a demonstration that the state was concerned about the issue. Similarly, the visits by Hu Jintao, Jiang Zemin, and Li Peng have for the most part had relatively little influence on the policies of poverty alleviation (with the important exception of Li Peng’s 1995 visit noted in Chapter 4). During the Southern Tours of the Qing the focus was on controlling the siltation and the flooding of the Yellow River, while today in China the focus lies on managing the potential shortage of water. But both of these types of inspections have had much to do with illustrating the state’s concern for ameliorating natural disasters involving water.

One of the major reasons for the Qianlong Emperor’s repeated southern tours was the prevalence of natural disasters in the lower reaches of the Yellow and Huai rivers during the 1730s through the 1760s (Chang, 2003). The concern for natural disasters also bears a similarity to inspection tours of modern state leaders to Dingxi. While tours have occurred at all times, they have been often been specifically related to ongoing natural disasters. For example Li Peng’s 1995 visit to Gansu, including Dingxi, which would go on to prove crucial in the unfolding of drinking water projects in the area, occurred as a direct result of the severe drought taking place at the time (Zhang & Chen, 1995). Drought was a major concern at the time, and Li Peng was followed six months later by Jiang Zemin. Both the Qianlong Emperor and Li Peng arrived in disaster stricken areas of the polity to perform the benevolence of the state in helping to relieve the disaster. In both cases they used the performances to announce new measures to help fight the disaster: in the Qianlong Emperor’s case new flood control (Chang, 2003) measure; in Li Peng’s case new funding for drinking water supplies (Cook, 2005). In both cases the state leaders had difficulty living up to the promises that they made to commoners during their visits (Chang, 2003; Cook, 2005). However what mattered for these visits was not what was accomplished in
terms of disaster management, but rather the ritual of the sovereign arriving to illustrate the care of the state.

Like the peasants who are interpellated into the classification of being impoverished, the ritualized visits of central government leaders perform a categorization of Dingxi as impoverished into being. Yet, the reason why such poverty must be emphasized is so that it may be ameliorated. That amelioration occurs through development and development is also a major theme that is on display when state leaders visit Dingxi. Yet there are elements to the new inspection tours that differ significantly from those of the imperial era. The first is duration. In Wen’s trip that is closely remembered in the valley, he spent a mere morning in the valley. Imperial inspection tours were generally months at a time. As a result there are many more inspections of more places by central leaders today than there were during the Qing. The second is the scale at which the grandiosity and spectacle of the inspection tour occurs. While the Southern Tours of the Qing Emperors (and that of Jiang Zemin) attracted national and international attention the spectacle of the shicha in Dingxi is much smaller. These visits are featured prominently in the provincial press (they are usually aired on national TV, but with little fanfare). Thus the spectacle of such visits can be seen as a ritual through which the provincial scale government polity relates to the national state. Similar inspections occur from leaders at the provincial level of government as well, and these coalesce to the point that local state workplaces have presentations (often entire rooms) dedicated to the leaders above them who have visited. These displays place these organizations in a symbolic web of relations with larger scale entities, actualized through representative visits from leaders.

Through these three forms of ritualized actions—by peasants, local state actors, and national leaders—the categories that have been intellectually and discursively established by state actor
are reworked as identities. The identities created through these performances are relational, primarily concerned with how the locality of Dingxi relates to outside areas. When not relating to other state actors peasants and local actors might behave quite differently. Indeed the reason the local party chief in Dingxi ordered a peasant not to shave was because many people do wish to present themselves to be as modern as possible. Yet, the political and economic power structures of Dingxi have created a region where being categorically impoverished is often a desirable identity.
Chapter 4. Rural Drinking Water Security

Since 2008 the Anding District (Dingxi County) water bureau has provided connections to rural drinking water for approximately fifty thousand people in the Zuli River Valley of Gansu Province. This project was intended to bring modern domestic water supplies to tens of thousands of rural peasants, demonstrate that China is a modern and technologically advanced nation, and help meet the UN Millennium development goal of cutting in half the number of people in China with poor access to drinking water by 2015 (measured at 35% in 2005, Gansu Department of Water Resources, 2005). However, once the project was begun, the project recipients were relatively uninterested in signing up. They were fairly content with their water supplies that arrived from a previous, highly successful, state-backed rainwater harvesting project, and viewed piped drinking water as both expensive and unreliable. This can largely be explained by examining domestic water projects in rural Gansu through an aleatory political ecology. Rural domestic water provision in Gansu is viewed as part of a broader strategy of poverty alleviation detailed in Chapter 3. The poverty associated with Dingxi tends to be discursively associated with the aridity and harsh climate of the region. State actors have viewed water scarcity as a development issue, and have aimed to improve water supplies first through improved rainwater harvesting, and later through rural piped water. Both of these projects have promoted a modern image for the state, and aimed to consolidate state power by controlling nature and remaking backward rural peasants into modern citizens. Peasants, on the other hand, are concerned about cost and convenience, and are largely happy with the state’s previous efforts to provide them domestic water through rainwater harvesting.
I should clarify what, exactly, I mean by domestic water. Domestic water means in this study water that is used by rural households in the Zuli Valley for anything except irrigation. Much of this water is still directed towards agriculture, particularly in the form of raising livestock. While water for these purposes is identified by the local water bureau as “drinking water” there is a hierarchy of water uses within households, such that water from the highest quality sources is reserved for drinking while water from lower quality sources is used for livestock or washing.

This chapter will examine the governance of domestic water from the perspective of an aleatory political ecology of water: I consider how shortage and vulnerability surrounding domestic water supplies have been managed by different groups. I will begin by presenting some of the academic debates that inform this chapter. Next I will present the situation of water provision prior to the series of interventions presented later in the chapter. While I do not wish to present prior hydrosocial relations as having been timeless, prior to the interventions detailed here the state did not play an active role in managing water scarcity in the villages studied here.41 This chapter will then detail two particular types of development interventions in water management: first the introduction beginning in the 1990s of improved water cellars and; second, a piped water project begun in 2008 that was begun with the goal of providing ‘drinking water security’ to residents of the Zuli Valley as part of a larger national project to improve drinking water security. I will examine the discourses surrounding these programs. I will then turn to examining how these projects have been received by project participants.

41 The one possible exception to this is that one respondent indicated that the state encouraged the digging of clay water cellars in the 1980s. I only heard this from one interview respondent, and this was not mentioned by officials from the water department.
4.1. Technical Waterscapes, and the Agency of Apathy

Much emphasis in descriptions of domestic water provision in both urban (Swyngedouw, 2007, Kaika, 2006) and rural (Birkenholtz 2012) contexts has emphasized the notion of rendering a waterscape technical. The notion of waterscapes has become widespread, if rarely defined, in recent geographical work on human-water interactions (Swyngedouw 1999; Harris 2006; Budds and Hinojosa, 2012). The earliest use of the term that I have identified was by Swyngedouw, who defines the term in passing as “water landscape” (1999, pg. 444), but did not engaged with the substantial debate about the nature of landscape. More recently Budds and Hinojosa (2012) have used the term as a means of addressing a context in water management in way independent of preconceived scalar definitions. Uses of the term waterscape have ranged from the scale of the city (Loftus and Lumsden 2008) to the region (Harris, 2006) to the nation-state (Swyngedouw, 1999). Budds and Hinojosa argue that “waterscape is not simply an alternative spatial scale, but a sociospatial configuration that is constituted by social and ecological processes, which become manifest through the particular nature of flows, artifacts, institutions and imaginaries that characterize a particular context” (Budds and Hinojosa 2012, pg. 125). Waterscape may then be way of understanding a particular historical and socio-natural configuration of water. This definition resembles Olwig’s (1996) examination of landscape as a socially historically constituted configuration. My use of waterscape here means the socio-ecological context of human water interactions that is historically constituted. I use this term in a way that is scale-independent, though my primary concern will be with the Zuli Valley. By technical waterscape I mean a presentation of the waterscape, most often by state and development actors, in technical terms that elide the social and political elements of the waterscape.
Piped water projects create a technical landscape upon which they work, which ignores political and social factors, as well as variations in what project recipients want. These studies examine how those charged with providing state backed water have often viewed as a technical problem devoid of social ramifications. In this way, these studies resemble studies of development that have emphasized how questions of development are viewed as technical and apolitical problems by those charged with carrying them out (Ferguson, 1994; Li, 2007).

There are two elements to this creation of technical waterscapes. First, control of the biophysical resource of water is consolidated under the control of the state (or sometimes capital cf. Kaika 2006). Second, making water management technical involves consolidating knowledge about water management. Mitchell’s (2002) study of irrigation development in Egypt illustrated that dam building and the development of irrigation were not instances of the creation of new technical knowledge, rather, they represented the concentration of knowledge in a centralized, bureaucratic form. Knowledge of irrigation practices involving the seasonal flooding of the Nile had long been held by those who lived and grew crops along the Nile valley. With the construction of the New Aswan Dam, such knowledge became useless, and was replaced by more technical knowledge of river basin management that was centralized in the hands of the state. This concentration of knowledge favored the cultivation of specific types of commodities, particularly sugar cane, in a social arrangement that was based on large-scale plantation agriculture. Mitchell’s case shows that the technical nature of changing water management is not merely an act of creating new knowledge, but rather concentrating and reconfiguring knowledge.

My case study will problematize notions about technical waterscapes by examining the role of peasant agency in such projects. Presentations of water based upon the notion of technical waterscapes...
waterscapes leave surprisingly little room for agency among the recipients of water projects. Landscapes rendered technical remain technical largely in the discursive sphere. What arise on the ground have been hybrid waterscapes, based on how water technologies interact with existing political, social, and economic conditions. Readings of the social relations of such hybrid forms tend to emphasize the unequal political economic conditions and subjugation that they produce. Birkenholtz, for example, says of rural piped water users:

This has brought villagers into new relations with each other and with the state as a service provider, reworking the relationship between people and water into a relation of exchange in a particular neoliberal economic moment. This has served to subjugate water users (Birkenholtz in press, 14)

Similarly, Loftus emphasizes the power of infrastructure to influence and control people’s lives. He says “Here, water infrastructure now appears able to regulate the rhythms of life itself, through ensuring what volume of water residents will receive, and at what times that water will be available.” (Loftus 2006, 1042) He later asks, “what form of social struggles might undermine the emerging dictatorship of the water meter?” (Loftus, 2006). Yet, while attentive to the fine-grained forms of differentiation emerging through hybrid waterscapes, such analyses leave surprisingly little room to conceptualize small-scale resistance or even apathy to such projects. This is not to say that such studies are inattentive to social power or the agency of water users. Rather, in emphasizing the production of uneven access to water, much of this scholarship has emphasized formal forms of organization and resistance to uneven water access (Loftus 2006, Loftus and Lumsden 2008; Birkenholtz, in press). To these conceptualizations of resistance to waterscapes that present uneven access to water I will add the examination of small-scale forms of resistance through apathy towards state-backed water project.

This chapter will illustrate that peasants in the Zuli Valley express their agency vis-à-vis state water projects not through outright resistance but through selective apathy, which Scott (1985)
has called a form of everyday resistance. Peasants have adopted state-backed projects, such as water cellars, that are beneficial. They have tried and then ignored state backed water projects, such as water cellars for irrigation, which simply do not work. And they have chosen not to engage with projects, such as running water, that are still problem plagued. All of these projects involve investments in either labor (in the case of water cellars) or capital (in the case of running water). But in each case peasants have had, and often chosen, the option to not participate. This non-participation forms a significant part of the agency of individuals vis-à-vis technocratic regimes in illiberal contexts. The agency of peasants in Dingxi can best be thought of through Li’s (1999) conceptualization of development as being a process of compromise. State actors arrive suggesting which forms of development will make peasants’ water use less backwards. Peasants then integrate, adapt, or find alternatives to these projects. State actors, content to see that their portion of a project is completed, care little whether peasants repurpose a project after the fact (as has been the case of water cellars for irrigation). The case of running water is more complex, but so far has remained a project that peasants by and large choose not to connect to. Finally, this chapter will show how different types of water management can be viewed through the Foucauldian lenses of expressions of power through apparatuses of *security* and *discipline*.

### 4.2. Domestic Water Prior to State Intervention

Prior to state intervention in water supplies in the 1990s, domestic water supplies in the area were both heterogeneous in character and vulnerable to drought. Broadly speaking, the upper valley relied upon groundwater from individual or communal wells or springs, while the lower valley relied upon unimproved rainwater collection for drinking water, turning to drinking the saline groundwater and river water in times of drought. There are three important points about water systems in the Zuli Valley prior to the introduction of improved water cellars. First, there
was significant heterogeneity in water gathering strategies both between and within villages. This heterogeneity was largely replaced by the introduction of improved water cellars which were a much more homogenous strategy in the lower valley, and a new patchwork of water strategies in the upper valley. The second important point is that households and other water mediating social institutions, particularly in the lower valley, remained extremely vulnerable to drought. Thus the social networks that existed were to a large extent social mechanisms to mediate the aleatory nature of pre-modern water. These institutions allowed for the sharing of water in times of drought, but also reinforced local power hierarchies. Thus, while a family may describe a clay water cellar as their main source of water prior to improved water cellars, they often continued to rely upon other sources of water, including using neighbors’ or family members’ water, or digging in the river in times of water shortage. Finally, for the most part domestic water was governed by social institutions that existed below and outside of the purview of state actors, through either familial or multi-family social arrangements. Subsequent sections of this chapter will illustrate that water projects backed by state actors have significantly changed the social conditions of risk surrounding water.

In the lower valley before the advent of improved water cellar projects in the 1990s drinking water generally came from rainwater harvesting. According to interviews with both local peasants and with officials of the state water department, groundwater in the lower valley is considered too saline for regular use, though river-water, which was similarly saline, would be turned to in times of drought. During interviews, research subjects were asked where their water came from for a variety of domestic sources. Table 4-1 illustrates responses that describe

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43 In the three villages of the lower valley I encountered only two wells that were regularly used: both had been dug by chicken farmers who then diluted the groundwater by half using water stored in water cellars that had been purchased.
water sources for three types of uses in the lower valley villages in 1990: drinking water, water for livestock, and other water uses, which includes primarily washing. Roughly half of water needs were reported as being met by clay water cellars, and an additional 25% that was reported to come from ‘water cellars’ may also have been referring to clay water cellars. 44 The technology for improved water cellars formed the basis of the first major technical revolution in drinking water management in the Zuli River Valley, which is discussed below.

The central technology in traditional rainwater harvesting is the water cellar, a covered pit ranging from 3-5 meters deep and 1-3 meters in diameter. 45 Rainwater is captured as runoff from impenetrable surfaces, including courtyards, roads, and roofs, and funneled into these cellars. Because they are underground, evaporation from water cellars is minimal, an important consideration in this arid region. Traditionally these cellars were lined with red clay, which minimized water losses through seepage. However, such cellars still were not particularly efficient at storing water. Red clay impeded, but did not stop, seepage from water cellars. Because of the tendency of loess soils to collapse when moist, only the lower half of the cellar could be used for storage—if water levels rose too high the cellars were prone to collapse (Cook, 2005). Such cellars were quite time consuming to build and represented a major investment for most families (interviewees indicated that the approximate time commitment was roughly 30 days of labor). The red clay used was not uniformly available. Among my research sites in the lower valley Village 3 had red clay available, while Villages 1 and 2 did not, and had to haul it from nearby villages. Additionally, red clay required significant time and effort to apply

44 There is no particular linguistic distinction between a water cellar and an improved water cellar in common usage. The word water cellar (shui jiao) is now generally taken to mean improved water cellar, but more generally means any water cellar. A clay water cellar (literally ‘red clay cellar’ hong tu jiao) now is used in contrast to more modern clay water cellars, but shui jiao may still refer to any water cellar.
properly; it was applied in layers that had to be cured properly to ensure that they remained water tight (Cook, 2005).

While some water cellars have been documented to be hundreds of years old (Cook 2005), few have lasted so long. Many interviewees reported that a clay cellar was among the largest investments a family could make, and several families could not afford one. One elderly interviewee (interview number 1030), for example, described how when he was young, clay water cellars were something only wealthy families could afford. He happened to come from one of these families, but his fortunes shifted, and by the 1970s his family’s cellar had collapsed, and he had to gather his water from the river from 1975-1986. Before the 1990s, when such cellars collapsed they were only slowly replaced due to cost. Because of the large investment in these cellars, they were often shared. Eight percent of households mentioned the use of shared water cellars in 1990. If anything, the portion of shared cellars may slightly understate the prevalence of shared water cellars due to recall bias (i.e. people failing to remember that a cellar was shared) and changing family structures (i.e. respondents under 45 were unlikely to have had their own households at the time, while those who may have had such arrangements are likely to no longer be household heads in their old age, or have passed away). Such shared water facilities were common throughout the valley, and were generally shared between family members, though occasionally households without family ties in close proximity would create such arrangements. Even when facilities were not formally shared, during times of drought or crises such sharing might happen.

45 While water cellars have unquestionably been a long standing technology in the Zuli Valley, officials in the first village also reported that during the 1980s there was a push to build clay water cellars, prior to the 1-2-1 project described below.
Approximately 11% of respondents listed the river as their primary source of water. These families were among the poorest who could not afford clay water cellars. A slightly larger portion used river water for livestock and cleaning, illustrating a pattern common throughout the area of using the cleanest water sources for drinking, and less clean water for livestock followed by cleaning in that order. However, water in water cellars was quite limited in quantity, and as a result many households (particularly in Village 3) would only use water from clay cellars for drinking, relying on river water for washing and livestock.

Both shared clay water cellars and the use of river water illustrate another pattern in the lower valley: both were the sources that residents would turn to in times of water shortage. Table 4-1 covers primary sources of water, but does not consider what people would do during drought conditions. In Villages 1 and 3, which lie along the Zuli Valley, most households said that there were some years where they would have to go “dig a hole in the riverbed” for water. However this phenomenon also was uneven within the community. Those who could afford larger water cellars needed to do this rarely, while some families reported having to do so every year. Indeed the ingrained notion of seeking groundwater in the riverbed seems a fallback that many Chinese are prepared to fall to in times of crisis. This was well illustrated when I asked one respondent early in my interview process how they knew where to dig, and I was surprised when my field assistant (who came from a peasant background in Henan Province to the East) responded that “all Chinese people know how to dig a hole in the riverbed.” His statement should be seen less as an actual statement of peasants’ knowledge of where to find water than as an illustration of the role of the aleatory nature or water in rural northern China. With of constant risk of scarcity, the act of digging for water in the dry riverbed is a part of life in rural Chinese life that seems to be a widespread worry. However, it should be noted that most people did not rely upon the river as
their primary source of water, only as a secondary source if their water cellars were not filled or collapsed.

Similarly the sharing of water cellars illustrates an adaptation to drought in the Zuli Valley. In times of drought many respondents in the lower valley said that they would go to neighbors or family members to ‘borrow’ water. It seems that such borrowing was generally not literally repaid with other water, but came to been seen within a broader general set of obligations to other family and community members (interview #1014). Thus, those who could share in time of drought possessed an important resource for creating networks of social obligation. Importantly such sharing bound social relations, through access to water, at the local scale. Both the interdependence of community, and power relations and forms of exclusion within the village were amplified by access to sharing water resources. Such situations were particularly placed during times of drought or water shortage. Thus, it was largely during events of water shortage or absence that water came to be a form of social power in the Zuli Valley.
Table 4-1 Domestic water sources in the Lower Valley 1990 as reported by survey respondents

<table>
<thead>
<tr>
<th>Water Use</th>
<th>Drinking #</th>
<th>Drinking %</th>
<th>Livestock #</th>
<th>Livestock %</th>
<th>Other #</th>
<th>Other %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Cellar</td>
<td>23 *</td>
<td>25</td>
<td>23</td>
<td>25</td>
<td>23</td>
<td>25</td>
</tr>
<tr>
<td>Well</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Spring</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Clay Cellar</td>
<td>50</td>
<td>54</td>
<td>44</td>
<td>48</td>
<td>45</td>
<td>49</td>
</tr>
<tr>
<td>Running Water</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Purchased</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Shared Well</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>River</td>
<td>10</td>
<td>11</td>
<td>16</td>
<td>17</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>Water Company</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Shared Cellar</td>
<td>7 **</td>
<td>8</td>
<td>7</td>
<td>8</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Irrigation</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Unclear</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

*Based on the history of water cellar development in the area, these were most likely actually clay cellars.

**An implicit age bias in the survey may result in shared cellars being under reported

Table 4-2 Domestic Water Sources in the Upper Valley 1990 as reported by survey respondents

<table>
<thead>
<tr>
<th>Water Use</th>
<th>Drinking #</th>
<th>Drinking %</th>
<th>Livestock #</th>
<th>Livestock %</th>
<th>Other #</th>
<th>Other %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Cellar</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Well</td>
<td>20</td>
<td>28</td>
<td>20</td>
<td>28</td>
<td>20</td>
<td>28</td>
</tr>
<tr>
<td>Spring</td>
<td>30</td>
<td>42</td>
<td>28</td>
<td>39</td>
<td>29</td>
<td>40</td>
</tr>
<tr>
<td>Clay Cellar</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Running Water</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Purchased</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Shared Well</td>
<td>15</td>
<td>21</td>
<td>15</td>
<td>21</td>
<td>15</td>
<td>21</td>
</tr>
</tbody>
</table>
Table 4-2 illustrates the domestic water sources for the upper valley in 1990. In 1990, upper valley residents generally relied on groundwater for their domestic water supplies, though the social institutions that mediated such water supply were quite heterogeneous. The institutions that governed access to groundwater sources for domestic purposes varied both between and within villages in the upper valley. Either springs or private wells, which were both held by individual households and shared, were the most common sources of water in the upper valley villages.

Households that drew their water from springs came exclusively from Village 5, which was located in mountainous terrain. In this highly incised landscape there are many springs in the upper reaches of gullies (Figure 4-1 and Figure 4-2). According to interviews with households, such springs were generally several minutes walk up a gully from houses, and were generally shared and maintained by a group of 3-7 households who relied upon the spring. Maintenance included cleaning the spring, and providing a cover to protect the water. Springs were generally reliable, but provided less water in the winter, and often required waiting for the slow trickle to fill one’s water buckets.
Figure 4-1 Gully containing a spring for domestic water in the Village 5. Photo by Author, September 2010.

Figure 4-2 A spring maintained by a group of 7 households in a gully in Village 5. This has subsequently been replaced by a well, but still receives some maintenance. Photo by Author, September 2010.
In Village 4, drinking water had, in the past, come from wells. Traditionally, individual families dug wells within their family courtyards (Figure 4-3). Often these wells served multiple generations of an extended family who shared adjoining courtyards. These arrangements were, at times complex. The well was generally located in the courtyard of a house that was passed to the eldest son, and extended family members would gather water from it. Because water gathering generally fell upon women, who were generally married into the family, control of well water often functioned as a form of intra-familial social power. This pattern is similar to that identified by Sultana (2009) in controlling water supplies in rural Bangladesh. These wells appeared to be primarily organized around families, and I did not encounter wells shared between non-familial households, likely because these wells were located within family courtyard homes, as opposed to the springs in the Village 5 and shared cellars of the lower valley villages that were generally located in open areas. These courtyard wells have, for the most part, ceased to be useful. Falling groundwater tables have made most wells unusable, and many in town rely upon buying water by the truckload from neighboring villages (the dynamics of water prices will be discussed below).
Figure 4-3 Multi-generation shared well in Village 4. Photo by Author, August 2010.

The situation in Village 6 is unique in that most of the water in this village was organized through state channels, yet these channels did not represent ‘modern’ water that was delivered through the formal channels of a state water apparatus (Bakker, 2002; Linton, 2010). Modern water comes through formal channels organized in a water distribution grid, and is often associated with the state hydraulic apparatus. Village 6 contains the water catchment and treatment plant for the city of Dingxi (Figure 4-4), and for several decades people would buy water from spigots at the plant. Under the territorial organization of Chinese space into cities and countryside, the government of the City of Dingxi differs from the government of its surrounding county. Thus while the Dingxi County (later Anding District) water bureau was responsible for provision of drinking water to rural areas of Dingxi County, provision of water to urban residents was provided by a state owned drinking water company (the Dingxi Water Company). This
company was fully administratively separate from the county water bureau. While efforts to provide drinking water in rural areas have emerged only since 2005, urban Dingxi City has derived water from this area since the 1980s. In this way, the presence of the Dingxi water company represents the urbanization of nature described by Kaika (2006). Services providing resources (particularly water) to urban areas extend their reach far beyond those areas, absorbing nature from surrounding areas and channeling it towards urban modernity. This arrangement has often been viewed as the urban conquest of nature outside of its territorial domain (Gandy, 2002; Kaika, 2006; Swyngedouw, 2004). However, in the case of the Dingxi water company the urbanization of water differs slightly from the role of urban agents of water in the countryside that is so often critiqued as the urban capture of rural nature, which emphasizes the exclusion of those who live in the shadow of such water projects (Kaika 2006). While the company did not provide piped water to the rural area, it allowed local residents to come gather water at the plant, which was considered one of the better sources of water available. I was also told that the water plant employed several people in Village 6 (though I never met any of them). In these small ways the water company spread the rhizomes of urban modernity into the countryside. Yet such modernity arrived in a hybridized way. Water purchased from the water company represented a strategy of water collection that existed at the interstices of modern water systems: provided through a centralized system of modern pipes, yet gathered into buckets to be brought to households. While such water gathering did not fit in the model of planned modern, urban, piped water delivered through a grid it nonetheless worked its way into everyday use. This water was more modern than other water sources, but was modern in a hybrid way. It was commoditized, urban in its political organization, and arrived through the apparatus of complex state power. Yet people still walked to get this water, and they were not formal beneficiaries of the project. When
Dingxi city planners reported the number of their citizens receiving modern piped water, they did not include peasants in the countryside who walked to the water source and informally obtained water. Thus the case of the Dingxi water company shows how modern water that serves as a planned form of techno-natural organization has social leakages that interact with the spaces within which it is located.

An additional form of organization in Village 6 was one specific natural village that dug a collective well serving several dozen families (Figure 4-5). Not exactly a well, this was a hole in the ground into which people walked to gather water from a spring at the bottom. It had,

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46 In China natural villages are those villages that have existed for long periods of time, or have emerged naturally, whereas administrative villages are territorial units of government introduced by state authorities for the purpose of governing
however fallen into disuse and was now largely filled with garbage. The construction of the well had been organized by the village sometime in the 1970s. Two things stand out about the early arrangements of water gathering in Village 6. First, they represent a greater level of social organization in providing domestic water than is seen anywhere else in the valley. Both provision of water from a state run company that is intended to serve a city 20 km away, and a well that was organized by a village, represent water governance scales beyond the household or grouping of households that were undertaken by state or parastatal organizations. Second, several households said that they gathered water from a variety of sources or locations, depending on the situation. For example, the only households that had not yet connected to running water in this village obtained domestic water from the Water Company, a shared well, or irrigation, depending on what was available. Finally, none of these sources left peasants in the upper valley directly dependent upon rainfall, as households in the lower valley were, though they were susceptible to drought insofar as drought could lower watertables. In 1990, prior to significant state intervention in water policies in rural Gansu, domestic water supplies in the Zuli Valley came from a variety of sources, including clay-lined water cellars, rivers, springs, and wells. What these water sources shared was a high degree of social embeddedness at the intra-household scale, and with the exception of Village 6, an almost complete lack of state activity in water provision.
Figure 4-5 Communal well in Village 6 that has fallen into disuse. The spring at the bottom of the hole is located near the garbage pile. This was the only state organized domestic water provision prior to the 1990s in any of the villages studied. Photo by Author October 2010.

4.3. State Interventions in Domestic Water

State interventions have attempted to provide domestic water to the people of the Zuli Valley in three distinct phases. The first intervention was an improvement of an indigenous technology, local water cellars. The second was a central-state backed running water project for the valley. The final project, the Tao River Transfer Project (Yintao Gongcheng hereafter Yintao Project) involves the transfer of water originating in the Tibetan plateau for use in the valley.

4.3.1. Improved Water Cellars

The first major change in the availability of drinking water in the Zuli Valley was the introduction of improved water cellars in the early 1990s.47 This project was initially introduced

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47 Much of the discussion of provincial level policy is drawn from Cook (2004; 2005).
by the Anding District Water Bureau, which has provided at least one cellar to most families over the past 15 years. However now the technology is widely understood, and today many individuals invest in building water cellars without state support. The improvements that have made water cellars a successful means of managing water in the Zuli River Valley were simple enough. In an improved water cellar, the red clay that had for centuries lined water cellars in Eastern Gansu is replaced with concrete. The project of constructing improved water cellars is supported by state actors, but generally undertaken by individual households. The general model through which this program is implemented is that the Anding District Water Bureau will provide concrete and sometimes sand for the water cellars while the households will provide the labor. While several additional changes to the basic design of the water cellar have been attempted, the concrete lining has been the most enduring.

Lining a water cellar with concrete provides several advantages over clay-lined cellars. First, and most obviously, concrete has a lower seepage rate than the clay linings that had previously guarded against water loss. According to research comparing the relative efficiency of improved and clay water cellars cited in Cook (2005), clay cellars had a seepage rate of 24.6% compared to 2.9% for concrete lined water cellars (Gao, Li & Liu, 2001 cited in Cook, 2005). Second, because concrete provided a near watertight seal, cellars could be filled to the top. In the past the upper half of the cellar generally remained empty to guard against collapse. Concrete lining obviated this precaution. Thus the effective size of a water cellar is roughly doubled with the use of concrete. Third, concrete water cellars were more durable. In 165 interviews I heard of only one concrete water cellar that had collapsed. Clay cellars, in contrast, collapsed frequently and required extensive maintenance. Fourth, because of these structural advantages, concrete water
cellars could be built larger—the standard size is 30 cubic meters, though I have heard of cellars as large as 50 cubic meters, compared to 4-8 cubic meters, which was the norm for clay cellars. Finally, as mentioned above, constructing clay water cellars was a laborious process, and constructing concrete water cellars required far less time. I encountered fairly few people who could describe to me how much labor went into building a clay water cellar, but Cook (2005) estimates that a clay cellar took 200 days of labor to complete, compared to 12 for a concrete cellar, and the latter estimate largely accords with my own observations.

Each of these technical advantages greatly improved the usability and availability of water cellars, but perhaps the greatest advantage of the improved water cellars from the standpoint of those attempting to provide a stable drinking water supply to peasants was that they were, ultimately, still water cellars. There was little difference from the technology that had been used locally to gather water for centuries. It took little effort to convince peasants in the Zuli Valley to build (and invest their own labor and sometimes money in) improved water cellars. However as will be discussed below in an effort to make these projects appear to be a ‘modern’ development strategy, this very applicability to local conditions has been downplayed by the state actors who have been charged with creating knowledge about these types of cellars.

The construction of water cellars in Gansu is often credited as being a successful policy and is held up as a model of appropriate technology (cf. Cook, 2004). Improved water cellars were initially studied by Zhu Qiang, a researcher at the Gansu Institute of Water Conservancy, and were adapted for agriculture by Dr. Zhao Songling, a professor at Lanzhou University, who is also widely credited with promoting the technology. Fortuitous timing played an important role

48. The discussion of the policy history of this project is based upon Cook (2005).
in the success of water cellars as a rural drinking water strategy in Eastern Gansu. Dr. Zhao began promoting the idea to water officials in the early 1990s at the same time as a series of major droughts. These droughts culminated in 1995 when Chinese Premier Li Peng visited eastern Gansu to personally inspect the most severe drought in 60 years in Gansu. Zhao Songling accompanied him as an agricultural expert. Following this visit, Li Peng committed funding to the 1-2-1 program (discussed below). While it seems that much of the money committed by Li Peng was embezzled before arriving in villages, the central government solidified support for water cellars as the most expedient means of solving Dingxi’s drinking water problems. The presence of droughts and the availability of a cheap solution made this a popular program. The initial program was created as the 1-2-1 program, and was viewed as an emergency response to the severe drought at the time. Through the 1-2-1 program in Anding district 72,200 water cellars were constructed between 1995 and July of 1996 (Anding District Water Bureau, 2009). Since that time, a series of projects the Anding District Water Bureau has continued to build water cellars under the guise of 10 separate subsequent programs. As these projects developed, the general model became that the local water bureau would provide concrete to line the cellar, and the fixture for the cellar lid, while the recipients would be responsible for digging the cellar themselves, and sometimes providing sand to mix with the concrete.

The number of programs through which water cellars have been built illustrates an additional factor in the success of water cellars at resolving the drinking water problem in rural Dingxi: like groundwater irrigation, water cellars are well suited to the bureaucratic incentive systems of

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49 The name 1-2-1 project somewhat belies the intentions of this program. 1-2-1 originally referred to the intended ratio for rainwater harvesting for agriculture, which was the purpose such programs were initially envisioned to serve. The idea was that a 100 cubic meter catchment would fill two tanks that would irrigate one mu of land. However, in fact, this program was used primarily for household water, not agricultural water.
Chinese development. Cadres in China are reviewed for promotion every two years, and must be able to produce tangible results during that time period (Smith, 2010; Whiting, 2004). This system favors projects that can be completed quickly and are readily measurable. Water cellars meet these criteria quite well. Building a water cellar is a one-time event and does not require ongoing training for a project recipient to understand its use. Construction of a certain number of cellars was also an easily quantifiable achievement for local water officials. In the Anding District Water Bureau there is a record of each of the 104,884 improved water cellars built through their programs since 1990 (Anding District Water Bureau, 2009). These projects have been part of 11 different named programs. No project has run longer than four years, and most run for one year only. These short cycles then fit the promotion cycles of cadres who are in charge of them. Of these water cellars 66,771 were newly constructed cellars, and 38,113 were clay water cellars that were subsequently improved, with the improvement occurring primarily during the initial 1-2-1 program in 1995. A more complex extension of the project, intended to promote rainwater collection for agriculture, has proven much less successful, largely because it required ongoing training and investment for success. According to the Anding District Water Bureau, 87,307 water cellars were built for irrigation, primarily between 1997 and 2002 (Anding District Water Bureau, 2009). Many of these cellars still exist in the villages where I conducted surveys; however, none remained in use for irrigation. Those close to houses had been repurposed to hold domestic water,\(^{50}\) while those that were farther from homes had simply been abandoned.

\(^{50}\) Such repurposing to gather domestic water also was common with a widely promoted rural methane digester program, the “One Pit Three Changes” program (一池三改 yichisangai) which saw many methane digesters converted to cisterns.
The use of improved water cellars has, for the most part, solved the problem of drinking water for peasants in the Zuli River Valley. Almost every family interviewed now has at least one improved water cellar, and most families have more than one. While some people reported that their cellars went dry, drought does not present nearly as serious a problem as it did in the past. To be clear, water scarcity in the Zuli Valley remains a problem, but improved water cellars have vastly enhanced peasant households’ ability to save water. Moreover, households’ use of water remains fairly frugal, thus improved water cellars are largely able to meet household needs. This relative success of water cellars plays an important role in how peasants have thought about later government drinking water projects.

State provision of water cellars paradoxically individualizes domestic water provision and disembeds water from many of the social relations previously associated with it. Much of this disembedding occurs by reducing the event of the scarcity of water, which had required social institutions to govern it. With improved stability in water supply coming from water cellars, the social role of water in the lower valley that often required people to ‘borrow’ water and incur social obligations has become less prevalent. Few people have situations where they must go to their family members or neighbors for water anymore. The emerging village level markets in hauled water, which will be discussed below, may have played a role in this change. Additionally, water cellars today play a much smaller role in displaying one’s wealth than they did in the past. Most households now have two water cellars, which can meet most household needs. Households with more than two cellars generally are those engaged in some form of animal husbandry. Having more water cellars is still associated with greater wealth, but while
water cellars have not fully disappeared as symbols of wealth, they have largely been replaced by consumer goods, including motorcycles and refrigerators.

While most studies of the role of state water practices in rural areas have emphasized replacing existing social institutions with state institutions (cf. Birkenholtz in press), in the case of water cellars in the Zuli Valley the state plays no ongoing role in the provision of water after the cellar is constructed. Water cellars have been largely provided by the state, but once they are installed people are no longer involved with the state, nor are they drawn into relationships with state bureaucracy on a regular basis. Indeed, in other contexts rainwater harvesting is often presented as a form of ‘traditional’ water technology that provides an alternative to top-down, state-led development (Gupta, 2011). Because of the immensely local nature of rainwater harvesting, it is viewed as an alternative to the capital intensive state backed water development projects that Bakker has described as the ‘state-hydraulic paradigm’ (Bakker, 2002). Rainwater harvesting relies on traditional and local methods and the role of state-backed technology has been to augment, rather than replace, local knowledge. In this way state-led rainwater harvesting in Dingxi is paradoxical. It is supported and funded by state actors at a variety of levels, yet it is a diffuse technology that does not directly intensify state power through state control of the water supply. While much written about state water development emphasizes the role of the state or private capital in gaining control of centralized water supplies, in this case state water development has resulted in improved independent water systems for peasants. The expansion of water cellars can also be examined in terms of Mitchell’s argument that the state hydraulic paradigm is less about creating new knowledge about how to manage water resources than about reorganizing and concentrating who controls knowledge of managing water resources (Mitchell,
Knowledge of how to control water resources in the case of improved water cellars is not centralized. The technology and knowledge associated with creating improved water cellars can be easily used by farmers without state support. The inputs are limited to sand and cement, which can easily be purchased. Many people in rural areas have learned to build water cellars. Perhaps the clearest example of how this technology can be diffuse is the third village in the lower valley, where farmers raising chickens have constructed large numbers of water cellars without state support (up to nine cellars in one household, of which two had been subsidized). Water cellars then, although they are a state project, do not centralize knowledge of how water is managed in the state bureaucracy. Quite the opposite, water cellars have diffused knowledge about an improved means of managing water.

While not representative of the ‘state-hydraulic paradigm’ improved water cellars in the Zuli Valley did represent the intensification of state power if in a less direct fashion. This intensification of state power occurred through the capillary mechanism of development and changes in peasants’ subjectivity rather than direct dependence upon the state for water provision. Through efforts to improve peasant living conditions, the Chinese state sought to create citizens who were more advanced and less backwards and more prosperous as described in Chapter 3. Rainwater harvesting came to be built into two central themes in modern Chinese politics. First, rainwater harvesting was viewed as central to the efforts of poverty alleviation and development. For example Zhu Qiang, the researcher with the Gansu Institute for Water Resources Conservancy who was responsible for the earliest studies of improved water cellars, has framed the project in both his academic writings and interactions with the media as being fundamentally a part of a development project in poor areas, and has argued that development in
China should pay more attention to peasants’ water needs (Chen, 2007; Zhu, 2003). Second, great pains were made to emphasize the scientific nature of modern rainwater harvesting. Although avowedly low tech, promoters such as Zhu have emphasized the scientific content of the rainwater harvesting program, emphasizing the experiments conducted to optimize these programs (Chen, 2007). Indeed, rainwater harvesting has been elevated to a national-level scientific priority by its inclusion in the prestigious 863 Science and Technology program, alongside the development of a domestic supercomputer and manned space flight (Chen, 2007; Ministry of Science and Technology of the People's Republic of China, 2006). How the science associated with rainwater harvesting differs from other parts of the 863 projects is that it delivers science to the countryside and applies science to the everyday lives of citizens, changing their backwardness. One informant quoted by Cook (2005) exemplifies this thinking in describing Zhao Songling (the promoter of improved water cellars discussed above): “Unlike many other scholars, whose work never went beyond theoretical undertakings into practice, Zhao’s work acted as a spur to the overall development of society. This is what truly meaningful scientific work is all about” (Cook 2005 pg. 141). Thus rainwater harvesting was presented as being a deeply ‘scientific’ undertaking, one that was modern and served the interests of development.

One thing that promoters of rainwater harvesting in China tend to emphasize is that it is not traditional. While they do describe the technology used as ‘appropriate,’ rarely do they mention the similarities between modern rainwater harvesting and traditional practices. Tradition is seen as a source of backwardness, which is precisely what the modern project of state development aims to escape. Zhu Qiang, for example, directly contrasts modern rainwater harvesting with ‘traditional rainwater utilization’ (Zhu, 2003) drawing out the lower efficiency of the system and
noting that it ‘passively’ waits for the rain in contrast to modern rainwater harvesting which is capable of ‘actively controlling rain to meet human demand’. The tropes of activity and passivity draw on the notion of modernity as active, while tradition is passive. Thus, while one of the most important elements in the success of the rainwater harvest program has been its continuity with existing practices, promoters of the program specifically do not draw on that connection lest the project be seen as not modern.

4.3.2. Running Water—Rural Drinking Water Security

Beginning in 2005, the Anding District Water Bureau began installing a centralized piped water system in the Zuli Valley under the auspices of the “Anding County Central Region Drinking Water Security Project.” This project, funded primarily by the State Council’s Leading Office of Poverty Alleviation and targeting Dingxi as a designated poor county, aims to provide piped running water to households throughout the valley (Anding District Water Resources Survey and Planning Research Institute, 2005). The project currently relies upon the collection of groundwater from an underground dam in the upper reaches of the valley (located in Village 5) and a gravity fed distribution system running 80 km that provides drinking water to the lower valley as far north as Village 3 (Anding District Water Resources Survey and Planning Research Institute, 2005). Ultimately, this system will also be connected to the larger Yintao Project discussed below. The aim of the drinking water security project is to create a very different relationship between people and water in the Zuli Valley. While in the past people have been both dependent upon and vulnerable to rainfall and groundwater for drinking water, under this project peasants become dependent upon state actors for their water supply.
The state actors involved in this project, at both the national and county levels discursively present the water security program as part of remaking the relationship between people and water, and remaking rural citizens. I have previously shown in Chapter 3 how state actors have linked the aridity of the region to poverty and backwardness, and providing drinking water is one among the central elements in poverty alleviation for this region. State discourses of providing drinking water in this region come under the rubric of ‘water security,’ which was made a priority in the 11th Five Year Plan (NDRC, 2006). The 11th Five Year Plan coincided with state actors at the national level turning their efforts towards modernizing the countryside through the reintroduction of rhetoric surrounding the “New Socialist Countryside” (first deployed in the 1950s see Perry, 2011). The provision of piped drinking water to peasants helps to transform these peasants into state subjects, and does so in two important ways. First, when the drinking water source is running water peasants are dependent upon the state for this basic commodity of life, thus they become economically much more dependent upon the state. Secondly, and rhetorically more importantly, water security is one way that peasants become modern Chinese middle class citizens. The provision of piped drinking water in China has been associated with modernity and urbanization since its introduction in Shanghai in the late 19th century (Lu, 2006). Secure water is one marker of development, which is the raison d’être of the Chinese state.

The link between development and nation building can be seen in the rhetoric used to present the drinking water security project. Several of the fourth generation party leadership’s slogans that directly frame development as a nation-building project are sprinkled throughout such projects. Few projects fail to mention rural drinking water security’s contribution to the New Socialist Countryside (shehui zhuyi xin nongcun) and the construction of a middle class society.
Running water is but one way that state actors aim, through development, to make the countryside more modern. The programs of the New Socialist Countryside are making village houses and economic activities more modern as well (Perry, 2011). Rural areas are made to be cities in miniature, and running water is often used as an example of the modernity of city life that can be brought to the country. The notion of modernization associated with providing running water to rural areas also involves the movement of people. In Villages 1 and 3, some work teams (she) had been moved in their entirety from the mountains to settle in an urban setting in the valley floor. From what people described, these movements were for the most part not coercive. They said that some people had stayed behind (though the people who I talked with, who had moved down from the mountains to the valley floor, looked down on these people). However the stated goal of these projects was to provide services to these people in a more modern setting, and in the process to make them more modern people. Two services in
particular were mentioned which local leaders said were easier to provide outside of the mountains: running water and education. For state actors at the local level their task was to provide citizens modern services, and the most functional way to do that was often through moving them into gridded, urban settings. In the rhetoric of the New Socialist Countryside and the ‘middle class nation’ all citizens of China are presumed to be equal in their access to basic resources, and drinking water projects have a role in actualizing that vision.

What is meant by water ‘security’ by state actors has been a bit amorphous. It generally is taken to mean having a modern and piped supply of water; however, uncovering what exactly is secured in drinking water security points to two separate directions. State publications tend to emphasize a reliable source of safe, clean drinking water, with greater emphasis placed on the cleanliness (Anding District Water Resources Survey and Planning Research Institute, 2005; Gansu Department of Water Resources, 2005; NDRC, 2006). These discourses often draw on the UN Millennium Development Goal of reducing by half the number of people with unsafe drinking water by 2015 (United Nation, 2010). However the local contingencies of Gansu make quantity, and reliability a greater concern than water quality. At the level of local implementation water security is almost exclusively taken to mean having a reliable source of water; one that will not fail in drought years. Local officials in the water department made clear that when they speak of water security their primary concern is about the presence of water during droughts. Thus the translation of water security, a translation from the global Millennium Development Goals to the local context of implementation changes the meaning somewhat. Like cellar water, tap water in these rural areas is unfit to drink without boiling. This translation has important ramifications

51 The question of sanitation aside, drinking unboiled water is an unthinkable notion in the villages where drinking water security projects are being implemented. According to traditional beliefs in the area water must be boiled for it to be safe anyway.
for how peasants interact with projects: cellar and running water are often, though not always, seen to be similar.

While the goal of the rural drinking water security project is to provide drinking water throughout the valley, pipes have only been laid in the areas of densest population, and more remote houses as well as all mountainous villages are not connected to the system. Two large urban areas, Dingxi and Chankou, already have water provided by separate water systems and are not covered in this project. Under the drinking water security program the county water bureau is laying water mains throughout the valley, and it is the responsibility of individual households to pay for connections to the system. The average connection cost is approximately 1273 yuan and the median connection cost is 1200 yuan (approximately 1/3 of average annual incomes in the region). Both of these monetary figures are valid for households adjacent to the main pipelines. Because costs escalate with distance from the water mains, only those houses closest to water mains have connected. Only two of approximately forty-one households who had connected did not live next to the main pipes. Areas further away or at a higher elevation are not connected. Water bureau officials report that ultimately they hope to connect most houses on the valley floor and on the west side of the Zuli River (where most of the population lives) to the running water system, but will not connect houses at higher elevations or on the less heavily populated east side of the river. At the household level pipes usually consist of a faucet located in the courtyard if the house is older, and a faucet inside the house in newly constructed houses. All water use is metered, and households pay 2.5 yuan per cubic meter of water for the first two meters of water each month and 3 yuan per cubic meter thereafter.

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Thus water cleanliness, according to the traditional standards set by environmental engineers, is somewhat of a moot point in this area.

Only thirty-five households are currently receiving water. The others have connected but are not yet receiving water.
The running water system so far has been plagued with problems. In the summer of 2010 lower valley water recipients estimated that they were only receiving running water half the time from the system. In the upper valley people estimated significantly better performance. The water department explains that the cause of this difference in water availability is that the water supply at the underground water source in the upper valley is simply not large enough to provide water to all the connections that have been made, and as a result they have resorted to rolling cut-offs. The distribution system was designed to work with the larger Yintao project discussed below, and accordingly has been expanded beyond what the current dam can support. Additionally a planned automated water regulation system at an intermediary storage tank serving the lower valley has failed to work properly, requiring water department employees to manually manage water levels at this remote tank, which now sometimes runs out of water. This automated system is in some ways the pride of the local water authority—it will be the first automated system in Eastern Gansu once it is working—but as of October 2010 the operating problems had not been resolved. The water department believes that water shortages will be solved with the arrival of water from the Yintao project discussed below, but at present the unreliability of the running water system has contributed to households not wanting to connect to the system.

The result of these difficulties in operating the system has been wide distrust of the system among peasants in the lower Zuli Valley. Many people who have not yet connected to the system are reluctant to do so because of the high costs and perceived unreliability. Despite the difficulties of this project, and the reluctance of peasants to invest in connecting themselves to the water grid, the project has altered the drinking waterscape of the lower valley in a significant way—it has drastically lowered the costs of buying water in an already existing water market (to
be discussed below). Water is taken from piped sources, loaded on trucks, and sold. In the past water was purchased from the town of Chankou, approximately 20 km away. The arrival of piped water in the villages of the lower valley has allowed water to be purchased locally drastically lowering the cost. Thus, rural piped water projects have significantly altered the waterscape of the Zuli Valley, but not in the ways that were intended. The costs of water supply have fallen, and the risk of water shortage have been ameliorated, but not in the ways that were planned by state water developers.

4.3.3. The Yintao Project

Planners at the Anding District Water Bureau hope that problems of water scarcity in their drinking water system will be solved with the arrival of the water from an inter-basin transfer project from the Tao River, which originates on the Tibetan Plateau in Qinghai Province. The water department believes that its project, the first phase of which is scheduled for completion in 2012, will bring about a massive shift in the valley, which will for the first time have sufficient water. The idea of transferring water from the Tao River to the Zuli Valley (and other areas of Dingxi) has been considered since the early 1950s, and construction was begun on the project in 1958, only to be stopped two years later when it became apparent that the project was not at that time feasible (Xinhua, 2006b; Yang, 2008). The project was reconsidered in the 1990s, and finally approved in the mid-2000s. The new Yintao project has been divided into two parts, one corporation raised money privately (presumably from state banks) to fund irrigation development from the project. A second section was funded directly from the central government for the construction of facilities related to drinking water as a project of poverty alleviation. While agricultural development is a commercial enterprise, issues of living conditions are considered a welfare issue, and handled through the financial organs of poverty alleviation (Xinhua, 2006a).
The Yintao project is not yet complete, and its ultimate impact remains unknown, but what is most interesting about the Yintao project is how it has been discursively constructed. At the household level the Yintao project does little to alter how people relate to water; it feeds a new water supply into an existing system. Management and provision of water will be handled through the same state hydraulic bureaucratic apparatus that presently provides water. However, at a conceptual level it treats water quite differently from how water was previously addressed in the region. Water in this project is viewed as a resource that is national, rather than local, in nature. Linton (2010) has described how the creation of water as a modern object has taken place through a process of abstraction, where one unit of water is viewed to be interchangeable with any other. Such abstraction must occur as a specific scale, and in the Yintao process this abstraction takes place at the national scale. Water becomes a resource like any other that can be moved to meet the needs of the nation. It requires more infrastructure to be allocated, but water is no longer something that can only be used where it falls. This project is emblematic of technologically intensive mega-projects that have symbolized modernity and rescaled water for state ends the world over (Kaika, 2006; Swyngedouw, 2007).

The control of water as a symbol of national identity is present from the rhetoric employed in state discourses surrounding the Yintao. Official sources hasten to point out that the Yintao project is the largest water project ever attempted in Gansu, and is used to illustrate the technical capabilities of the province. In nationalistic terms the project is called “Gansu’s Dujiangyan” (Xinhua, 2006a), alluding to the ancient Chinese irrigation project that is often viewed as a source of national pride (Mertha, 2008). Mega-projects have long been associated with national identity and displays of state power (Scott, 1998; Kaika, 2006; Swyngedouw, 2007), and in many ways the Yintao Project fits that trend. Yet the way that the Yintao Project is presented as
being national tells us much about the changing nature of Chinese national identity with respect to water resources.

This point of national pride is often made with reference to the history of the project. The Yintao project was first undertaken as a project of the Great Leap Forward in 1958. During this period, and estimated 70% of Gansu’s working population was sent to work on irrigation works (Dikötter, 2010), including up to 160,000 working on the Yintao project. The Yintao was conceived incredibly quickly. Although the first proposals to build such a project were aired as early as the 1930s (Gansu Provincial Archives, 2009), work was begun quite hastily in 1958, with only three months between when the project was proposed by the provincial government in February 1958 and the beginning of construction in May 1958 (Gansu Province Yintao Project Construction Management Office, 2011; Yang, 2008). While describing the Great Leap Forward Construction of the Yintao, descriptions of the project extol the labor involved in the project, emphasizing the nation being built through the struggle of laboring people to tame nature (on the role of labor conquering nature during the Maoist era see Shapiro, 2001). Historical accounts of the failure of the project in the 1950s valorize the labor of the workers, showing images of workers cutting a canal through the mountains (Xinhua, 2006b). When describing the project in 1958, Chairman of the state council Xi Zhongxun said of the Yintao “this project is not only of national significance, but of global significance…. it shows that we are not only masters of society, but masters of nature” (quoted in Yang, 2008, p. 122). While discussing the previous failure to build the Yintao project in the 1950s, this failure is often blamed on poor “economic conditions” and the lack of “national strength” at the time (Xinhua, 2006). Others have bluntly said that the project was without “any scientific spirit” (Zhang, 1992, p. 151). In the present day completing the Yintao project then will make up for past national failings. A central part of post-
colonial national identity is always being in a state of catching up and remedying past weakness (as discussed in Chapter 2); this project symbolizes such an effort to overcome past failings. State propaganda surrounding the Yintao project focuses on the improvements that it will bring to life in the area, but is often more concerned with presenting the project as a “50 year struggle” against nature, that will be recorded in the annals of Gansu history. This fifty-year struggle is an important timing milestone, as it aims to rectify what was seen as a national failure of the past. Elsewhere they refer to the project as the “dream of generations” (Xinhua, 2006b), which broadly refers to the desire for water, but completion of the project is referenced to the failure of the Great Leap Forward. However, when describing the success of the project today, sources invariably speak of the role of science and technology (Xinhua, 2006a). Because initial attempts to complete the Yintao project failed, its completion is now seen as a triumph of the Chinese nation over nature through scientific modernization. Where the initial attempts to forge the nation and reshape nature through labor failed, in post-reform China, science and technology are the sources of national strength that now allow this project to succeed. Thus the Yintao project, and associated large-scale irrigation works and modern, urban piped drinking water are viewed as symbols of a scientifically advanced, modern nation. While supporters of water cellars struggle to maintain that their projects are scientific in nature, there is little doubt that inter-basin transfer projects are symbols of national strength in an age when national identity is tied to science and technology.

A second way that the Yintao project is viewed as a source of national identity is the emphasis on transcendence of the local nature of water as a resource. This project is often emphasized in official discourse as being both trans-watershed (kua you) and trans-county (kua xian) (Xinhua 2006a). Thus, this project is about making water a resource like any other, one that
can be moved by humankind according to its wishes. Natural boundaries of watersheds do not matter when water is conceptualized at provincial (and national) scales. Other scholars have illustrated how the conceptualization of water as a national resource that rationalizes moving water between basins is itself an act of nation building, that requires thinking of the nation in new ways (Sneddon & Fox, 2011; Swyngedouw, 1999). The Yintao project links together five counties (of which two are actual beneficiaries) through a shared dependence on a water system. The isolated places of Eastern Gansu become that much less isolated when they are tied together through shared state water infrastructure. Ultimately this project involves a re-scaling of water flows that gives priority to the political map that binds state-spaces over the physical map of watersheds. It is the political borders of Gansu province, not the Tao River, that delineate where water will flow.

**4.4. Domestic Water in the Zuli Valley in 2010**

Following the state interventions discussed above, drinking water use has changed significantly in the Zuli Valley. But the effect of these changes has been different between the upper and lower valleys. While the upper valley experienced a diversification of water sources driven by both the introduction of water cellars, falling water tables, and the introduction of irrigation, the lower valley experienced a complete conversion to water cellars.
Table 4-3 Domestic Water Sources in the Lower Valley, 2005 as reported by survey respondents

<table>
<thead>
<tr>
<th>Water Use</th>
<th>Drinking #</th>
<th>Drinking %</th>
<th>Livestock #</th>
<th>Livestock %</th>
<th>Other #</th>
<th>Other %</th>
</tr>
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<tbody>
<tr>
<td>Water Cellar</td>
<td>90</td>
<td>98</td>
<td>90</td>
<td>98</td>
<td>90</td>
<td>98</td>
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<tr>
<td>Well</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Spring</td>
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<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Clay Cellar</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Running Water</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Purchased</td>
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<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
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<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>River</td>
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<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Water Company</td>
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<td>0</td>
</tr>
<tr>
<td>Unclear</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4-3 presents the dramatic effect that the 1-2-1 program and other improved water cellar programs had on domestic water in the lower valley during the 1990s. By 2005 only one respondent reported still relying on a clay cellar (though as mentioned above, a few may have mentioned cellars when they meant clay cellars), and only a handful of respondents continued to use river water. 98% of households had, by 2005, begun to rely on improved water cellars as their primary source for most of all domestic water (Table 4-3).
Table 4-4 Domestic Water Sources in the Upper Valley, 2005 as reported by survey respondents

<table>
<thead>
<tr>
<th>Water Use</th>
<th>Drinking #</th>
<th>Drinking %</th>
<th>Livestock #</th>
<th>Livestock %</th>
<th>Other #</th>
<th>Other %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Cellar</td>
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<td>10</td>
<td>19</td>
<td>27</td>
<td>13</td>
<td>18</td>
</tr>
<tr>
<td>Well</td>
<td>20</td>
<td>28</td>
<td>14</td>
<td>20</td>
<td>16</td>
<td>23</td>
</tr>
<tr>
<td>Spring</td>
<td>17</td>
<td>24</td>
<td>12</td>
<td>17</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>Clay Cellar</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Running Water</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Purchased</td>
<td>10</td>
<td>14</td>
<td>9</td>
<td>13</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Shared Well</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>River</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Water Company</td>
<td>8</td>
<td>11</td>
<td>8</td>
<td>11</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Shared Cellar</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Irrigation</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Unclear</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
</tbody>
</table>

For the upper valley (Table 4-4), in contrast to the lower valley, the period of increased state involvement in water management during the 1990s resulted in a more heterogeneous waterscape of domestic water provision. In 1990, wells, shared wells, and springs accounted for 91% of water sources; by 2005 those sources had fallen to 60%. The causes of these changes are mixed. During this period there was a significant increase in the amount of purchased water used with a concentration of purchased water in Village 4, which experienced falling water tables as a result of the introduction of groundwater irrigation backed by the country water bureau in the early 2000s. This irrigation water provided another way of getting domestic water by diverting irrigation water to water cellars for domestic consumption. Thus, while the irrigation project had the unintended consequence of producing scarcity and sending more households to purchase...
water, it also facilitated opportunities for households in irrigated areas to obtain domestic water in informal ways from the irrigation system.

A second major change that occurred in the upper valley during this period was the rise of water cellars used not for household consumption, but for domestic livestock. By 2005 water cellars had become the means of providing water for livestock in a plurality of households. There are some interesting dimensions to this change. Under the 1-2-1 program and subsequent improved water cellar programs, households generally received a water cellar, regardless of whether they had other water sources (indeed current construction of houses as part of the New Socialist Countryside program includes both running water and water cellars). In areas with fresh groundwater, water from water cellars generally came to be used for livestock or other household tasks. This is particularly true in areas of Hui ethnicity, such as Village 5 Interview respondents who were Muslims of the Hui ethnicity reported that they will not drink or cook with water from water cellars, believing that it is unclean, so in Hui regions water cellars are only used for livestock. Nonetheless, most households in Village 5 had water cellars that were used for water for livestock and cleaning.
Table 4-5 Domestic Water Sources in the Lower Valley, 2010 as reported by survey respondents

<table>
<thead>
<tr>
<th>Water Use</th>
<th>Drinking #</th>
<th>Drinking %</th>
<th>Livestock #</th>
<th>Livestock %</th>
<th>Other #</th>
<th>Other %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Cellar</td>
<td>77</td>
<td>84</td>
<td>82</td>
<td>89</td>
<td>82</td>
<td>89</td>
</tr>
<tr>
<td>Well</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Spring</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Clay Cellar</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Running Water</td>
<td>15</td>
<td>16</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Purchased</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Shared Well</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>River</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Water Company</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Shared Cellar</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Irrigation</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Unclear</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4-5 illustrates that in 2010 water cellars remained by far the dominant source of water in the lower valley. While running water has been introduced, it has not reached all households, and those that have the opportunity to connect often choose not to for reasons that will be discussed in Section Five below. As will be discussed below, these data elide a major shift that has occurred in the lower valley. While no respondents said that purchased water was their primary source of water for any use, purchased water has become an important secondary source of water as prices have fallen with the arrival of piped water, and has greatly enhanced water security in the lower valley in a process described below. It should also be noted that slightly more respondents used piped water for drinking than other uses, meaning that nearly a third of those
connected to the drinking water grid used running water only for drinking or cooking, while continuing to use other sources for other uses. Interviewee 3024 was a case of this phenomenon. Prior to the arrival of running water he had relied upon water cellars for drinking water, and carried water from the river for other purposes. He continues to use running water, which he views as being cleaner, only for drinking, relying upon cellar water for his other needs now.

Changes in water provision in the upper valley in 2010 (Table 4-6) primarily represent the introduction of running water to the area, which now accounts for 28% of drinking water sources. The conversion to running water represents a variety of changes from previous water sources representing the small-scale geographic variations in water provision. The area where running water was introduced coincided with areas in Village 6 served by the water company.

Table 4-6 Domestic Water Sources in the Upper Valley, 2010 as reported by survey respondents

<table>
<thead>
<tr>
<th>Water Use</th>
<th>Drinking #</th>
<th>Drinking %</th>
<th>Livestock #</th>
<th>Livestock %</th>
<th>Other #</th>
<th>Other %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Cellar</td>
<td>7</td>
<td>10</td>
<td>25</td>
<td>35</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>Well</td>
<td>22</td>
<td>31</td>
<td>12</td>
<td>17</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>Spring</td>
<td>6</td>
<td>8</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Clay Cellar</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Running Water</td>
<td>20</td>
<td>28</td>
<td>17</td>
<td>24</td>
<td>19</td>
<td>26</td>
</tr>
<tr>
<td>Purchased</td>
<td>16</td>
<td>22</td>
<td>12</td>
<td>17</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>Shared Well</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>River</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Water Company</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Shared Cellar</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Irrigation</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Unclear</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
</tbody>
</table>
and a communal well fully converted to running water. In Village 5, the number of households dependent on spring water decreased both because some households connected to running water, and other households converted from springs in gullies to wells dug in more accessible places. Simultaneously, the pattern of increased water purchases in Village 4 continued as water tables continued to fall. In Village 4 pipes have been laid for the extension of drinking water, but will not become operational until the Yintao project is completed, one of several areas without drinking water despite having pipes laid. As will be demonstrated below, the irregularity of water in these projects is one factor in a conjuncture that has led to peasant indifference to piped water.

While the changes that state policies have wrought vary from village to village, in most cases peasants in the Zuli Valley are less dependent on water sources mediated through familial or small-scale social relations today than they were 20 years ago. At the same time, peasants also enjoy much greater water security. That is to say, the aleatory political economy of water has been governed in a way that has reduced the chance of water scarcity. This increase in water security has been a central cause of apathy towards the installation of running water.

4.5. Peasant Responses to Running Water

Although the provision of running water in the Zuli Valley is fairly recent, relatively few have connected to running water and when asked if they plan to connect many lower valley residents replied that they did not have the money to connect, that it is simply not worth the high costs, or that they found the water delivery too unreliable. This indifference to running water is due to the conjuncture of how the development of running water has played out, the history of access to water in the Zuli Valley, and what peasants value in domestic water. The transition to piped drinking water has not gone smoothly, and many people do not trust the drinking water system to provide a stable supply of water. The arrival of piped water has also reduced the cost
of hauled water. Furthermore the introduction of submersible pumps has meant that the reduction in water-gathering labor provided by running water does not constitute an improvement over peasants’ labor requirements for water cellars. These patterns result in two factors that were important in understanding peasants’ indifference to running water: how stable the water supply has become, and how peasants interact with water on a daily basis. This conjuncture can be viewed through the lens of an aleatory political ecology to view how the social and political relations surrounding the risk of water shortage have been shifted. Prior to the interventions examined above, the risk of water shortage was primarily mediated through informal familial social mechanisms. The running water project and Yintao project have aimed to mediate the risk of water shortage through a state-hydraulic apparatus, though without complete success. The conjuncture of state-backed water cellars and falling prices for hauled water have greatly reduced the risk of water shortage.


To state actors promoting running water, the security or stability of the water supply is perhaps the greatest benefit of the program. Peasants in the Zuli Valley do care about the stability of water supplies, however three factors have led peasants to believe that running water is not the best means of providing a stable water supply. First, as discussed above, running water in the lower valley has not done a particularly good job of providing a secure water supply. Second, water cellars have made significant progress towards providing a secure water supply. Finally, the presence of running water at some households in the community has drastically reduced the price of water purchased through informal markets in hauled water, making incremental water purchasing a more economical strategy that installing running water.
Water cellars have made great progress toward providing peasants with domestic water security. This can be seen in peasants’ investment decisions. The addition of cellars was a common investment to improve water security. This trend was most prominent in villages of the lower valley where several villagers have gone into raising chickens and selling eggs as a source of income, but was present throughout all villages. Poultry raising is a very water intensive industry and respondents had built up to nine water cellars to water their chickens. With this many water cellars, peasants generally were able to capture some water, but largely relied on purchased water. Even for those not engaged in animal husbandry, buying water during times of rainwater scarcity has become common throughout the valley, and having additional water cellars is often associated with water purchasing behavior.

Water in the valley-land villages of the lower valley in 2010 was sold for approximately 10 yuan per cubic meter, including 5 yuan for the water (a markup of 50% over the price paid by those who have running water in their houses), and 5 yuan for delivery. While three times the cost of water coming from a connection, 10 yuan per cubic meter is still much cheaper than the 40 yuan per cubic meter that delivered water had cost just two years before piped water arrived in the area (all data is based on interviews). The average cost to a household of connecting to the running water system was 1273 yuan; this value represents the costs of households directly adjacent to the system. For those who lived far from the main water lines connection costs were estimated at up to 10,000 yuan (for a family approximately a 1/4 mile from the main line). Thus for the average family living near the line, running water would only become cheaper than purchased water after the purchase of about 500 cubic meters. For household purposes (outside of raising animals) most households connected to running water used less that 2 cubic meters of water per month (although average household water use was about 150 pounds per day, or about
4 cubic meters per month, suggesting that most people continued to rely upon rainwater arriving in water cellars even after connecting to running water), indicating that from the perspective of saving money, it would take eight years for running water to pay for itself. The relatively low price for delivered water in the valley, the high price of installing a connection, and the unreliability of the system combine to create a situation where running water does not appear either cheaper or more stable. As a result, people often view a second or third water cellar (the price of which is similar to installing running water) as a better investment. This decision, however, is based on the presence of some running water in a local market in water. Some households who have running water installed are able to sell it, which is what makes it affordable for those who have not installed running water. Thus, people are able to indirectly benefit from the presence of running water in the community without connecting to it themselves. However, it should be noted that these are not purely market transactions. Many of the people who were engaged in the purchase and sale of water were conducting transactions with their friends and relatives. Thus, the informal markets that emerged were embedded in social institutions, and depended upon the state-hydraulic bureaucracy for their water source.

4.5.1.1. Water Hauling: Usurious or Useful?

This case presents a different view of the widely held notion of delivered water (by tankers) as an avaricious and exploitative institution. While the often-exploitative role of water delivery revealed by other studies certainly is often true (Birkenholtz, in press; Swyngedouw, 2004), this study calls for a more nuanced view of the role that tankers can play. Others have pointed out that delivered water exacerbates inequalities in water access in both urban and rural contexts by diverting water from sources that provide water to villages at much lower costs including piped systems, natural bodies of water, and government subsidized delivery, moving that water into a
for-profit capitalist system. Birkenholtz, for example, claims “[t]he unevenness of networked water supply has produced a system of usury that further subjugates the poorest” (Birkenholtz in press, 14). Moreover such systems invariably operate at the margins of the law, if not outside of it. While such diversion certainly takes place in the Zuli Valley, water tanker delivery has added flexibility to a preexisting system of household water storage that has allowed water storage to often be a more economical option than running water. To understand why hauled water can have a positive impact on peasants in the Zuli Valley I employ an aleatory political ecology approach to the question of hauled water. This calls for an examination of how decisions about the instability of a water supply are made, by whom, at what scales, and to whose benefit. In the case of the Zuli Valley, the rise of tankers has fundamentally been a compensatory mechanism that has reduced, rather than exacerbated, the risk of water scarcity.

One way that water delivery in the Zuli Valley differs from other cases is that water is hauled relatively short distances. Rather than hauling long distances and having entire villages or neighborhoods be dependent on hauled water, in the Zuli Valley much of the water hauling takes place within villages from areas closer to pipes to those more distant, or households that have simply not connected. In the past, water was hauled from the town of Chankou to lower valley villages, at rates of about four times the current rate. Thus the Zuli Valley allows us to ask what scale is small enough to make water hauling not usurious. The short distances involved, and the change from previous arrangements that involved much longer distances in times of shortage has made water hauling a relatively stabilizing influence.

In addition to the scale of hauling, we must think of the technology involved. Two pieces must be considered in the Zuli Valley. First, water hauling has emerged alongside water cellars. Second, while the idea of a water tanker is generally a large truck hauling water between
villages, water tankers in the Zuli Valley tended to be small three wheeled tractors with specialized water hauling tanks added in the back (Figure 4-6). These are only economical to use over the smaller distances in the Zuli Valley. These tanks were fairly small, with the smallest (and most common) types having a capacity of 1.5 cubic meters. This type of hauling system was fairly inexpensive. Many people already own three wheeled tractors, and adding the tank was a fairly inexpensive step. This creates low barriers to entry into the water hauling business, making it fairly flexible and competitive. This competition may form a second reason hauled water has contributed to overall water security in the Zuli Valley. Water haulers appear to operate on fairly narrow profit margins. It is likely that at least some of the water being hauled in the Zuli Valley is being obtained from the piped water system illicitly. Such diversion could be a factor in the frequent unavailability of water from the piped system. However, even if this is true, the nefarious effects of this diversion are questionable. Water remains available at a relatively low price.
An additional difference between water that is hauled in the Zuli Valley and hauled water in other areas is the nature of who controls the process of hauling. Water hauling in much of the developing world is a business, and often one that aims to monopolize control of a resource. In contrast, water hauling in the Zuli Valley is carried out through a diffuse network of actors, both in provisioning water and hauling water. Importantly, those that haul water are often not the same people as those who control access to water from the pipe. I interviewed several people who owned tanks and hauled water. None of them did this as a full time or professional job. Instead they largely used water hauling to meet their own needs.53 An example of the flexibility of such markets in hauling, though something of a counter factual comes from a chicken farmer

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53 No one I spoke to admitted to hauling water as a side business, though some may have been engaged in this activity. Regardless, it was clear that farming remained the primary focus of these farmers’ activities.
in Village 2 who owns a water hauling tank (interview 2004). Like many farmers in the area, this farmer responded to local state promotions to go into raising chickens. However, unlike most other chicken farmers, he has chosen to do so in a mountain village far from regular water sources. He purchased water for his chickens in the lower valley for 8 yuan per cubic meter from a household. He estimates that the vendors’ total costs for the water, including paying for tap water and pumping from a water cellar where it is stored (but not including the construction of the water cellar or purchase of pump), to be 5 yuan, leaving them a profit of 3 yuan per cubic meter. The farmer then hauled this water using his own tanker and truck, which he estimates costs him 12 yuan per meter, for a total cost of 20 yuan per meter for water delivered to the mountains. He also loans his truck and tank to neighbors when they need to haul water. It is worth considering the actors in this hauled water provision network. The owners of the tap in town used water supplied at subsidized rates by a government project. They resold this water at a minor profit to someone with whom they had a preexisting social relationship. The purchaser of the water owned the capital used to haul water, and hauled this water himself. He also shared this resource with his neighbors. There were several potential households from which the purchaser could buy water (it appears he was paying a slightly higher rate than others). Other neighbors have multiple tankers they could use to purchase from multiple households. This creates a system that is both adaptable, and fairly competitive. Crucially these actors were embedded into social institutions. As others have illustrated (Dubash, 2004) even the market provision of water tends to take place through socially mediated institutions.

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54 This particular farmer was constantly losing money. He credited this loss to the high cost of feed (which he purchased at higher rates than others), while others in the village credited his problems to poor management. Regardless, the high cost of water was one reason, but not the sole reason, for his financial difficulties.
A final difference between hauled water in the Zuli Valley and other regions of the developing world lies in how it is used. While hauled water in urban slums and often in villages is the primary source of water, hauled water in Dingxi is largely supplemental to existing rainwater catchment systems. Thus, demand for water from this hauled water system remains more flexible. An alternative to purchasing water at usurious rates can, at times, simply consist of being more economical. For example, some chicken farmers in Village 3 who depend on hauled water for their animals are able to save money by mixing water from saline wells with fresh water that is purchased. The provision of hauled water reduces instability in water provision, by providing the option to purchase water when needed. Birkenholtz (in press) has shown that hauled water in his case study in rural India led to produced scarcity. In contrast, hauled water in the Zuli Valley has led to a reduction in the risk of water scarcity.

Thus, a variety of factors contribute to make hauled water a productive element of the waterscape. The distances that water is hauled are short, there is an adaptive and competitive market, and the use of this water is supplemental to rainfall, and exists largely within embedded social institutions. The existence of this hauled water strategy, is, of course premised on some households having tap water available. It should be noted that not everyone in the valley is happy with the institution of water hauling. In Village 4 residents were not particularly happy with purchasing water, which they have increasing come to depend upon over the last decade. However, the situation here is somewhat unique, as this area had previously had groundwater, and has been driven to water purchasing by falling water tables that have made wells in the area unusable. It should also be noted that many households did not like purchasing water, but they did not like the idea of piped water either, and found the former slightly preferable. Thus to understand why water hauling has had different results in the Zuli Valley than previous studies
we must look to the aleatory, and examine how the chance of a water shortage has been managed through water hauling. In other cases the institution of water hauling is a form of usury that produces water shortages (Birkenholtz, in press), while in the Zuli Valley the use of water hauling is part of series of strategies that ameliorate water shortages.

4.5.2. Convenience and the Daily Practices of Water Use
Peasants largely conceive of running water as a convenience. During the survey peasants were asked in an open response form what was the greatest benefit of connecting to the water grid. After listing multiple benefits they were then asked which was the most important benefit of running water. By far the most common responses had to do with convenience (}
Table 4-7). A full 89% of respondents mentioned convenience as a benefit of running water, and 50% thought that it was the most important benefit of running water. Other important benefits related to health and cleanliness (which people listed separately, though the two are clearly related). Interestingly, only approximately 10% of respondents mentioned security (defined as stability of supply) as a benefit of running water. There are likely two reasons for these responses. First, particularly in the lower valley water service has been unreliable, leaving many with the impression that running water is not a very stable source of water. Second, for reasons discussed below, water security is not viewed as the problem that it once was in rural Gansu.
### Table 4-7 Benefits of Running Water Identified by Survey Respondents (gathered by author)

<table>
<thead>
<tr>
<th>Most important benefit</th>
<th>Mentioned</th>
<th>% Most important</th>
<th>% Mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convenient</td>
<td>83</td>
<td>147</td>
<td>50%</td>
</tr>
<tr>
<td>Clean</td>
<td>27</td>
<td>52</td>
<td>16%</td>
</tr>
<tr>
<td>Health</td>
<td>19</td>
<td>27</td>
<td>11%</td>
</tr>
<tr>
<td>Secure</td>
<td>15</td>
<td>17</td>
<td>9%</td>
</tr>
<tr>
<td>Saves Labor</td>
<td>7</td>
<td>24</td>
<td>4%</td>
</tr>
<tr>
<td>Saves Money</td>
<td>8</td>
<td>12</td>
<td>5%</td>
</tr>
<tr>
<td>Drinking*</td>
<td>6</td>
<td>8</td>
<td>4%</td>
</tr>
<tr>
<td>Vegetables**</td>
<td>0</td>
<td>6</td>
<td>0%</td>
</tr>
<tr>
<td>Saves Time</td>
<td>1</td>
<td>4</td>
<td>1%</td>
</tr>
<tr>
<td>Not sure</td>
<td>2</td>
<td>0</td>
<td>1%</td>
</tr>
</tbody>
</table>

*Drinking was a somewhat unique answer, however six people stated that drinking was the most important benefit, and did not provide further clarification.

**Many people use water from running water to irrigate small vegetable gardens within their courtyard homes.

The idea of convenience being the central benefit of piped drinking water in the Zuli Valley is, indeed, eerily congruent with the descriptions of running water offered by state discourses. In this vision running water is a modern convenience that makes the countryside more like urban areas. Those who receive running water will become more modern, less backward, less impoverished people, who have water available at the turn of the faucet. In this way the state endeavors to create new forms of subjectivity in rural areas, based on modern access to water. Peasants have largely adopted this discourse, and do not disagree with the vision of a more modern, convenient life-style. However, peasants have found a different route to achieving this lifestyle than state backed water provision.

The convenience provided by running water is, above all else, a luxury, something that is very nice to have, but is not essential. As mentioned above, in Dingxi means of acquiring
domestic water have long been a form of luxury. Peasants in the valley have found ways to have the benefits of running water without the expense or drawbacks of connecting to the water grid by purchasing submersible pumps for their water cellars. Submersible pumps, the second drinking water related item that people tend to invest in, are directly related to the discourse of convenience among peasants. While state actors presented an image of modernity that was based on the notion of having reliable and safe running water, to peasants having the convenience of not having to pull water from water cellars was a more desirable goal. Pumps, costing approximately 200 yuan, are placed in water cellars to reduce the work of drawing water from the cellar. Gathering water in the past had been arduous labor. Prior to the construction of water cellars, people generally had to walk approximately 15 minutes round trip to gather water from communal water cellars or wells. The introduction of improved water cellars greatly reduced this burden: for most people in the Zuli Valley water is incomparably more convenient to obtain today that it was when they were young.

The small advantage provided by running water relative to pumps can be understood by considering how domestic water is actually used on a daily basis in the Zuli Valley. Water that is used for most household tasks in Northwest China, including washing, cooking, and boiling comes from a tong, a waist-high clay pot with a capacity of approximately 30 liters. A tong is used in rural northwest China regardless of whether water comes from a water cellar or pipe. Where piped water is run into a household, the faucet is usually located over the tong, and is used to directly fill the tong (Figure 4-7). This situation is generally only found in the newest houses, mostly those associated with the New Socialist Countryside program. When a running water spigot is located in a courtyard, the most common arrangement for older houses, it is generally used to fill buckets that are then used to fill the tong. This usually happens once or
twice each day, depending on the size of the family. When a water cellar is used, buckets will be used to gather enough water to fill the tong, usually 4-6 loads are carried to fill the tong. Alternately, when a submersible pump is used it will be placed in the water cellar with a flexible plastic pipe run through a window to a position over the tong. There are very few sinks, showers or toilets in even the newest households. In my time in Dingxi I only encountered one house, which was part of a New Socialist Countryside construction, which had these things. Moreover, the residents of this house didn’t quite know how to use the sinks and showers that they had, and largely continued to use water as they always had. Thus, from the perspective of daily household use, it makes relatively little difference whether water arrives from a spigot or the water cellar. The addition of a pump to a water cellar can make the cellar just as convenient as running water, with the advantage that it is rarely cut off. Because convenience is what many peasants value most about running water, the improvements running water can provide are not large enough to justify the cost.\footnote{It should be noted, however, that water being ‘clean’ or ‘healthy’ were the second most frequently mentioned attribute. This accords with the practices of many houses of prioritizing different water uses based upon the perceived differences in the quality of the waters used.}
Peasants in the Zuli Valley did not disagree with the state-backed notion that modern convenience is central to development. However, as with the ‘down to the countryside’ programs mentioned in Chapter 3, alternate avenues to the vision of modernity presented by state actors exist. In the Zuli Valley purchasing a submersible pump provides similar levels of convenience to running water, but at a lower cost and with greater flexibility (as it allows one to move water between cellars). Thus modern convenience represented by running water is arriving through a mixture of state programs to provide water cellars, discourse of the convenience and modernity of running water, and the marketplace that has provided submersible pumps. While state actors envision a pure modernity wherein peasants will adopt state-backed technologies of running water to become a new type of modern national subjects, peasants have negotiated these ideas of
modernity and found alternate ways to achieve similarly modern lifestyles outside of state development programs.

Peasant indifference to the arrival of running water in the valley can be explained by the confluence of several factors. First, the unreliability of the system has tarnished the reputation of running water to do what it is supposed to do best: provide water all the time. Second, the relative success of the improved water cellar projects over the last decade and a half has left people feeling fairly secure about their water supplies, and that their water sources are already comparatively convenient. Finally, markets in water make the costs of purchasing water when a water cellar runs dry relatively cheaper than installing a water connection. These markets provide an additional guarantee of water security. For those with actual experience with running water, the notion that it is a convenience that symbolizes modernity holds little sway. Some of the goals illustrated by state discourses also motivate how peasants approach water. People are concerned about the supply of water, but the market (based on the state project that provided piped water to some households) has largely obviated individual connections to achieve this goal. Similarly the convenience emphasized by peasants is similar to the goals of making a modern, middle class society, but can be obtained far more cheaply by adding a pump to an existing water cellar than connecting to an elaborate state water grid.

One significant caveat is that this description of indifference to running water applies largely to those villages that have connected to, or will soon connect to running water. As a counterpoint, the opinions about running water in the two mountain villages (Village 2 and portions of Village 5) were far different. In both cases, running water is not a real possibility in the area. Furthermore, because these villages are more remote, the cost of hauling water is quite high. Peasants in the two mountain villages spoke of running water as being almost magical.
When asked what the benefits of running water were people often responded that it is “all beneficial.” Similarly when people in mountain villages were asked whether they planned to connect to running water, most responded that they would if it were available. In contrast, those in valley villages expressed concern about system reliability, costs, and other factors. Tellingly, the language that mountain residents used to describe this security, “zhengchang” or normal, was precisely the language used by valley bottom residents to describe water shortages. In the valley bottom, water supplies were described as being “bu zhengchang” or irregular. Several respondents in Villages 1 and 3 complained about irregularity in water supply, and others said that they would not connect to the water system until it was zhengchang. Through this language it is clear that those who live in mountain villages have a somewhat idealized vision of what running water means, whereas those on the valley floor, who have had to make the actual choice of investing money in connecting to running water or not, are less sanguine.

4.6. Conclusions and Theoretical Contributions

The case of domestic water provision in the Zuli Valley provides a case study of how engaging with the aleatory can further our understanding of the political ecology of water. This chapter has illustrated a series of social, political and economic institutions that have existed to mitigate the risk of a shortage of running water. Prior to the state-backed interventions of improved water cellars and running water, the risk of water scarcity was managed at the household scale and through cooperation between households either within one’s extended family or with other nearby households. The introduction of improved water cellars was conducted by state authorities under a policy of development which has been imbued with scientific thinking, yet paradoxically reduced reliance upon state institutions of managing water scarcity, while also not intensifying state power over the management of water scarcity. The
running water project and the Yintao project have represented a concentration of management of the risk of water scarcity in the state-hydraulic apparatus. In both cases the state controls access to the biophysical resource of water and centralizes knowledge of how water is managed to mitigate the effects of potential water scarcity.

The first rubric through which different water interventions can be analyzed is who controls knowledge of water resources. Following Mitchell’s (2002) argument that state centralization of water management has been fundamentally about shifting who controls knowledge of how to control water we can examine each intervention from the perspective of the control of water knowledge. In this analysis, prior to state intervention, knowledge of water management was quite diffuse, but also specialized. Knowledge of how to construct clay water cellars was quite complex and specialized. The advent of concrete water cellars actually made knowledge of how to manage the scarcity of water through water cellars more accessible, as concrete water cellars proved easier to construct than clay cellars. Thus the first intervention had centrifugal effect on knowledge of how to manage water scarcity. Although produced by the state, knowledge of water management actually became more accessible through this program. The two later interventions—the rural running water project and the Yintao project—both had the effect of centralizing knowledge. In both case knowledge of how to manage water scarcity came to rest with the state.

The second way that we may examine the effect of different policies in managing water scarcity is by examining who controls biophysical water. Prior to state intervention, biophysical water was controlled by households or groups of households within a local area. The introduction of improved water cellars actually increased the relative independence of households from other social groups that had managed water scarcity by increasing the capacity
of households to manage biophysical water internally. Finally, the rural running water projects and Yintao project have centralized control of the biophysical resource of water in the hands of the state. Yet, although the relationship between the state and water consumers was intended to be direct in these projects, the role of local water markets which are in turn socially mediated by existing relationships has meant that water, even when provided wholesale by the state, has arrived through a variety of mechanisms to individuals. These changes are summarized in Table 4-8.

Table 4-8 Summary of impacts of state-backed domestic water interventions in the Zuli Valley

<table>
<thead>
<tr>
<th>Water management intervention/institution</th>
<th>Institutions Mitigating Water Scarcity</th>
<th>Control of Knowledge of managing water scarcity</th>
<th>Control of Biophysical Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing institutions prior to 1990s state interventions</td>
<td>Households</td>
<td>Households</td>
<td>Households</td>
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<tr>
<td></td>
<td>Extended Families</td>
<td>Extended Families</td>
<td>Extended Families</td>
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<tr>
<td></td>
<td>Neighbors</td>
<td>Neighbors</td>
<td>Neighbors</td>
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<tr>
<td>Improved Water Cellars</td>
<td>Household, supported by County Water Bureau</td>
<td>Households</td>
<td>Households</td>
</tr>
<tr>
<td>Informal Water Markets</td>
<td>Households, Economic Institutions, Social relationships</td>
<td>Households</td>
<td>Households, County Water Bureau (water sources)</td>
</tr>
<tr>
<td>Rural Running Water</td>
<td>County Water Bureau</td>
<td>County Water Bureau</td>
<td>County Water Bureau</td>
</tr>
<tr>
<td>Yintao Project</td>
<td>Provincial Department of Water Resources</td>
<td>County Water Bureau</td>
<td>County Water Bureau</td>
</tr>
</tbody>
</table>

The case of domestic water governance in the Zuli Valley may be considered as an example of governing human-environment interactions through mechanisms of security and discipline.
(Foucault, 2007). State actors who have undertaken to govern how peasants relate to *the potential scarcity* of water in the Zuli Valley have done so in a way that aims to reduce the chance of potential water scarcity. Foucault argued that the disciplinary approach to the regulation of grain shortages involved the state directly regulating the production of and provision of grain. Like Foucault’s example of grain management, running water projects have resembled disciplinary power insofar as state actors directly control and allocate water resources. The state controls both the provision of the essential resource of water and knowledge of how to manage water. In contrast, the improved water cellar program enabled peasant households to have greater control of water resources, more closely resembling an approach of security towards the aleatory. Water cellars also indirectly encouraged the circulation of water through market mechanism (though this was an element that may not have been intended, at least to the degree that it has occurred so far). Power over both the biophysical resource of water and knowledge of how to manage water in the case of water cellars was *centrifugal*, which was identified by Foucault as being a mark of governance through apparatuses of security. In contrast, in the case of piped drinking water power over both the biophysical resource of water and knowledge of how to manage water scarcity was *centripetal*, which Foucault associated with disciplinary forms of power.

In summary, the introduction of running water and the Yintao project have been attempts to centralize the mitigation of the risk of water scarcity in the hands of the state through technical means, which may be thought of as the exercise of disciplinary power over hydrosocial relations. In this way these projects are similar to the technical waterscapes that others have explored in the extension of state power over water (Birkenholtz, in press; Kaika, 2006; Swyngedouw, 2007). However these projects have not been met with either outright acceptance or resistance (as
Loftus (2006) or Swyngedouw (2004) have argued, but rather with fine scaled apathy and adaptation. The response to the arrival of running water has not been either embrace or outright resistance, but a certain degree of apathy on the part of the project beneficiaries that resembles the forms of everyday resistance examined by Scott (1985). Moreover, by using local water markets, peasant households have been able to adapt the project to prevent water shortages in ways not envisioned by its original planners.

Nor is it that only recipients of state intervention who have adapted; the state has also adapted to the situation at hand. Following Li (1999), many of the projects of state actors have involved *compromise*. Compromise, for Li, was part of the work of government by state actors insofar as state agendas of development were adapted by project administrators and implementers in ways that helped both. The state actors that have reworked the hydro-social governance of drinking water in the Zuli Valley have had visions of a technical waterscape, yet they have ultimately compromised with project beneficiaries in its implementation. State actors continue to construct water cellars along side new running water systems—houses built through the New Socialist Countryside program include both—and the successful water cellars program has been labeled as a product of high technology (through the 863 program) rather than a case of appropriate technology. Moreover, the local water bureau has turned a blind eye to the local trade in water, which is technically illegal. In this way drinking water programs as a form of development have been an expression of power, and have created new ways of governing Chinese subjects, but they have done so in ways that were not the technical rendering of peasant’s relationships to water scarcity that were initially envisioned.
Chapter 5. Agriculture and the Aleatory in the Zuli Valley

The present chapter will elaborate on the aleatory political ecology approach outlined in Chapter 2 by examining agricultural change in the Zuli River Valley. This chapter will begin by outlining how the problem of aleatory water has been constructed as the central problem of agriculture and economic development in the Zuli Valley. It will then present data on agricultural changes that have occurred between 1990 and 2010, followed by a brief chronology of development interventions that have been undertaken to achieve those changes. Section 5.4 will address changes that have been attempted in the management and disposition of the biophysical resource of water through irrigation. These changes have been based upon management of water through a disciplinary approach, with state actors regulating where supplies of water will be available and how they will arrive. Section 5.5 will examine policy interventions in the governance of human relationships with agricultural water that have not relied upon intervention in the management of biophysical water. These interventions have involved the creation of markets to facilitate the expansion of cash crops that do not require the allocation of biophysical water; instead they aimed to manage the risk of water shortage by obviating biophysical water in the agricultural systems the Zuli Valley. While these changes have involved the expansion of market agriculture, I will demonstrate that the introduction of agricultural commodity markets in drought resistant crops had its origins in specific state policies intended to ameliorate water shortages (that is big D Development) rather than in a general expansion of market forces (or little d development) (Hart, 2001).
5.1. Agricultural hydrosocial relations in Northwest China

During my interviews with peasants about agricultural production I would ask them what their harvest was in a normal year 5 and 20 years in the past. Many would express frustration at the question. They often recalled each specific year quite well, but told me that it was hard to say what an average year was. In this area there was not really such a thing as an average year. There were good years and bad years, but they did not readily think of there simply being an average year. They would often use the fixed expression that they ‘depend on the heavens to eat’ (kaotian chifan), or they would explain that it always varied. The problem of poverty in Dingxi has often been associated with the problem of aridity. However, rather than simply aridity, the absolute lack of water, it is more accurate to say that the problem of development in Dingxi has been one of the variability of water. That is to say, that the problem of agricultural development in Dingxi has long been as much about the variability of water availability. The aleatory nature of agricultural water in the Zuli Valley shows up in other ways as well.

As indicated in Chapter 1, the shortage of water in Dingxi is widely viewed as the determining factor in poverty in the Zuli Valley. However it is not only absolute shortage of water, but also rather the variability of rainfall that creates a risk of water shortage, which makes water a concern in the valley. The Zuli Valley sits on the cusp of the region of China where rain-fed agriculture is feasible. Dingxi is classified as a semi-arid, rather than arid environment, and the 380mm isopleth that is generally considered to be the marker of an area being able to sustain rain-fed agriculture bisects the valley (Wei et al., 2005). In this liminal position the risk of water shortage is particularly acute. This has been compounded by relatively higher inter-annual variation in rainfall; Wei et al. measured the inter-annual coefficient of variation in precipitation for villages in Dingxi at 21.3-23.7% (2005). This high inter-annual variation in rainfall, combined with an existing deficit in rainfall early in the growing season, has meant that Dingxi
is particularly susceptible to drought. Eastern Gansu experienced particularly devastating
droughts in the mid-1990s that played a role in the creation of the 1-2-1 program detailed in
Chapter 4. While the droughts of the early 1990s grabbed national attention, droughts have been
frequent throughout Dingxi’s history. Table 5-1 presents a list of droughts that Dingxi
experienced during the period of 1956-1985 (compiled in the Dingxi County Gazetteer, 1990)).
This table illustrates that during this 30 year period only eight years did not experience a drought
during some season. These droughts have been *events* of water scarcity, and mitigating the
impact of such events has been a central project of state actors. This has been encapsulated by a
saying in Dingxi that I often heard during interviews, “of ten years, nine are drought” (*shi nian
jiu han*). The risk of water shortage is a central threat that hangs over the villages of Dingxi. The
potential for drought illustrates that a central concern in understanding the political ecology of
agricultural water in the Zuli Valley is the potential for water scarcity. As a result, most of the
attempts to govern water have focused on ways of reducing that potential.
Table 5-1 Drought Events in Dingxi County 1956-1985

<table>
<thead>
<tr>
<th>Season</th>
<th>Early Spring (March-May)</th>
<th>June</th>
<th>Late Summer (July and August)</th>
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<tbody>
<tr>
<td>1956</td>
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<td>1985</td>
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D= Drought Rainfall was 25-49% below average.
S= Severe Drought Rainfall was greater than 50% below average. Data Source (Dingxi Gazetteer, 1990)

Academic researchers (Fei, 1985; Yang & Zehnder, 2001), policy analysts (Brown & Halweil, 1998), and state actors (Hu, 2009; Shang, 2007), both inside and outside of China, have
often linked food security with the aridity of the region. Water is not the only resource affecting
how well peasants are fed in the Zuli Valley, but it is the resource that is most limited and over
which peasants have the least control. For this reason I will conceptualize agricultural hydro-
social relations in terms of the linkage between agricultural water and food. These relations are
bounded on one end by rainwater, and on the other by staple foods. Prior to state-backed
interventions discussed here, the hydrosocial relationship of agricultural water in the Zuli Valley
was fairly straightforward. Rain fell. It was absorbed by the soil in place. Some of it evaporated.
Some of it went to nourish the roots of crops. The volume and timing of rainfall were the
primary determinants of the success of crops. Those crops fed the peasants who grew them. I
have presented a simplified schematic of this relationship in Figure 5-1. Out of interests of
parsimony, this model excludes many factors that do not affect subsistence levels of production.
I do not consider, for example, surplus food gathered as grain taxes that may have left the valley
prior to the introduction of cash crops. Certain agricultural taxes were previously paid in grain,
and some regions of my study area have achieved surpluses in the past (particularly in the upper
valley). Similarly, I have not considered the role of food aid that was brought into the valley
from outside areas, particularly in times of drought. While labor appears generally not to have
been in short supply for agriculture, at certain times, particularly during the Great Leap Forward,
this may have been the case. Immediately prior to interventions, in this area farming was
predominantly a subsistence activity. In interviews very few respondents indicated that in 1990
they had sold any crops at all. However this model of the connection reflects the belief that water
availability is central factor in the poverty in Dingxi that is shared by academics, state actors, and
interviewees.
I have taken 1990 as a base year for hydrosocial relationships prior to most of the types of state intervention to ameliorate potential scarcity of agricultural water that I will discuss. I selected this time period because key informants reported that it was before major state interventions in agricultural water (with the exception of some irrigation), but peasants were still likely to remember the time period. One collaborator who helped me to develop my questionnaire said that 1990 was more or less typical of past practices. This notion of an unchanged and stable form of agriculture is problematic. Choosing one point in time and using it as an emblem of past relationships suggests that there is a stable time in the past that was unchanging. This choice ignores the expansion of total cultivated area and diversion of labor from agriculture to infrastructure and industry during the Great Leap Forward, and the associated ‘Taking Grain as the Key Link’ program. It also fails to account for the presence of opium as a major cash crop in Gansu in the early 20th century (Cressey, 1934), indicating that prior to state efforts to impose local autarky during the Maoist period Gansu was linked to other areas of China through trade.
I use 1990 as a point of reference not because it represents an unchanging, primordial agriculture in Dingxi, but because 1990 precedes the period of active state support for expansion of cash crops as a strategy to manage water scarcity and because 1990 predates the widespread shift from grain to specialized agricultural production documented by studies of changes in agriculture (Alpermann, 2011) and my own data on changes in cropping patterns in Dingxi. From a logistical perspective, my collaborators who advised me in developing the survey felt that 1990 was about as far back as respondents were likely to remember. More important, programs that promote cash crops are at the center of what I hope to illustrate is the governance of water scarcity through apparatuses of security, which represented a shift from the past. 1990 precedes most of the interventions mentioned in this dissertation.

5.2. Agricultural Change in the Zuli Valley

5.2.1. Land Allocation
Here I present changes in allocations of land by peasants towards different types of crops that have been driven by the policy interventions that will be presented in the following three sections. The change from rain-fed subsistence agriculture to market agriculture facilitated by hydrosocial interventions is quite clear from survey respondents’ estimates of how much land they dedicated to each crop in the past and present. This section presents data on relative land allocation between crops as determined by summing the total acreage that respondents reported that they had planted of any given crop, and determining each crop as a percentage of the total. These responses were obtained by asking subjects to recall what they had planted in the past, and therefore may be affected by recall errors. For the 5 and 20 year recall periods, farmers were asked about how much they planted, and therefore these should be taken as estimates. The average of all farmers’ allocations of land was determined for each crop, along with changes in those crops. This procedure reduced three potential sources of error. First, peasants would
estimate land holdings that differed slightly from their stated land holding. By considering a percentage of all the crops I could better estimate how peasants perceive how they have allocated land between subsistence and cash crops. Second, sizes of land holding varied considerably between mountainous villages and valley villages. Focusing on the percentage of crops dedicated to each crop focuses on the household level, rather than cumulative area of crops. Finally, many households had gone through a ‘family dividing’ process (fenjia) during the past two decades, and the size of landholdings were not stable between years. Cash crops are indicated in solid blue and purple tones, while subsistence crops are stippled earth tones. Thus, these results indicate how households have allocated resources toward subsistence and cash crops in response to state policies and technologies. But they do not represent the actual land allocations for the whole village.

Figure 5-2 and Table 5-2 illustrate the changes in the average percentage of each farmer’s estimated land dedicated to each crop for the entire valley. In 1990 the average household in the Zuli Valley dedicated 85% of its land to subsistence crops (shown in stippled earth tones and defined as anything except potatoes, maize and vegetables) while 15% was dedicated to market crops (defined as potatoes, maize, and vegetables, shown in solid blue and purple tones). While national markets exist for some of the crops grown on a subsistence basis (particularly wheat and legumes) their cultivation in this particular region has historically been mostly limited to subsistence-level production. Additionally, interviewees reported that potatoes cultivated on less than 0.5-1 mu (1/12-1/6 acre) were generally considered subsistence crops.

Because peasants control land use rights and not land ownership, there were not situations where sales had taken place. Family division (where some land is allocated to a son when they receive their own Hukou) was the only means by which land was legally transferred. There were short term sharing arrangements in land, but only irrigated land was actually rented out regularly. Peasants said that no one would pay rent for dry land.
These small plantings of potatoes were part of a subsistence pattern that can be understood as an adaptation to the variability of rainfall in the area and the risk of drought. While wheat was the dominant crop grown, it was supplemented by other crops rich in carbohydrates, particularly millets and potatoes. Each of these crops matured in a different season. Wheat is harvested in early summer, and is more susceptible to spring and early summer droughts. Millet and potatoes are harvested in the fall, and therefore better able to withstand early summer droughts. By varying the season when crops were harvested farmers were able to withstand potential droughts in any one season. This subsistence pattern has largely given way to commercial agriculture. By 2010, land allocation had changed to 60% market crops and 40% subsistence crops. Table 5-2 illustrates that at the level of the valley the change in estimated percentage of land dedicated to each crop (except ‘other’) between 1990 and 2010 is statistically significant at the 5% level.\textsuperscript{57}

\textsuperscript{57} Significance was assessed using a Wilcoxon signed-rank test. The non-parametric Wilcoxon test was selected because samples were generally not normally distributed (as assessed by visual inspection of histograms).
This change in crop allocation has not taken place evenly in all areas of the valley. The hydrosocial relations of agrarian change have differed in the three sub-areas of the valley (mountain, upper valley, lower valley) due to differences in the availability of the biophysical resource of water.
### Table 5-2 Percentage of Land Dedicated to Crops in the Zuli Valley in 1990, 2005, and 2010.

<table>
<thead>
<tr>
<th></th>
<th>Maize</th>
<th>Potatoes</th>
<th>Flax</th>
<th>Wheat</th>
<th>Millets</th>
<th>Forage</th>
<th>Legumes</th>
<th>Vegetables</th>
<th>Other</th>
<th>Subsistence</th>
<th>Cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>0.56%</td>
<td>14.15%</td>
<td>16.93</td>
<td>46.16</td>
<td>9.10%</td>
<td>4.75%</td>
<td>8.31%</td>
<td>0.12%</td>
<td>0.00%</td>
<td>85.18%</td>
<td>14.82</td>
</tr>
<tr>
<td>2005</td>
<td>9.28%</td>
<td>28.53%</td>
<td>13.91</td>
<td>27.14</td>
<td>5.32%</td>
<td>5.88%</td>
<td>7.89%</td>
<td>2.40%</td>
<td>0.12%</td>
<td>59.80%</td>
<td>40.20</td>
</tr>
<tr>
<td>2010</td>
<td>27.69%</td>
<td>22.64%</td>
<td>13.81</td>
<td>10.77</td>
<td>0.81%</td>
<td>7.10%</td>
<td>6.53%</td>
<td>9.90%</td>
<td>1.03%</td>
<td>39.83%</td>
<td>60.17</td>
</tr>
</tbody>
</table>

Δ 1990-2005: 8.7%*** 14.4%*** -3.0%** -19.0%*** -3.8%** 1.1% -0.4% 2.3%** 0.1% -25.4%*** 25.4%***

Δ 2005-2010: 18.4%*** -5.9%** -0.1% 16.4%*** -4.5%*** 1.2% -1.4%** 7.5%*** 0.9% -20.0%*** 20.0%***

Δ 1990-2010: 27.1%*** 8.5%*** -3.1%** -35.4%*** -8.3%*** 2.4%** -1.8%** 9.8%*** 1.0% -45.3%*** 45.4%***

* p<0.1  
** p<0.05  
*** p<0.0001

### Table 5-3 Percentage of Land Dedicated to Crops in Villages in the Lower Zuli Valley (Villages 1 &3) in 1990, 2005, and 2010.

<table>
<thead>
<tr>
<th></th>
<th>Maize</th>
<th>Potatoes</th>
<th>Flax</th>
<th>Wheat</th>
<th>Millets</th>
<th>Forage</th>
<th>Legumes</th>
<th>Vegetables</th>
<th>Other</th>
<th>Subsistence</th>
<th>Cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>1.0%</td>
<td>18.3%</td>
<td>16.8%</td>
<td>41.5%</td>
<td>14.2%</td>
<td>2.7%</td>
<td>4.8%</td>
<td>0.3%</td>
<td>0.0%</td>
<td>80.4%</td>
<td>19.6%</td>
</tr>
<tr>
<td>2005</td>
<td>19.3%</td>
<td>35.1%</td>
<td>14.2%</td>
<td>14.6%</td>
<td>6.2%</td>
<td>5.5%</td>
<td>4.3%</td>
<td>1.0%</td>
<td>0.3%</td>
<td>44.7%</td>
<td>55.3%</td>
</tr>
<tr>
<td>2010</td>
<td>42.3%</td>
<td>26.7%</td>
<td>16.2%</td>
<td>1.7%</td>
<td>0.8%</td>
<td>6.1%</td>
<td>2.6%</td>
<td>1.1%</td>
<td>2.4%</td>
<td>30.0%</td>
<td>70.0%</td>
</tr>
</tbody>
</table>

Δ 1990-2005: 18.3%*** 16.8%*** -2.6% 26.9%*** -8.0%** 2.8%** -0.5% 0.7% 0.3% -35.7%*** 35.7%***

Δ 2005-2010: 23.0%*** -8.4%** 2.0% -12.9%*** -5.4%*** 0.6% -1.7%** 0.1% 2.1% -14.7%*** 14.7%***

Δ 1990-2010: 41.3%*** 8.4%** -0.6% -39.8%*** -13.5%*** 3.4%** -2.2%** 0.8% 2.4% -50.4%*** 50.4%***

* p<0.1  
** p<0.05  
*** p<0.0001
Table 5-4 Percentage of Land Dedicated to Crops in Mountainous Villages in the Zuli Valley (Villages 2 & 5) in 1990, 2005, and 2010.

<table>
<thead>
<tr>
<th>Year</th>
<th>Maize</th>
<th>Potatoes</th>
<th>Flax</th>
<th>Wheat</th>
<th>Millets</th>
<th>Forage</th>
<th>Legumes</th>
<th>Vegetables</th>
<th>Other</th>
<th>Subsistence</th>
<th>Cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>0.1%</td>
<td>9.1%</td>
<td>16.8%</td>
<td>46.5%</td>
<td>6.1%</td>
<td>8.8%</td>
<td>12.9%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>90.8%</td>
<td>9.2%</td>
</tr>
<tr>
<td>2005</td>
<td>0.8%</td>
<td>22.9%</td>
<td>12.8%</td>
<td>34.8%</td>
<td>6.6%</td>
<td>9.3%</td>
<td>12.9%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>76.3%</td>
<td>23.7%</td>
</tr>
<tr>
<td>2010</td>
<td>16.4%</td>
<td>23.2%</td>
<td>13.8%</td>
<td>22.6%</td>
<td>1.2%</td>
<td>11.7%</td>
<td>11.3%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>60.4%</td>
<td>39.6%</td>
</tr>
</tbody>
</table>

Δ 1990-2005
- 0.7%** | 13.8%*** | -4.0%** | -11.7%*** | 0.5% | 0.5% | 0.0% | 0.0% | 0.0% | -14.5%*** | 14.5%***

Δ 2005-2010
- 15.6%*** | 0.3% | 1.0% | -12.1%*** | -5.3%*** | 2.4%** | -1.6% | 0.0% | 0.0% | -15.9%*** | 15.9%***

Δ 1990-2010
- 16.3%*** | 14.1%*** | -3.0%** | -23.9%*** | -4.8%*** | 2.9%** | -1.6% | 0.0% | 0.0% | -30.4%*** | 30.4%***

*p<0.1
**p<0.05
***p<0.0001

Table 5-5 Percentage of Land Dedicated to Crops in Upper Valley Villages in the Zuli Valley (Villages 4 & 6) in 1990, 2005, and 2010.

<table>
<thead>
<tr>
<th>Year</th>
<th>Maize</th>
<th>Potatoes</th>
<th>Flax</th>
<th>Wheat</th>
<th>Millets</th>
<th>Forage</th>
<th>Legumes</th>
<th>Vegetables</th>
<th>Other</th>
<th>Subsistence</th>
<th>Cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>0.4%</td>
<td>13.5%</td>
<td>17.3%</td>
<td>53.0%</td>
<td>4.4%</td>
<td>3.0%</td>
<td>8.4%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>86.1%</td>
<td>13.9%</td>
</tr>
<tr>
<td>2005</td>
<td>3.3%</td>
<td>24.6%</td>
<td>14.8%</td>
<td>37.3%</td>
<td>2.4%</td>
<td>2.3%</td>
<td>7.5%</td>
<td>7.7%</td>
<td>0.0%</td>
<td>64.4%</td>
<td>35.6%</td>
</tr>
<tr>
<td>2010</td>
<td>17.7%</td>
<td>15.3%</td>
<td>10.0%</td>
<td>10.3%</td>
<td>0.4%</td>
<td>3.1%</td>
<td>7.0%</td>
<td>36.4%</td>
<td>0.0%</td>
<td>30.7%</td>
<td>69.3%</td>
</tr>
</tbody>
</table>

Δ 1990-2005
- 2.9%** | 11.1%** | -2.4% | -15.7%*** | -2.0%** | -0.8% | -0.8% | 7.7%** | 0.0% | -21.7%*** | 21.7%***

Δ 2005-2010
- 14.3%*** | -9.3%** | -4.9%** | -27.0%*** | -2.0% | 0.8% | -0.5% | 28.7%*** | 0.0% | -33.7%*** | 33.7%***

Δ 1990-2010
- 17.3%*** | 1.8% | -7.3%** | -42.7%*** | -4.1%** | 0.1% | -1.4% | 36.4%*** | 0.0% | -55.4%*** | 55.4%***

*p<0.1
**p<0.05
***p<0.0001
Land allocation changes have had the least impact in the mountain villages where 60% of land remains dedicated to subsistence crops (Table 5-4 and Figure 5-3). While mountain areas have begun to grow maize, it has happened slowly for several reasons. First, in Northwest China maize requires land flat enough to use plastic mulches. While much of the land in these villages has been terraced, large portions remain sloped. Secondly, technology of all sorts arrives more slowly in the mountain villages where the organizational power of local government is somewhat weaker. Finally, some mountain regions in the study area are simply located at too high an elevation to grow maize successfully. Potatoes, on the other hand, have become more widely grown in mountain villages, and are the primary cash crops in those areas. However, a large percentage of land in these villages remains dedicated to spring wheat.

Figure 5-3 Percentage of land dedicated to crops in mountain villages.
The lower valley experienced a more drastic increase in the cultivation of cash crops, which now equal roughly 70% of total acreage planted (Table 5-3 and Figure 5-4). The initial increase in cash crops came from potatoes, which accounted for 37% of total land planted by 2005. However, by 2010, the land dedicated to potatoes had also begun to decrease, a trend that will be discussed in greater detail below.

Like the lower valley, the upper valley has seen the percentage of cultivated land dedicated to cash crops expand to roughly 70%, but the mix involved is far different than the lower valley (Table 5-5 and Figure 5-5). The lower valley has transitioned primarily to growing potatoes and maize, while vegetables, primarily cabbage, are the largest crops in the upper valley. It is notable that the expansion of vegetable production proceeded most quickly between 2005-2010 for
reasons that will be detailed in section 5.4.2. This was accompanied by a dramatic decline in the amount of wheat planted.

![Figure 5-5 Percentage of land dedicated to primary crops in upper valley villages.](image)

### 5.2.2. Intensification of Pesticides in Agriculture
Not only has the type of crop being grown in the Zuli Valley changed, but this change has been accompanied by a significant increase in the amount of pesticides being used. I struggled to find ways to measure the quantity of pesticides being used in agriculture. The people would describe the amount that they used in number of bottles, and often did not know the name of the pesticide used. The only consistent quantitative measures that people were aware of was approximately how much money they spent, and what crops they used pesticides on. Due to the wide variety of pesticides used, which likely have different prices, I have reduced this data to whether peasants
applied pesticide on each crop. Table 5-6 shows the number and percentage of respondents who report using pesticides on plants in 2010, 2005, and 1990.

Table 5-6 Respondents reported use of pesticides (both insecticide and herbicide) on various crops.

<table>
<thead>
<tr>
<th></th>
<th>Maize</th>
<th>Potato</th>
<th>Flax</th>
<th>Wheat</th>
<th>Millet</th>
<th>Foxtail Millet</th>
<th>Forage</th>
<th>Legumes</th>
<th>Vegetables</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>148</td>
<td>146</td>
<td>119</td>
<td>70</td>
<td>10</td>
<td>7</td>
<td>63</td>
<td>60</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>99</td>
<td>58</td>
<td>21</td>
<td>46</td>
<td>1</td>
<td>0</td>
<td>13</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>67%</td>
<td>40%</td>
<td>18%</td>
<td>66%</td>
<td>10%</td>
<td>0%</td>
<td>21%</td>
<td>18%</td>
<td>71%</td>
</tr>
<tr>
<td>2005</td>
<td>64</td>
<td>151</td>
<td>135</td>
<td>115</td>
<td>36</td>
<td>38</td>
<td>60</td>
<td>74</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>26</td>
<td>14</td>
<td>33</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>27%</td>
<td>17%</td>
<td>10%</td>
<td>29%</td>
<td>0%</td>
<td>3%</td>
<td>7%</td>
<td>8%</td>
<td>29%</td>
</tr>
<tr>
<td>1990</td>
<td>10</td>
<td>134</td>
<td>140</td>
<td>153</td>
<td>52</td>
<td>66</td>
<td>58</td>
<td>82</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10%</td>
<td>2%</td>
<td>3%</td>
<td>5%</td>
<td>0%</td>
<td>0%</td>
<td>3%</td>
<td>2%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Pesticide application has increased in all types of crops, but most prominently in cash crops. Sixty-seven percent of those planting maize report using pesticides. Interestingly, of those still planting wheat 66% report using pesticides. Perhaps the highest use of pesticides is in cultivation of cabbage. 71% of households growing vegetables commercially reported using pesticides. However, this understates the case of pesticide use in the upper valley villages. When eight households in Village 1 that grow watermelon and garlic using a unique mulching system are
excluded, 85% of those growing vegetables (primarily cabbage but also hot peppers) in Villages Four and Six reported using pesticides. In these upper valley villages the smell of pesticides was overwhelming. At one point I asked an informant if there were a skunk-like animal, and they told me that no, that was simply the pesticides used for cabbage. I saw pesticides being applied frequently, and was told by several informants that they sprayed every three days. A variety of pesticides were used, but several people reported the use of DDVP, or Dichlorvos, a pesticide that the U.S. Environmental Protection Agency lists as highly toxic and has considered banning on several occasions due to its acute toxicity (Raeburn, 2006). Indeed several people also reported that one reason that they are planting less wheat is the increased use of pesticides in vegetables makes the wheat have trouble growing, though it is unclear exactly how the increased use of pesticides on vegetables would affect wheat. Vegetable growers not only were more likely to use pesticides, but used significantly more pesticides as well. Farmers were asked to estimate how much money they spent each year on pesticides, and while those who planted vegetables reported spending an average of 1658 yuan, those who did not plant vegetables reported spending on average only 104 yuan each year.

The changes in cropping that have occurred in these three sub-areas of the Zuli River Valley show that modernization and marketization of agriculture are reshaping the agricultural patterns of Northwest China. These changes are not simply changes in agriculture, but represent state-backed, hydrosocial interventions in agricultural water that have been undertaken as deliberate projects of development.
5.3. Agricultural Hydrosocial interventions 1975-2010

The agricultural changes that have occurred in the Zuli Valley have been wrought by a series of interventions in the agricultural hydrosocial relations of the valley that have occurred since 1975. I use interventions in this case study to mean policies and technologies, generally state-backed, that are intended to solve the problem of the risk of scarcity in agricultural water. However, these projects have functioned both by changing the allocation and distribution of water, and by switching to agricultural production that requires less water or was at less risk of drought. Such policies and technologies are generally framed by state and academic actors in terms of broader discourses of development, and have included technologies to introduce other water sources, technologies to retain water, and policies to mediate the relationship between crops and food. Each of these has been undertaken by a state actor, though not always one that is tied to the functional bureaucracies of the Ministry of Water resources. These changes are, in rough chronological order:

1. From 1975-1982 a series of eight dams were completed in the Zuli Valley that were intended as a local river-basin scale irrigation scheme. These dams irrigated 16510 acres of land as of 1990 (Dingxi Gazetteer, 1990). By approximately 1990, these dams had begun to silt up, to the point that only one of these remains functional.

2. During the mid 1990s the 1-2-1 project detailed in Chapter 4 was intend to provide irrigation through rainwater harvesting. During my field research I did not encounter any respondents who reported that they continued to use these systems. The expansion of small scale rainwater harvesting irrigation systems will not be treated in depth by this dissertation, but has been examined by Cook (2004; 2005). Cook (2005) argued that these rainwater harvesting based
irrigation systems were less successful than their drinking water counterparts (detailed in Chapter 4) because they required longer term investments in training and capacity building for end users.

3. In the early 2000s the Anding District Water Bureau began a strategy of rolling out a system of groundwater irrigation in the upper portions of the Zuli Valley. This system has been fairly informal in its implementation, and was based upon the development of several wells and a centralized distribution system. This system and the transition from wheat to cabbage as the primary cash crop associated with the new irrigation systems will be detailed in Section 5.4.

4. Simultaneously, in the early 2000s the Prefecture and County governments of Dingxi, with the support of the Gansu Provincial Agricultural Department and national SLCPA began a strategy of encouraging farmers to switch from small grains to potatoes as a local cash crop. Potatoes were viewed as an ideal cash crop because their water demands are better aligned to seasonal variations in water availability than are those of small grains that had long been predominant in the areas. Section 5.5 will examine this change and the accompanying shifts in agriculture and marketing.

5. Beginning in the mid-2000s new maize cultivars combined with the extensive use of plastic mulches allowed the cultivation of maize for the first time. The attractive returns associated with maize, combined with the relatively lower labor requirements during a period of increased labor out-migration have made maize a particularly attractive crop in the early 2000s. The technologies and policies associated with this change will be detailed in Section 5.6.

6. In 2006 the Yintao water transfer scheme which was introduced in Chapter 4 was begun which aims to, in its first phase, provide irrigation water to all of the regions of that previously
had access to irrigation waters under the earlier water systems. Section 5.4 will mention this project briefly.

5.4. Irrigation: Making Water Mobile

The first type of intervention intended to reduce the probability of agricultural water shortages in the Zuli Valley involved the construction of dams and irrigation works. Agricultural water governance is most often associated with irrigation (cf. Birkenholtz, 2009b; Budds, 2008; Dubash, 2004; Gidwani, 2002; Mollinga, Meinzen-Dick & Merrey, 2007; Nickum, 2010; Perreault, 2008) and the Zuli Valley is no exception.

Irrigation projects in the Zuli Valley can be divided into two types: surface and groundwater irrigation. Both these types of irrigation have been undertaken primarily by state actors, primarily the county water bureau. First, in the late 1970s, the county water bureau attempted a basin-scale surface-water irrigation project in the Zuli Valley. By the early 1990s this project had largely collapsed and the county water bureau soon hopes to use water from the Yintao project discussed in Chapter 4 to provide water for these systems. Following the failure of surface water projects in the early 1990s, the county water bureau began a centralized tube well irrigation system in the upper valley based on the use of fossil groundwater.

Irrigation systems reduce the possibility of a shortage of water crisis through the provision of additional water. In the cases studies here, water provision has almost exclusively come from state actors. Each of these irrigation systems aims to solve the problem of water scarcity in the Zuli Valley’s agricultural hydrosocial relationship by adding water from an outside source to the

---

58 There are two likely exceptions to the exclusive state control of irrigation management. First, I was told that in at least one village that I did not survey there were privately owned irrigation tubewells. Second, according to the Dingxi County Gazetteer (1990), there were approximately 500 acres under irrigation from springs and gravity fed systems in the County by 1949, primarily around Dingxi City and in the upper valley. These were likely not constructed by state actors, though who was responsible for them is unclear.
hydrosocial system, or regulating water availability across larger spatial and temporal extents (Figure 5-6). In this case, the problem of water scarcity is met with the solution of water mobility. Such mobility also requires rescaling hydrosocial relations in either time or space.

![Figure 5-6 Irrigation based hydrosocial relations in the Zuli Valley. These relationships have been changed by state intervention primarily through the state provision of irrigation water and the introduction of national markets.]

Prior to the founding of the PRC in 1949, there were limited efforts at irrigation in Dingxi County. Small-scale ditch irrigation projects were begun around Dingxi City and in portions of the upper valley, particularly around the town of Neiguan. In 1949 approximately 500 acres in the county were irrigated, almost all of which were irrigated through ditch irrigation (Dingxi Gazetteer 1990).

### 5.4.1. Surface Water Irrigation

The first attempts by state actors at creating large-scale dams and irrigation works were made during the Great Leap Forward. In 1958-1959 attempts were made to construct two dams, one of which was located near the third village. The Great Leap Forward in Gansu was characterized by an emphasis upon water conservancy work, in which up to 70% of Gansu’s workforce was engaged at the height of the Great Leap Forward (Dikötter, 2010). Chapter 4 discussed the shortcomings of this approach in the Yintao Project, but there were similar difficulties in local scale dam projects. Both of the dams constructed at this time have been characterized as “lacking
in scientific planning” (Dingxi Gazetteer, pg. 444) and as a result were not successfully implemented. Dam building was not widely attempted again in Dingxi until 1970 when two additional dams were constructed, one of which soon washed out in a flood, the other of which continued to operate through the late 1980s. During the 1970s several smaller dams were also constructed which quickly silted up. Thus during the period of 1949-1976 only one dam was constructed in Dingxi County which lasted beyond a few years (Dingxi Gazetteer, 1990). Beginning in 1976, seven dams were constructed over a three-year period in an effort to regulate biophysical water at the basin scale for the purposes of agriculture.

From 1976-1978 a series of 7 additional dams that formed an irrigation system based upon the river-basin were constructed by the county water bureau. By 1985 there were a total of 8 dams in the county (Dingxi Gazetteer, 1990). These irrigation works were channeled into a series of sluices that irrigated the lower valley. Within my study area this project affected most of Village 1 and a portion of Village 3. All of the land irrigated by the project was relatively flat-bottom land that was used primarily to grow wheat, traditionally the dominant crop in the area. In interviews, farmers in Villages 1 and 3 reported that under such irrigation wheat yields did increase, often doubling, and yields became much more stable from year to year.

Basin-scale irrigation reduced the risk of water shortage by disciplining the biophysical resource of agricultural water both temporally and spatially. Temporally, basin-scale irrigation

59 Finding exact data on the area that these dams irrigated is somewhat difficult. The only source of data on these projects is the Dingxi County Gazetteer (1990), which lists the dam projects as having had an irrigated area of only approximately 500 acres in the entire county. However, from my interviews, most everyone, from farmers, to village officials, to water bureau personal, said that the dams were the most important part of the system. This discrepancy can most likely be explained by irrigated land being listed in the Gazetteer as ditch irrigated (ziliu qudao) rather than dam (shui ku) irrigated. This is further supported by other peculiarities in how irrigated land was accounted for: three villages which contained four dams in the lower valley were only listed as have 82 irrigated acres. The source of this discrepancy is likely that this water travel through the Zuli River channel before uptake into irrigation ditches. On the difficulty of working with Chinese state irrigation statistics see (Nickum, 2003).
made the supply of water even throughout the year and between years, while spatially the project distributed water between areas of the upper valley that received more rainfall and areas of the lower valley that received less. Because the Zuli River has its greatest water shortages in the early summer (Wei et al., 2005; Zhu, 2003), basin-scale management allowed water to be stored over the course of a year and released when needed early in the growing season. Early spring droughts (chun han) are those that peasants in the Zuli Valley worry most about, and as detailed in the introduction, rainwater is generally insufficient for small grains during this period. Basin-scale irrigation intervened by storing water through state organizations for use in the spring.

The second form of intervention associated with basin-scale irrigation involved abstracting water from being a distinctly local resource to one that was governable and could be allocated where needed across the river valley. The prime land for irrigation was located in the central and lower valley, while rainfall was concentrated in several locations in the upper valley that have little flat land. These dams were concentrated in the southern end of the county, which receives significantly more precipitation than locations to the north (490mm precipitation per year in the South vs. 340mm per year in the North (Wei et al., 2005)) and stored water for use in the north.60 Agricultural water was no longer limited to being used where it fell; instead mediating technologies – dams, canals, and sluices – made water mobile.

Modern water management has been based on the abstraction of water as an interchangeable and calculable object (Linton, 2010). Yet, it is specific actors, working at specific scales, whose measurements and calculations abstract water. In China the scale at which water is abstracted has coincided with the level of territorial administration of the water bureaucracy charged with its

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60 I am unsure of exact the locations of all of the dams, but the Dingxi Gazetteer (1990) provides information on which township each dam was located in.
management. This intervention required the county water bureau to think of biophysical water as an abstract object, which could be predicted, measured, and allocated within the defined geographical area of the basin. By envisioning water as an abstract quantity that was usable at the scale of the basin, this choice of scale for hydrosocial governance was driven by both political and technical constraints. Politically, the new scale was congruent with the territorial jurisdiction of the county water bureau (since the county and river basin are largely coincident). Thus, the level of state intervention and the scale of hydrosocial change were the same. Technically, this decision was limited by the past failure of the Yintao project (Xinhua, 2006) and the biophysical conditions of the watershed that dictates water storage in the south and use in the north. The dam and irrigation works then smoothed out the supply of water across both time and space, moving water from the wetter South to dryer North of the county, and storing water for use between seasons.

The era of river-basin scale irrigated agriculture in the Zuli River Valley proved remarkably short. According to interviews and officials at the county water bureau, by 1992, seven of the eight dams that initially provided water to the system had silted to the point of being unusable. Only one remaining reservoir, the Shimen reservoir, is still active, and irrigates a relatively small area (1000 acres) of the upper valley. In the lower valley, irrigation works remain, but they are mostly unused. Ultimately the design of these dams proved too complex a means of mediating water for this region. While having a longer usable life than the several dams attempted during the 1950s-early 1970s, these dams too ultimately were filled with silt. Yet, even at the time of their construction, such dams did not effect a change in the crops that were grown in the region. Instead, crops that had been staples for a long time achieved higher yields with a steadier supply
of water. There are several explanations for this outcome. At the time, agricultural taxes were still paid in grain, specifically staple crops such as wheat. This system locked farmers into cropping patterns required to achieve a certain quota of grain each year. In the mid-1990s, these policies were relaxed by allowing payments of cash in lieu of grain, and, in 2004, the tax was eliminated (Kennedy, 2007). More importantly, there were not yet national-scale markets that would allow peasants to market cash crops. Agricultural trade remained a primarily local activity. While production could begin to be modernized through the introduction of water, the region’s agricultural markets were still not nationally integrated. Changes in the scale of markets and other socioeconomic factors of hydrosocial relations would later change agriculture in the region. By the late 1990s, it was clear that basin-scale irrigation had failed, and policy makers began looking for other ways to deal with the problem of aridity in the Zuli Valley.

More recently, state actors in the water bureau have turned their attention to the same source that was originally proposed to bring water to the Zuli Valley: the Tao River. The Yintao project, which has been discussed in greater detail in Chapter 4, is emblematic of technologically intensive mega-projects that have symbolized modernity and rescaled the state the world over (Kaika, 2006; Swyngedouw, 2007). Water, which was once a local resource, or at most a basin-wide resource, will be rescaled to become a provincial resource, managed and allocated at a scale congruent with the level of territorial governance charged with its administration. Thus while the provincial-based engineers of the Tao basin transfer project conceptualized the water of the Tao River as a provincial resource that could be used to irrigate the Zuli basin as early as the 1950s, it was not until the 2000s that the provincial water ministry gained the technical and financial ability to materialize that abstraction. With the Tao river basin the abstraction and management of water has been rescaled from the watershed to the province.
Inter-basin irrigation solves the problem of the potential for a shortage of water in much the same way as basin scale irrigation. Water is disciplined and controlled to be available at times to prevent a shortage. In this case water comes from somewhere else, specifically the Tibetan Plateau. County water bureau officials believe that this project will ultimately solve the problem of water shortages in the Zuli Valley. It will use the same sluices and irrigation works as early attempts, yet have a more stable, extra local water supply. Yet, many farmers in the lower valley are skeptical, having seen agricultural water projects fail before. Agricultural water made mobile has come to visit before, but it has never stayed long.

5.4.2. Groundwater irrigation

In the late 1990s, approximately ten years after the farmers in the lower valley could no longer reliably receive water to irrigate wheat, the Anding District Water Bureau began installing tube wells for irrigation in the upper valley that, in contrast to the lower valley, has potable groundwater. Although aquifers in the area are as shallow as 10 m below the surface, prior to the advent of tube wells there was no history of irrigation in the area. The physical infrastructure of the upper valley consists of seven tube wells, each approximately 130 m deep, dug since 2000.61 According to the water bureau officials who maintained the system, each pump irrigated approximately 600 mu (100 acres) and a total of 4200 mu, or 700 acres were managed. These groundwater irrigation systems spread across 11 she (work brigades) in four villages, including two townships, and in 2010 served 385 households. Generally these are fairly straightforward irrigation systems, with one pump connected to a system of pipes, and only one farmer able to

61 The Dingxi county Gazetteer also mentions the expansion of pump-driven groundwater irrigation in the upper valley during the 1970s, with 420 pumps and 10,000 acres irrigated by 1985 (Dingxi Gazetteer, 1990). This irrigation appears to have been limited to mostly the Dingxi City area and the Neiguan town, likely because these were the only areas electrified at the time. I did not work in either of these areas, and did not hear of any pumps older than 10 years in the upper valley villages where I conducted interviews.
irrigate at a time. One system, in Village 4, is somewhat more complex, featuring a holding tank to maintain pressure, but still can only be used by one farmer at a time. Each of the systems delivers 50 cubic meters of water per hour. Until quite recently, this irrigation water was directed primarily towards wheat; however, in the last five years it has increasingly been used to grow vegetables, particularly cabbage, for the national market for reasons described below.

Like basin scale irrigation, groundwater irrigation solves the problem of the aleatory nature of water in a disciplinary way by providing additional water that the state appropriates from somewhere else. In the case of groundwater, irrigation water is appropriated from the past. The water being used to irrigate the Zuli Valley is fossil water that is pumped from 130 meters below the surface. This has led to falling water tables. Water department officials reported that in the last ten years, water tables have fallen by approximately three meters, or about one foot per year. This fall, however, has been uneven. Some years there has been no fall at all, and sometimes even an increase. However, in years when drought occurs the water table has fallen by approximately 1 meter per year. The fossil water is used in the agricultural system as a buffer to deal with the unpredictable nature of rainfall. In wet years when there is sufficient rainfall there is little need for irrigation, but in years of water shortage the effect of water shortage on agriculture can be ameliorated. Groundwater pumping has been described by county water bureau officials as a drought resisting technology (Jin, 2011). This form of governance is disciplinary insofar as it has involved the direct regulation and movement of the biophysical resource of water. County water officials are aware that this groundwater pumping is unsustainable. When I asked them about the future they said that in the future the Yintao project
will replace groundwater as a water source, and that they view the groundwater as a bridge solution until the Tao river water arrives.

The introduction of groundwater irrigation has also created socio-economic integration with other regions of China that is characteristic of governance far removed from the biophysical resource of water. First, irrigation water used in the upper valley includes large amounts of embodied energy, in the form of electricity used for pumping, which comes from a national network of power distribution. Electrification in the 1980s connected rural portions of the Zuli Valley to the Northwest China power grid, providing an essential input required to irrigate. Irrigation water is pumped from approximately 130 meters, requiring an estimate of 144 kilowatt-hours (kWh) of electricity per mu irrigated.\(^62\) Energy in these quantities was unavailable in the region before electrification in the 1980s. Thus, until the 1970s (in areas near major towns) or 1980s (in more remote areas) surface water was the only resource available to use for irrigation (Dingxi Gazetteer, 1990). Rural Dingxi’s connection to the Northwest Power Grid has allowed the transformation of agriculture in this region.

The second form of socioeconomic intervention that has altered hydrosocial relations in the upper Zuli Valley is the introduction of national vegetable markets. Table 5-5 illustrates that irrigation water was initially (as recently as 2005) directed towards growing traditional crops, particularly wheat. By the late 2000s, this water came to be used instead for growing vegetables,

\(^{62}\) These energy requirements were calculated as follows. Lifting 1 acre-foot of water 100 feet requires 185 kWh, assuming 55.4% efficiency of the pump (this represent efficiency levels prevalent in agricultural uses in California in the 1990s) (Conlon, Weisbrod & Samiullah, 1999). Therefore, lifting 1 acre-foot 130 meters would require 789 kWh. On average farmers irrigated for 1.5 hours per mu three times per growing season for 4.5 hours total per growing season. Each hour represents 50 cubic meters of water, for a total of 225 cubic meters of water per growing season, or 0.1824 acre-feet. At 789 kWh of energy requirement per acre-foot, this gives a total energy requirement of 143.9 kWh per mu. If anything this may slightly understate energy requirements, since this estimate was based on the average efficiency of agricultural pumps used in California during the 1990s. Pumps used in Dingxi may be less efficient.
particularly cabbage. This shift to growing cabbage was a deliberate policy decision made by the
township government of Neiguan, a township in the upper valley not included in this study,
whose leaders realized that the relatively cool and dry climate of the upper valley is well-suited
to cabbage growing. Through a series of policies, Neiguan has become a central point for
marketing cabbage in Northwest China.

Neiguanying (generally called simply Neiguan, locally pronounced Liuguan) with a
population of 40,000 is the largest town in Anding District, outside of the urban area surrounding
Dingxi City. As a result Neiguan has long played a more active role in entrepreneurial programs,
and was cited for its village enterprises as early as the 1980s (Fei, 1985; Kirkby, Shen &
Bradbury, 2000). Neiguan is at the center of the upper valley, and it is adjacent to the only
township-level administrative unit that still receives substantial irrigation water from the original
basin scale irrigation programs begun in the 1970s, the Shimen reservoir above Neiguan which,
according to the county water bureau, provides irrigation for approximately 6000 mu (1000 acres). Neiguan also was the center of an early effort at using electric pumps to irrigate cropland
beginning in the 1970s.

Village leaders in Neiguan realized that the cool dry weather of the township, combined with
the availability of irrigation water, would be ideal for growing cabbage. As a result the Neiguan
village government initiated specific policies to support cabbage cultivation, officially described
as the “vegetables in the valley, potatoes in the mountains” policy of the village (Neiguan
Township Government, n.d.). The specific policy mechanism in Neiguan that supported
vegetable growth in other townships in the upper valley includes the construction of marketing
spaces and storage caves. Creating successful markets for agricultural products requires, among
other things, physical infrastructure to facilitate market processes (Garcia-Parpet, 2007). In addition to creating a gathering space for trade, creating storage facilities is a central concern. The township has now constructed 106 storage caves to keep vegetables fresh, an additional 125 storage caves for long term storage (crops to be kept for several months), and five marketing facilities (Neiguan Township Government, n.d.). According to interviewees in the 4th and 6th villages, private entrepreneurs have constructed additional facilities. These storage caves are then rented to people who come from outside of the local area at prices reportedly around 800 yuan per day (interview #4025). These vendors who purchase cabbage are almost invariably described as having come from the ‘South.’ One interviewee said that when the people from the South were in Neiguan, prices were good, and when they were not prices were bad (interview #6001).

The ‘South’ for these people seems more a generalized meaning of outside, or another part of China than the actual South of China in particular. The ‘South’ is perceived to be more modern and entrepreneurial space, which comes to interact at times with Neiguan. Although these state policies were designed to promote the economy of Neiguan town, they have spilled over to other townships as well. This is at least partially a deliberate policy of Neiguan’s local government, which has aimed to become the “logistics and distribution center of southwest Anding District” (Neiguan Township Government, n.d.). To borrow from Foucault (2007) these leaders proposed to use apparatuses of security through the promotion of circulation as a means of creating economic development in their locality.

Following Gidwani (2002), the emergence of cabbage agriculture can be examined in terms of the changes it has fostered in the social relations of the valley in terms of land, labor, and capital. The first of these is the significant increase in the use of capital in irrigated vegetable
agriculture. Pesticide use has risen across the valley, but this has been particularly acute and costly in areas of vegetable cultivation, where spraying occurs every three days with insecticides (most often dichlorvos). In addition, the relatively high costs of seeds and the costs of irrigation water make cabbage the most capital intensive crop grown in the valley, requiring much higher capital inputs that other traditional crops or corn and potatoes. One large-scale cabbage grower (interview #4025) described borrowing 10,000 yuan for seeds, pesticides, films, and water, while most farmers of subsistence crops and potatoes in mountainous villages did not borrow money at all.\(^63\) This particular interviewee illustrated a second trend, which was the existence of markets for land in irrigated areas. In the lower valley and non-irrigated areas when others use land money generally does not change hands, but in the upper valley there is an active rental market. Interviewee #4025 rented 18 mu (approximately 3 acres) in a neighboring valley.\(^64\) I interviewed another household (#6003) that rented all of their land except a small amount used for forage. The family had work in the city and concluded that it was more profitable to rent land that engage in farming themselves. They rented eight mu in Village 6 for approximately 500 yuan/mu ($480/acre).

A third change that increasing cabbage cultivation has made was seen in local labor markets. The labor involved in cabbage cultivation is significantly more than other crops and lasts longer. Cabbage is planted in four crops to have staggered harvests between July and October, with the harvest season running a full 4 months. By all accounts labor intensity is much more significant than the labor involved in other forms of agriculture practiced in the Zuli Valley. As a result the

\(^{63}\) Farmers differentiate from taking a loan from a bank or rural credit union (daikuan) versus borrowing from a relatives of friends (jie).

\(^{64}\) Interestingly, he rented this land from Hui landowners, and he said the Hui generally did not participate in irrigation agriculture. Instead they would engage in trading animals and rent their land to Han farmers. I was not able to verify this, but it present and interesting and unexplained ethnic division of labor.
introduction of cabbage created new labor markets in harvesting cabbage. Most farmers who grew cabbage hired at least some people to pick their cabbage for them (to supplement family labor). Indeed, one significant problem I faced in the upper valley was finding people willing to share time to talk about cabbage production during the 4 month harvest season. While conducting surveys I had arranged to pay people who guided me through the villages 50 yuan per day for their services. While this seemed reasonable in the lower valley, in the upper valley daily wages had risen to 70 yuan per day. Thus the introduction of groundwater for irrigation and marketing mechanisms for cash crops had the effect of altering the relationships between land, labor, and capital in the upper valley. This shift in relationships between land, labor, and capital is symptomatic of a broader intensification of market relations in the area as households shift from subsistence to cash crop production. But this is a particular type of market production. The markets for which these households produce are specifically nationally scaled markets. The vegetables grown here circulate throughout China (interestingly respondents reported that few were sent to the provincial capital of Lanzhou because the intervening county of Yuzhong produces more vegetables). In this way, peasant households in the mountains of the upper valley were enrolled into the Chinese nation through mechanisms of circulation. Through trade, but trade that is bounded by the national polity, peasants have increased their interactions and interdependencies with the rest of China. This is precisely the strategy of national integration proposed by Wang and Bai (1991) and Fei (1985) in the 1980s. Thus the facilitation of circulation, one of Foucault’s (2007) central elements of apparatuses of security, was a means

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65 Logistically the challenge was accomplished by conducting more interviews at night. This experience in Village 4 led me to delay interviews in Village 6 until the harvest season had concluded.
through which national integration was achieved. In the process these changes have created new types of national subjects.

Sturgeon (2010) examined how the creation of development programs produced minorities as subjects who embraced entrepreneurialism as a way of being part of the ‘modern’ nation. Development has created new types of subjects in the upper valley as well, but these are of a slightly different type than those described by Sturgeon. It was in the upper valley where I heard the joke that peasants now depend on the markets to eat (kao shichang chifan) instead of depending on the heavens to eat (kaotian chifan). This joke reveals a shift in thinking about what elements of peasants’ lives contain the aleatory. The notion of depending on the heavens to eat invokes nature as the aleatory force in peasants’ lives, much as Foucault located the aleatory in that which makes something ‘natural.’ The goal of state water development has been to reduce the risk and variability associated with water in people’s lives, and it has succeeded. But in the process, it has opened social and economic conditions as a new aleatory force in peasants’ lives. Peasants now depend on the variable agricultural market conditions, clearly locating the aleatory in national markets rather than nature. This dependence means that changes in market prices directly affect the food security of peasants. Thus much of the development that has taken place in the upper valley is about shifting the aleatory in peasants’ daily lives away from nature.

5.4.2.1. State Actors and Groundwater Irrigation

The intervention of groundwater irrigation in the upper valley can be considered in terms of the governance of the aleatory relationship between water and people’s livelihoods in two ways. First, groundwater irrigation, like basin scale irrigation, represented the state provisioning water from an outside source. Second, it involved the promotion of circulation, changing which types of crops were grown, and the social relations that surrounded those crops. Each of these changes
was undertaken by a different state agency. The role of the Neiguan township government has been discussed above, but it is worth briefly considering the role of state organization in constructing the original tubewells.

The Anding District Water Bureau has constructed most of the irrigation works associated with groundwater irrigation. The irrigation system is run by a sub-office of the district water bureau located in Village 6. This is not, however, a unit of water management associated with a lower unit of government. Functional bureaucracies in China do not exist below the county level (Lieberthal & Oksenberg, 1988). Rather than having a territory designated at the level of the township, this office is a county water bureau representative that serves portions of three townships that receive groundwater for irrigation. The administrative jurisdiction of this office is mostly limited by the location of the groundwater it manages. However, in addition to managing irrigation this office is also more broadly responsible for water affairs in the upper valley. For example, when I visited to interview these representatives three pieces of construction equipment had been impounded in the water department compound for operating in a riverbed without a permit. The equipment was being held until their owner paid a fine. Other functions, however, such as the drinking water system, were not the responsibility of the local management office. This small office, with the support of the larger county water bureau, has overseen the development of irrigation in this area. However, they are not fully charged with the construction of water infrastructure. While they always said that “they” had dug the wells, these water officials also mentioned that a recent set of upgrades to the irrigation delivery system involving replacing open canals with closed pipes had been conducted by a company from Baiyin City.

One fascinating element of the program of irrigation management in the upper valley is its informality. When I asked employees of the Anding District Water Bureau (both those associated
with the central office in Dingxi and those who managed the project directly) the name of this project I was told that it has none. When I asked about documentation they said there was none, apparently because this project has been slowly and informally planned. A new well was added each year or two, and each of the wells irrigated a system independent of other wells. It was not labeled as a large, cohesive project. Instead small amounts of irrigation water were made available as new wells were dug. This presents a stark contrast to the common vision of state backed irrigation projects as the epitome of rationalized, centralized, and planned state bureaucratic power (Bakker, 2002; Scott, 1998; Wittfogel, 1957). Yet others have demonstrated that the actual management of state-backed irrigation at the local level is a process rife with local negotiations and machinations (Budds, 2008; Gidwani, 2002). In the case of groundwater in the upper Zuli Valley it is likely that such local politics have much to do with the structure of disciplinary power between state actors.

Tubewell systems appear to be a particularly good fit for the bureaucratic incentives that exist for state actors in the water department. From the perspective of state actors, tubewell irrigation has the advantage of being quick to implement and readily quantifiable. Tube wells can be drilled in a season, and additional irrigation works built up year to year in a slow but steady fashion. Thus, local cadres can have projects completed in time for their review for promotion after two years (Zhong, 2003). While I have no direct evidence that such promotion cycles were a factor in the construction of groundwater irrigation systems, promotion cycles have been linked to the rapid deployment of improved water cellars within the same functional bureaucracies (Cook, 2005). Thus, it is likely that considerations of promotion also played a role in the thinking of those implementing groundwater irrigation systems. Irrigation in the upper valley provides the slow, steady, predictable and quantifiable achievements that lead to promotions. Thus, the
disciplinary power structures of visibility and evaluation that exist within Chinese bureaucracies encourage projects like groundwater irrigation that may be quickly and measurably implemented.

Developing groundwater irrigation in the upper valley of the Zuli River has required both the disciplining of the biophysical resource of water, and interventions in the socioeconomic aspects of hydrosocial relations to promote the circulation of cash crops. The national connections made for both inputs (e.g. electricity) and outputs (e.g. cabbage) have made irrigated vegetables a viable cash crop in the upper Zuli Valley (Figure 5-6). Until these national market institutions were introduced, the hydrosocial relations in this region were only partially altered.

5.4.3. Irrigation and Agricultural Change and State Power

Irrigation in two different guises, basin and inter-basin surface irrigation and groundwater irrigation, has attempted to alter the aleatory nature of water in the Zuli Valley. It has done so by providing water at times of water deficit, reducing the shortage of biophysical water. This has been achieved through a disciplinary mechanism, regulating water across both temporal and spatial scales. Spatially, basin scale irrigation regulated water across varying water availabilities in the valley, while inter-basin irrigation aims to rely upon water from outside sources. Temporally, basin scale irrigation regulated water between seasons of the year, while groundwater irrigation relied upon fossil water to regulate water availability.

While the state has played a dominant role in the introduction of irrigation, the character of the state that is doing the irrigation, and the discursive elements associated with providing irrigation, have varied considerably. An early basin scale irrigation scheme was built by a singular centralized water authority at the county level, and has in many ways become emblematic of a failed development project. Basin scale irrigation attempted to do this by regulating the temporal and spatial distribution of the biophysical resource of water. The
groundwater irrigation based hydro-social regime of the upper valley, in contrast, has unfolded in an unplanned and somewhat disorganized way. Wells have been dug and irrigation improvements have taken place gradually over the course of many years. Yet this disorganized way is reflective of the disciplinary power structure of the state apparatus. Incentives have encouraged the expansion of tubewell irrigation, but it has also been managed in an ad hoc way by a small representative office of the county water bureau that operates in this area. This element of the state has created the technological systems of water management that have transformed the valley. These wells have allowed for crops to resist drought in poor years, but have also spawned new forms of social relations constructed around vegetable agriculture.

The change from wheat to vegetable production was created by the introduction of vegetable markets by the nearby township government of Neiguan, and has resulted in the particular water management system of cabbage production that has also altered social relationships. Cabbage production has, in turn, altered the social dynamics of the region. The increased demand for labor, compared to previous wheat cultivation, has led to people working longer hours. Some people have become very wealthy, while others have seen little change. Thus, the new hydro-social system of cabbage production in the upper valley has created a new type of subject: one that exists in a cash crop economy where both labor and water have come to be financially calculable objects. Farmers of the upper valley have become entrepreneurial subjects who view themselves as finally liberated from the whims of nature, but instead have become dependent upon the whims of the markets, and now view their well-being as tied to economic forces that are national in character.

The irrigation projects discussed above reveal an irony in state-backed attempts to create national subjects through the alteration of the environment. Those projects that have been built in
terms that emphasize state or national power, whether implicit or explicit, have failed at creating new forms of environmental subjectivities. Basin scale irrigation and the previous Great Leap Forward attempts at building irrigation works, which were informed by a Maoist idea of nation building through the struggle with nature, utterly failed to produce long-lasting changes in how people related to water, and if anything engendered a mild cynicism about the capacity of the state to undertake development. The Yintao project, which has been framed in a discourse of national power through science and technology, has not yet changed irrigation in the valley. In contrast, the irrigation project that has dramatically altered peasants’ lives, state-backed groundwater irrigation, has been implemented informally and without images of state planning.

Perhaps what is most striking about the irrigation project in the upper valley is its lack of formality or ideological baggage. It is not officially labeled as a project. There are no documents describing the project, although work completed on the irrigation systems appears in the annual reports of the county water bureau. If most water projects are rendered technical by being labeled as ‘engineering’, irrigation development in the upper valley has not been labeled at all. There is no stated ideology tied to this project to interpellate the peasants into being development subjects. Yet this project has had the most profound impact on peasants’ environmental subjectivities. Peasants have been enrolled in the system of national commodity markets envisioned by Fei (1985) and Wang and Bai (1991). This has shifted their subjectivities. Peasants of the upper valley no longer expressed a subjectivity related to risk in the environment, instead seeing risk in changes in market price. Peasants have been freed from being subjects dependent on the heavens, but they answer now to the markets instead. These peasants have then been enrolled into the nation not through a transformation by large-scale state water management, as previous examinations of water and state power from Wittfogel (1957) to Swyngedouw (1999).
have examined, but rather through a growing web of economic relationships that are nationally scaled, not all of which directly touch upon water.

If irrigation teaches us about the creation of national subjects, it also teaches us about the role of the state in creating those subjects. While the creation of peasants in the upper valley as a new type of subject has been the direct result of state policy, it was not created by design. The peasants in the villages where I worked in the upper valley were not the population targeted for transformation through a development project into vegetable entrepreneurs by the policies of the neighbor township government in Neiguan. The transformations of their livelihoods are not recorded in Neiguan’s annual statistics. Instead their transformation took place with the rise of market created by Neiguan’s state policies. In this way, fragmented authoritarianism can also be understood to have an extraterritorial moment, when state policies spill over into jurisdictions for which they were not intended. While it is difficult to discern the exact intent of the ground water irrigation works in the upper valley because it was not proposed as a coherent plan, it seemed to generally be part of the broader project of economic development, but without concern for what crops are grown. Thus, the particular hydro-social relations that emerged in the upper valley have been the result of the actions of two disparate state actors. One of these, Neiguan town, had neither formal authority over neither the population nor the functional areas—water and agriculture—that have been transformed. The second state actor was charged with implementing water development, but has not proceeded with a grand narrative about its work. The state that has overseen the expansion of irrigation in the upper valley consists of three middle-aged men who sleep on cots in a remote government compound.
5.5. Potatoes: Obviating water
Following the failure of basin scale surface water irrigation to ameliorate the risks of water shortage in the Zuli Valley, local officials began searching for other ways to deal with the aleatory nature of agricultural water. Beginning in the late 1990s, state actors in the local government and agriculture ministry settled on promoting potatoes as a cash crop as a central element to their poverty alleviation efforts. Growing potatoes does not require moving or altering biophysical water supplies in any way. Instead, potato agriculture solves the problem of water scarcity by changing when water is needed. Potatoes require water later in the growing season, making them more suitable to the local precipitation patterns that include more late season rain than small grains which often wither during dry spells in May and June (Shang, 2007; Wei et al., 2005; Yan, 2008b; Zhu, 2003). The introduction of potatoes must be understood as a deliberate intervention by state actors in peasants’ relationship with agricultural water that aimed to ameliorate the problem of the variable nature of water in Dingxi. Potatoes did not emerge autochthonously as a cash crop in this region through the gradual expansion of capitalism (the little d development of Hart, 2001). Rather, they were introduced by a variety of state-backed interventions (big D Development) that endeavored to alter how peasants related to agricultural water. These interventions came in the form of policies that created national markets for agricultural products through plant breeding and market promotion.

Potatoes had long been a part of a mixed strategy to provide staple food in the Zuli Valley. According to Yan, until 1995 potatoes generally made up approximately 10% of planted areas in the county (2008b, p. 49), only slightly less than the 15% of land dedicated to potatoes based on my survey results. Potatoes were in this case part of a strategy of planting multiple different types of crops that matured at different times and were therefore able to withstand potential water shortages that could occur in different seasons. Table 5-1 illustrates that droughts in
Dingxi occurred throughout the growing season. By planting a mixture of wheat, millets, and potatoes peasants would have crops that matured at three different times. Thus, if a wheat crop failed in June, a millet crop might still come in August, or a potato crop in September. Potatoes were part of a mixed subsistence strategy at this time, and were somewhat supplemental to other crops.

The first efforts to create potatoes as a form of development emerged in 1996 when the prefecture party committee proposed the “Potato Project” (yangyu gongcheng, literally potato engineering project). There were five goals to this project: increasing the planted area dedicated to potatoes, improving seeds, improving yields, and increasing the portion of potatoes used for industrial uses and sent out of the areas (Yan, 2008b). Because state actors view poverty and aridity as deeply intertwined, the promotion of potatoes was seen as a way to solve the problem of aridity. Summer grains required early season water (May-June), and would often wither in droughts during May and June. Potatoes, in contrast, required water later in the summer (July, August, and September) (Shang, 2007; Yan, 2008b), the three months during which 60% of precipitation in the Zuli Valley falls (Wei et al., 2005). Potatoes seemed a perfect fit for the prevailing hydro-climatic conditions. If the reason water was the limiting factor in agriculture was temporal, potatoes could obviate managing biophysical water by attuning crop water demand to the prevailing weather conditions. Local government and academics began pushing for potatoes as a means to reduce poverty; local government framed the switch to potatoes as adapting to the local weather conditions or "going with nature and the seasons" (shunying tianshi) (Yan, 2008b).

The introduction of climate-appropriate potato agriculture required intervening in how people related to food (Figure 5-7). As with cabbage, the previously direct link between the crops
farmers grew and the foods that they ate came to be mediated by national commodity markets. Rescaling of agricultural hydrosocial relations in potato cultivation occurs primarily after the harvest of the crops. The creation of national markets for potatoes as well as direct policies to support those markets, allow potatoes to be a cash crop in the Zuli Valley. Potatoes are sold in national markets, and the wheat that peasants rely on for food is, in turn, purchased in a national market (most often actually coming from other areas of Gansu). The fact that the markets that convert potatoes to staple foods are national in scale is a direct outgrowth of state policies. While a global market for wheat exists, the Chinese central state has made concerted efforts to ensure that it is self-sufficient in grain production (Alpermann, 2011; Boland, 2000; Yang & Zehnder, 2001), often with grave environmental consequences (Shapiro, 2001). While potatoes are not classified as a staple crop, potato traders and representatives of local government told me that almost all of the potatoes grown in the region were used domestically within China, rather than sold for export.
Figure 5-7 Potato Hydrosocial relations in the Zuli Valley. Potato agriculture does not alter the biophysical nature of water at all, but introduces national markets to make cash crops that are suited to the climate an economic development strategy.

5.5.1. Policies for market integration
Integration with national markets was not an organic process, but rather the result of specific policies of the county and prefecture governments, the agricultural ministry, and national-scale poverty alleviation authorities that were intended to make potatoes a successful dry-land agricultural strategy. First, integrating potatoes in a national market requires extensive transport networks. In the case of Dingxi, potatoes are shipped by both truck and train to markets throughout China. Second, making markets for potatoes required the creation of physical market places and storage facilities.

5.5.1.1. Transport
The first form of state intervention that has encouraged potato markets has been transportation policies. There are two notable policies that have improved potato marketing. First, improvements to roads and highways have made it more economical to ship potatoes to the East. Such road building has generally been associated with the Open Up the West Campaign
(Goodman, 2004), and the state actors involved in road building lie beyond the scope of my research. But the effects of road building have been real and significant. Potato traders with whom I spoke described a trade-off between shipping by rail or road. When shipping by road they paid more for freight, but with less risk that prices would change before their shipment arrived. Shipping by rail cost far less, but increased the risk of prices falling before the potatoes arrived, resulting in sometimes losing money on the transaction. Cronon (1991) has cited the similar role of long distance trade in grain and the variable prices in different markets as the origins of grain futures markets in U.S. during the early 19th century. However, if potato futures markets exist in China, none of the brokers I spoke to used them. Instead they bear the risk of price changes during transit themselves. In recent years improved roads have reduced the difference between the price of road and rail and potato buyers have shipped increasing numbers of potatoes by road. However, rail remains a major means of shipping potatoes, and the local state plays an active role in shipping potatoes throughout China by rail. Each year the Dingxi prefecture government organizes specialty trains carrying potatoes to Eastern market cities. According to promotional materials in the Dingxi’s potato exhibition hall (explained further below) the city government organized trains to 36 different cities in 2009. Thus state actors have proposed policy actions in the area of logistics as a way of solving the problem of potential scarcity of water. Indeed, Dingxi’s plans for the city call for Southern Dingxi City to become the potato logistics center of Northwest China (Xie & Zhang, 2011).

5.5.1.2. Marketing

Logistics are directly related to a second type of state intervention, the construction of marketplaces. In the Zuli Valley there are at least three storage and marketing locations. First, Dingxi City includes a large potato market with several adjacent storage facilities (the proposed Dingxi logistics center). The town of Chankou, also located on the main rail line, is home to
several potato starch processing plants and also contains a large potato marketing facility, which I have been told actually handles more trade in potatoes than Dingxi, though I have not found data to verify this assertion. Finally, Village 1 also contains a smaller market. It is unclear to me how many similar smaller scale markets might exist throughout the county. However, this village-based market has been far less successful than the larger markets. Most farmers with whom I spoke who lived in this village and two adjoining villages did not market their potatoes there, preferring to drive 20 km to the larger market at Chankou where their potatoes commanded higher prices. The higher prices at Chankou are likely related to its location on a main rail line, which reduces transport costs. Each of these three potato-marketing facilities was created by a different state actor; two (in Chankou and Village 1) were constructed by village and town governments, while one was constructed by the prefectural government (in Dingxi City).

Each of these marketing facilities consisted of two components. First, there are physical market places where potatoes are sold, the literal space for the transaction. Second, and perhaps more importantly, there are storage facilities. The district government and village governments have built a large number of storage caves to store potatoes between marketing and shipping. The Anding District government reports that as of 2010 it has a storage capacity of 300 million tons for potatoes (for a crop of 350 million tons), which has doubled over the last five years (shown in Figure 5-8).

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66 Potato starch in China is used in food preparation in a way similar to cornstarch in the U.S. Potato starch is also turned into noodles. As a result potato processing is a rather large industry.
Figure 5-8 Potato storage caves under construction at the Dingxi City Potato Market. Source Photo by Author, October 2010.
The physical space created as a potato market is a large marketplace located on the south side of Dingxi City. It consists of two long buildings, each containing several small stalls where potato brokers are located (Figure 5-9). Other sellers are located under a large canopy in the center, and still others spill out into neighboring areas. The market transactions are structured in three tiers. First, the primary producers, potato growers, arrive in the market. If they own a three-wheeled tractor they will drive their produce themselves, otherwise they will hire a local within their village to do so. Producers sell their crops to a second tier of brokers, who form the core of the market. These brokers serve as intermediaries, aggregating potatoes from individual farmers into quantities large enough to be purchased by vendors from other cities. Finally, a third tier of buyers from other parts of China come to town to purchase potatoes. Out of town potato buyers
will hire locals who will work as buying agents on their behalf. They believe that these agents will be better able to speak the local dialect and deal with local brokers, resulting in better prices. Some out of town buyers venture to the market in cars with tinted windows. An agent will periodically run back and forth from the car to confirm the price of a purchase. However, more often, the purchasers from out of town remain in their hotels, with their agents using cell phones to call and confirm prices for purchases. The hotels, rather than the dusty potato market, are where the actual commerce that connects Dingxi potatoes to national markets takes place. There are many potato buyers in town during the buying season, but they do not come to the market. In fact, those who do not come from Dingxi County are rarely seen in the market. The bustling nature of the hotels, and potato traders that I met there seemed to confirm this way of interacting with the markets. A potato buyer might then come to the market to inspect what they had purchased. Interestingly, for the most part, buyers from around the country continued to physically come to Dingxi to arrange the purchases, even if they spent up to a month simply waiting in a hotel. I encountered one broker who conducted deals regularly over the phone with a trusted buyer in another city and would simply have the potatoes shipped, but this was the exception. For the most part, buyers arrive to be physically present to purchase potatoes, and arrange shipment back to where they come from. Such buyers will spend about 3-4 months of the harvest season, from October until Spring Festival, visiting a series of potato markets in North China, of which Dingxi is among the best known. They order potatoes, arrange for storage, and arrange to have their potatoes shipped back to the areas that they come from, either by truck if the potatoes are needed soon, or by train if they can wait. Within the communities that these buyers come from, they function as wholesalers who will then sell to other potato vendors who come from smaller vegetable markets.
Thus, the potato marketplace as a space, or center of potato trading, resembles an empty trading floor. The buyers are not physically present, instead being represented by agents. Nor is there the fierce bidding of an auction. Purchases happen slowly and methodically, with buyers walking from one seller to the next, waiting until they find someone who makes the best offer. Dingxi is one of several centers of potato trading in the country, but that does not make it a bustling hub of activity. Despite the gala of the opening of the potato market that makes Dingxi the center of potatoes in China, the actual commerce of potatoes is trans-local, and conducted by outsiders in nondescript hotels in downtown Dingxi.

The active role of local state policy in promoting and regularizing potatoes, a climate-appropriate cash crop, can be seen in the counterfactual case of Jerusalem artichokes and lamb, two similarly climate-appropriate cash crops that were briefly grown in the area. A local entrepreneur began encouraging farmers to plant Jerusalem artichokes in approximately 2004, and for a few years they were widely planted and quite profitable for farmers. However, a broader market never developed, and farmers remained reluctant to plant a crop that remained dependent on only one buyer. Similarly, lamb from the area is famous for its high quality within the province, and is widely sought out. When I visited Dingxi with colleagues from Lanzhou, they would often purchase lamb to bring back. Yet, without state support, neither lamb nor Jerusalem artichokes have taken off in a way similar to potatoes. The alteration of agricultural hydrosocial relations in the Zuli Valley to support potato agriculture required specific policy interventions by local state actors, including storage and marketing facilities. These interventions facilitated national-scale markets that have made potatoes a cash crop in the Zuli Valley, and shifted peasants from growing their own food to growing cash crops. If we are to consider the

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67 Information on these alternative crops has come entirely from notes from interviews. I have found no written documentation of these crops.
aleatory political ecology of water broadly, we must include state-backed interventions in agricultural practices that not only manage biophysical water, but also reduce the need for biophysical water as forms of hydrosocial governance. These interventions have little to do with the biophysical resource of water. Instead, these programs represent ways of obviating the biophysical water through the construction of storage caves and marketing facilities, plant breeding, and state-backed transportation initiatives, all of which are quite distant from the direct issue of water. These interventions were part of a deliberate and successful state policy to change the relationship of farmers to agricultural water in the Zuli Valley through the introduction of mechanisms of circulation.

While this market may appear organic, the traders who come to buy potatoes in Dingxi do so because of the actions of the local state. Like the Neiguan township government, various units of local government, including the Dingxi Prefecture, Anding District, and several villages, have invested in potato storage and marketing facilities. They also arrange the trains that ship many of the potatoes to Eastern markets. Thus, these programs represent agricultural development with state support. Moreover, this state support is directly linked to solving the problems of aridity in Gansu, and managing peasants’ relationship with water through development. Many of the decisions about these state policies are made each year at the annual potato meeting.

5.5.2. **Potato meeting: the pageantry of potatoes and the potato exhibition hall**

In 2010, I attended the annual ‘potato meeting’ which is intended to mark the beginning of the potato-marketing season. It is held each year in late September, despite the fact that little potato trading happens for several weeks thereafter. Rather than actually marking the beginning of trade, the potato meeting is a time to reaffirm the importance of potatoes as the local specialty crop of Dingxi. The meeting is held in a courtyard in front of the main potato market in the city (Figure 5-10). A stage was backed by a large sign, replete with pictures of bulbous potatoes.
declaring the potato meeting and which government agencies sponsored it. An identical sign, differing only by the word 2009 instead of 2010, lay 100 yards away, covering a pile of potatoes awaiting sale. A crowd made up mostly of government workers in matching hats having come from their work units sat on stools to watch the performances. There were songs, dances, and a speech each from at least one extra-local high-ranking political official (that year a minister from Inner Mongolia). After the festivities ended, most government employees in attendance walked the two kilometers back to their offices near the center of Dingxi City.

Figure 5-10 The 2010 Dingxi Potato Meeting Photo by Author, September 16, 2010

The potato meeting is intended as the opening of the potato-marketing season but is, in most ways, more political than economic. It was a performance that inscribed the importance of Dingxi as the central place in China when it comes to the potato trade and provided local officials a concrete example of their commitment to the preferred development program for
Dingxi. The crowd gathered at the staged performance consisted mostly of bureaucrats required to be there. Nonetheless, Dingxi City was bustling. Many buyers and representatives of potato related companies had come to attend a second day of negotiations behind closed doors where issues such as buying standards and where sponsored trains would be sent, were to be set. These people, for the most part, did not attend the ceremonies, but many ventured into the exhibition hall described below. Additionally, restaurants and hotels were doing a brisk business as deals were struck on the sidelines of the meetings.68

One facet of the potato meeting is that it is one of the few times each year when the Dingxi potato exhibition hall is open. This hall serves as a combination convention center and museum. The early part of the hall constitutes a small museum to the Dingxi Potato, while booths to the left are occupied by potato seed companies and those to the right occupied by various machinery and potato starch companies.

The museum exhibit in the hall focuses on the accomplishments of expanding potato agriculture in Dingxi; it reports how many more acres of potatoes are cultivated now than in the past, how much storage exists for potatoes, and the number of potato processing plants. The role of this museum is to authoritatively place Dingxi as the central place of potatoes in China. There are photos of trains showing the annual shipments of potatoes to the East. There is a picture of Dingxi in the center of a map of China, arrows radiating out to all of the major cities where potatoes are purchased (Figure 5-11). There are images of national symposia on potato agriculture that have been held in Dingxi, and images of the national-level potato breeding development district in the suburbs, meant to emphasize the role of science and technology in development. Pictures of potato breeding focus on test-tubes (also visible in the exhibits of the

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68 As a sign of the deal striking mood that pervaded the city at this time, while eating breakfast one morning I was recruited to join a foreign trading desk of a Beijing-based agricultural commodities firm.
seed companies). There are images of the potato starch plants line the northern section of the Zuli Valley. Pictures of potato cultivation invariably focus on mechanization with mechanized plows, mulch laying machines, and harvesters. This focus on mechanization is an interesting juxtaposition to the realities of potato agriculture in Dingxi, which is done primarily by hand. There are even pictures of the potato market, festooned with red balloons and filled with people, in contrast to the rather empty reality of the market outside. The images presented in the museum depict the aspirations of Dingxi as a place of potatoes, central within China, mechanized, industrialized, and urbanized (see below), the very opposite picture of a remote, hardscrabble town in the loess plateau, most famous for its poverty.

Figure 5-11 A map in the Potato Exhibition Hall showing where Dingxi potatoes are shipped. This image places Dingxi in the center of China. Photo by Author, September 16, 2010
Anderson (1991) has identified the museum (along with the map and the census) as one of the central tools in creating national identities. The museum displays in the potato exhibition hall are very much an example of creating national identity, but in a way somewhat different from that identified by Anderson. The role of the potato exhibition hall is to place Dingxi within the nation. It accomplished this by making Dingxi central to the Chinese nation in one small way centered on potatoes. It does this through the use of a potato oriented map displaying Dingxi at the center of China, through stories of national level meetings about potatoes held in Dingxi, through images of the trains that connect Dingxi’s potatoes to the greater world, and by showing the important visitors who have called upon Dingxi for potatoes (including a famous photo of President Hu discussed in Chapter 3). Through these means, Dingxi aims to be the potato capital of China.

5.5.3. Potato Capital
The stated goal of Dingxi’s potato development policies has been to create Dingxi as the “Potato Capital” (shu du) of China. This choice of words is deliberate, and implies the idea of urbanization and centralization. The use of the character du stands in stark contrast to the nearby county of Xiji, Ningxia, which also aims to be a center of potato production. Xiji, however, calls itself China’s potato hometown (zhongguo tudou zhi xiang). These two mottos appear similar, China’s potato capital, China’s potato hometown but they differ in whether they conceptualize of their role in China as being urban or rural. The character du means capital, or metropolis, and has strong connotations of urbanity. Xiang, on the other hand, connotes a rural area. As noted in Chapter 3, xiang is a space that one descends towards from the center or urban space, and is in this way imagined as a space in contrast to urbanity. While xiang is an administrative unit (the township level of government), as used by Xiji and other local governments who market themselves as being zhi xiang, it means the rural hometown more broadly. Xiji is not alone in
using xiang to describe itself as the center of something. Most of the counties in Dingxi prefecture describe themselves as the county of various products (Wikipedia’s Chinese site altogether lists thirteen items that Dingxi prefecture’s eight counties are the ‘hometown’ of (Wikipedia n.d.)). Both du and xiang imagine their locality as a constitutive part of a larger Chinese nation, but they do so in slightly different ways. Du is urban and central in nature, while xiang connotes rurality.

If we are to consider Dingxi as the capital of potatoes, it is worth considering briefly the etymology of the character du 都. There are three related meanings of the character du relevant to the spatial imaginings of Dingxi in Chinese national space. First, du can mean metropolis or urban space. Many variants of ‘urban’ are derived from the character du, including urbanism (dushi ciyu 都市词语), urban planning (dushi jihua 都市计划), urbanization (dushi hua 都市化), metropolis (dushi 都市, du huiqu 都会区). The second variety of meaning associated with the character du has specifically to do with making a region being the capital of a polity, including several words for capital (jingdu 京都, duyì 都邑, shou du 首都, shendu 神都) national capital (dumen 都门, goudu 国都), imperial capital (didu 帝都, huangdu 皇都), to establish a capital (diandu 奠都, jìandu 建都), and perhaps reflecting China’s reallooking gaze at least four different words for past capitals (gudu 古都, gudu 故都, jiudu 旧都, liudu 留都). What is common to each of these words is a focus on being not only urban, but also being at the apex of political power and central to the polity. Finally, there are several meanings of the word du that indicate positions of leadership, including commander (dudu 都督). A central meaning of the word du is to be first rate, or the most important of something. Thus through two shades of meaning center/periphery and urban/rural binaries are
simultaneously used, but the differences between them are elided. Being the capital of something makes it simultaneously urban and central. Thus a du is the center of something, while a zhi xiang, inflecting the peripheral connotations of rurality, is peripheral.

Using the character du allows an elision of two spatial hierarchies: center and urban. As discussed Chapter 3, the urban/rural is but one variation of the many hierarchies that juxtapose the modern against the backwards. This spatial metaphor is closely tied to the binary of central and peripheral. For example, when speaking of going down to the countryside (xiaxiang), there is the closely related term of having been sent from the center (zhongyang xialaide). The character du implies both centrality and urbanization. In modern China both of these are related to modernization. By becoming more urban, modernized, and scientific around the issue of potatoes, the city also endeavors to become more central in imaginings of Chinese space. If state leaders in Dingxi cannot escape the topological position of Dingxi on the periphery of China, they can overcome the cultural implications of backwardness associated with that position by focusing on changing Dingxi’s position within other spatial hierarchies discussed in Chapter 3, particularly the urban/rural binary. This change, moreover, is representative of the progress of development as a form of nationalization. Dingxi is taken as a case of how a city that was described as “an illness in the heart of China” (Yan, 2008b, p. 1) can move through development and overcome poverty. This illness is overcome through development (Cao, 2004; Economic Report, 2007; Hu, 2009) and the creation of Dingxi as a thoroughly modern, central urban and nationally Chinese space.

5.5.4. Potato Urbanization and Potato Zoning

A central feature of the potato exhibition hall is the presence of the potato zoning map (Figure 5-12). At first glance, the urban planning map in the center of the Dingxi potato exhibition hall looks like any other plan for a city in China. It portrays the planned rapid urban growth of the
city, highlighting its transportation links, a central square, and zoning into residential and commercial areas. A close inspection of this zoning, however, shows that the city is neatly zoned by type of potato-related activity. To the south lie potato trading and markets; to the north potato starch processing plants.

![Map of potato-related districts in Dingxi City](image)

**Figure 5-12** A map depicting zoning of potato related districts in Dingxi City. The blue section closest to the viewer represents a district of potato logistics. The region to the left represents potato seed breeding. The orange zone at the top of the map is reserved for potato starch processing. This map illustrates how ideas of urban planning that are associated with modernity are applied to rural items such as potatoes. Photo by Author. September 16, 2010

Potatoes are seen as Dingxi’s ticket to modernity, and this is reflected in Dingxi’s urban planning policies. Dingxi contracted with Lanzhou University’s urban planning research bureau
to create a plan for the potato industry in Dingxi, illustrated on the potato urban planning map displayed in the Potato Exhibition Hall (Xie & Zhang, 2011). The plan zoned Dingxi into three regions: first, the Chankou potato refining district north of Dingxi city at Chankou village would be the center of potato refining and research related to industrial potato uses. This means primarily potato starch manufacturing research and production. Second, the western valley seed potato breeding and research area aims to be the center of seed potato breeding in China. Finally the south valley potato logistics and storage district will be for the marketing, trade, transportation and distribution of potatoes across the region, and aims to be the potato distribution center for all of Gansu (Xie & Zhang, 2011).

This urban planning represents the application of modernity to the backwardness of agriculture in several ways. First, this planning is urban in nature; it aims to make Dingxi a city based on the potato rather than a rural area. In this vision Dingxi has transitioned from China’s potato hometown to China’s potato metropolis (Yan, 2008b). It was undertaken by an urban planning research bureau and represents many of the hallmarks of urban planning in China. It includes zoning of different types of industry, and aims to create special development zones or districts focused around specific types of industry (Cartier, 2001). Each of these zones is fundamentally dedicated to adding value to the product of potatoes, an issue of economic development identified by Fei Xiaotong and other proponents of Western Development in the 1980s (Fei, 1985; Wang and Bai, 1991). Thus the low value activity of agriculture aims to be improved through higher value added activities. Seed tuber breeding is intended to provide more modern breeds to potato farmers, but more importantly the local government aims to make Dingxi the center for potato seed breeding in all of China (Xie & Zhang, 2011). Similarly, the potato starch district is intended to be the center for all of China, and the potato logistics center
aims to be the central point in all of Gansu. In this way potato urban planning is its own form of creating Dingxi as a central place in China. Moreover, the creation of urban development zones in Dingxi is intended to create modern industry and create the conditions for forms of modern capitalism in rural China. These plans for urban modern, value added industry replacing subsistence production exactly fit Wang and Bai’s (1991) prescription of eliminating backwardness in the Chinese periphery. Creating a city organized around potatoes moves Dingxi along the teleology of modernization and up through the spatial hierarchies of modern China.

The effort to change Dingxi’s position on the spatial hierarchies of urbanity and center/periphery is associated with trying to escape its position on other axes of spatial hierarchy as well. The cultural presentation of development surrounding the potato industry in Dingxi exemplified by its potato-based urban planning, large potato meetings, and the use of the character du, can be viewed as attempts to alter Dingxi’s position in hierarchical binaries of modernity.

5.5.5. **Potato Markets as Security Against Drought**

The development of potatoes has become one of Dingxi’s central industries (a second industry, traditional Chinese medicine, I rarely encountered in my fieldwork), and the central way that Dingxi identifies itself in terms of development vis-à-vis the greater Chinese polity. Potato development in Dingxi has been quite explicitly about changing how people relate to agricultural water. Specifically, the entire program of promoting potato cultivation aimed to make peasants less dependent on crops that were vulnerable to the early season droughts that affect Eastern Gansu. From the perspective of an aleatory political ecology of water we must conceive of water governance broadly, and in these terms the actions of a variety of local state actors in Dingxi must be considered interventions in the agricultural water because they have changed peasants’ relationships to agricultural water in profound ways. Peasants’ vulnerability to
the most frequent and most devastating type of water scarcity (spring-early summer drought or *chunhan*) has been reduced by shifting to crops that demand water later in the year when rain is more likely to fall.

The promotion of potato agriculture in Dingxi fits the paradigm of a Foucauldian apparatus of security (Foucault, 2007) to govern peasants’ relationships with agricultural water. Rather than trying to regulate water directly as previous efforts at irrigation had done, potato marketing aimed to change the constellation of social and natural forces that related to agricultural water. These changes related to water by shifting the temporal water demands of agriculture, but they were accomplished through the facilitation of markets to promote the circulation of goods. This approach was quite explicitly framed as a case of allowing nature to take its own course. The term “going with nature and the seasons” was used to describe the process of working with nature, rather than against it, that informed potato promotion efforts. In official discourses around potato promotion in Dingxi, state actors have called for following the Three Obeys (*san shun*). These are “going with nature and the seasons” (*shunying tianshi*), “going with the market” (*shunying shichang*), and “going with the epoch” (*shunying shidai*) (Wang, 2012). While the first two seem somewhat clear, the last is elaborated as “going with the laws of science” (*zunxun kexue guilü*). This idea of going with nature or allowing the market to take its course is the hallmark of apparatuses of security that emphasize working with, rather than against, nature. This application of apparatuses of security to the problem of the aleatory stands in stark contrast to governing the aleatory nature of water through the provision of irrigation water. Potato agriculture does not attempt to shift or discipline how water behaves, instead taking agricultural water as it comes, and shifting the constellation of social forces that surround it.
Yet, amid the otherwise successful transition to potatoes, there are also clear cases where the goals of state actors with respect to potatoes have not been met. One village built a potato market and no traders showed up. Despite the best efforts of agricultural extensionists, peasants still don’t use plastic mulches on their potatoes. And finally, in recent years the total number of potatoes being planted has declined. Although potatoes are the star to which local state development has been hitched, peasants have moved towards maize when it became available through a series of state interventions by other units of government.

There have been two major factors driving peasants away from potatoes. Potatoes are far more labor intensive than maize, which, at recent prices and with technological interventions, has become as profitable to grow, as discussed further below. Second, there is simply less labor available than in the past. In past years, outmigration of labor, particularly from the mountain towns, was limited; however it is now a major trend in the region. The availability of maize as an agricultural strategy and pressures on labor have resulted in lower levels of potato planting in recent years. Despite the goal of the county government to become 'China’s potato capital', maize is largely taking the potato’s place.

5.6. Plastic films and maize

The final major change to agricultural hydrosocial relations in the Zuli Valley has been the introduction of maize as an agricultural crop. Maize is a new crop in the region, and its introduction required three hydrosocial interventions (Figure 5-13). First, plastic film mulches were introduced to retain soil moisture. Second, new varieties of maize were bred to be drought resistant. Finally, the arrival of maize was dependent upon the introduction of national and international markets for the commodity.
Maize agriculture in the Zuli Valley depends on plastic film mulches that biophysically intervene in hydrosocial relations by preventing evaporation that would otherwise desiccate the soil. With this intervention, crops that would otherwise wither can last through the dry early summer period (Li and Gong, 2002). Figure 5-14 illustrates how plastic films work by preserving moisture in the soil. The technique used is called “full mulch double ridge furrow” cultivation and features mulch covered ridges from which rainwater flows into furrows where maize is planted (Li & Gong, 2002). Once it flows near the maize, water becomes trapped under the plastic film and is unable to escape. It is not an exaggeration to say that film mulches make maize agriculture possible in this region. Most people I interviewed said they would not plant maize without these mulches, and no one grew maize without mulches. The plastic film is a direct intervention in the hydrology of the region; however, by focusing on preventing the loss of water rather than on the provision of water it presents an alternative approach to agricultural water governance.
5.6.1. Mulches
The introduction of film mulches was a direct state policy to change how peasants related to water. This state policy has three parts: research, extension, and subsidies. First, state supported universities and the Chinese Academy of Sciences have invested considerable effort into researching how films can interact with agriculture (Li & Gong, 2002; Liu et al., 2009; Zhang, Li, Yang, Wang & Chen, 2010; Zhou, Li, Jin & Song, 2009). Indeed maize is just one of many crops for which research into films has been conducted. Earlier efforts at both research and extension focused on spring wheat (Li, Guo & Wei, 1999; Li, Wang, Xu & Xu, 2004; Li, Wang, Wang & Xu, 2004; Xie, Wang & Li, 2005). These research activities emerge out of a national scientific infrastructure that is locally focused on solving the problem of aridity in the Loess Plateau. The films regulate the possibility of a shortage of agricultural water by reducing the potential for water to be lost through evaporation. In this way mulches intervene in processes
related to the biophysical element of water, but do so in ways that do not involve the allocation or distribution of water. Instead it intervenes in water in situ.

Maize is the latest in a string of crops for which films have been supported by the local government and agricultural extension programs (Cook, 2005). Initial efforts to introduce film mulches focused on wheat and later potatoes. Neither of these proved long lasting. With wheat the intervention simply proved too expensive and time consuming for the marginal increase in productivity. Several interviewees had tried films with wheat, but abandoned the approach because it was too expensive and laborious. Similarly only one respondent still used plastic films on his potato crop (despite ongoing promotion of this technique in the official discourses about potato agriculture in Dingxi). During my interviews, respondents variously reported that potato yields were not increased by plastic mulches, that potato yields actually fell if mulches were used, or that potato yields were increased, but not by enough to justify the cost of purchasing the plastic film mulches. Thus, maize was the first crop for which peasants saw a clear and sustained improvement in their livelihoods by introducing mulches as a water management technology. Maize is the first crop that has been grown using this technology in a sustained manner: even when film mulches are not subsidized, farmers continue to purchase them for maize.

The second form of state policies related to maize agriculture is subsidies to encourage maize production. Film mulches for maize are currently subsidized by national poverty alleviation funds that are distributed by township governments with the support of the provincial agricultural ministry (Wang, 2009). The funds that farmers received for mulches varied considerably, but most farmers reported receiving some funds. The most common arrangement was that the local government would pay for 30 yuan worth of the total 120 yuan price of each role of film mulch. Some farmers received a complete subsidy, and other none at all. Generally,
the subsidy was limited to six rolls of mulch. These variations existed because the subsidy program was carried out by township governments, allowing significant variation in how the program was implemented.

The final state policy promoting maize as a solution to aridity in the Zuli Valley has been extension. Maize has been supported by agricultural extension efforts undertaken by the county agricultural bureau to teach peasants how to grow it. Figure 5-15 presents a calendar that I observed in most households that aims to teach peasants about double furrow maize cultivation by telling them when they should do each step of the cultivation process. Maize is a new crop in the region, and it requires teaching peasants how to cultivate it. These state extension efforts have emphasized the notion of double furrow maize cultivation as a type of technology. Mulch-based maize is presented as a scientific and technical solution to solving the problem of shortage of water. Thus the integration of peasants in Gansu into the national economy through the markets for maize mentioned below was presented to peasants as simply a case of improved technology. Interestingly, almost no peasants that I talked to spoke of growing their maize in the double furrow arrangement presented by scientific researchers and agricultural extensionists, instead always referring to the planting as simply “using films”.

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5.6.2. Seeds
The second hydrosocial intervention involved in maize agriculture in the Zuli River Valley was to change the very nature of the plants that were grown. The choice of plants and varieties is part of agricultural hydrosocial relations, and altering the biology of plants to be drought resistant is part of transforming agricultural hydrosocial relations. Until the past decade, maize had been unable to tolerate the arid weather of the Zuli Valley. Several drought-resistant maize varieties, the most prominent of which is called 'success ball' (chengdan), made maize agriculture successful in Eastern Gansu. Farmers had always planted potatoes in small quantities as part of a diversified cropping strategy, but maize had never been planted until hybrid seeds and plastic mulches were introduced. I was told by several farmers that chengdan maize was
originally bred by the Chinese Academy of Sciences. However, the patent for this cultivar is held by the Sichuan Institute of Agricultural Sciences, while the actual seed used in the Zuli Valley is produced by a seed company from Hebei province. Although the local understanding that these seeds were produced by the nation’s preeminent scientific organization is incorrect, these cultivars did arrive through a national infrastructure of seed breeding and extension.

5.6.3. Markets
Finally, expansion of maize agriculture in the Zuli River Valley has depended upon the introduction of national, as well as local, markets for maize. National markets for maize brought national-scale institutions to bear on the previous direct link between peasants and their staple foods, and facilitated the biophysical transformations in how agricultural water is used. Peasants in Northwest China do not eat maize. Therefore, like potatoes and vegetables, maize must be exchanged in national markets and wheat flour purchased. One of the more interesting facets of maize production was the institution of what was referred to as “exchanging flour” (huan mian) in the first village. Under this system peasants did not sell their maize to the market all at once; instead they held onto the grain, trading it for flour over the course of the winter, as they needed flour. The price they received was identical to market prices, but because they were holding on to their grain over the course of the winter peasants perceived this as being more self-sufficient. Those peasants who had more market-oriented perspectives simply sold their grain.

The price of maize has been rising rapidly in recent years in China, due in large part to its role as an input in growing protein, both meat and eggs, which increasingly prosperous urban residents continue to demand. Indeed, many people said that most of the maize being grown in the lower valley did not leave the valley, but was used as chicken feed in Village 3, which had dozens of small-scale confined poultry-farming operations that produce eggs for the provincial capital of Lanzhou. The prices of eggs in Lanzhou was rising quite rapidly at the time of this
field research, having risen 43% in the first half of 2010 (Cui, n.d.). The chicken farms in the lower valley farms were created through a specific state policy by the township government, supported by the national poverty alleviation office, which sought to raise peasant incomes by becoming a center of egg production. Thus the introduction of maize agriculture in the valley relied upon the introduction of a variety of socioeconomic interventions at both national and local scales to convert crops into usable foods for farmers.

The shift to growing maize in the Zuli River Valley has involved changing how the biophysical resource of water interacts with plants, the very nature of plants, and the socioeconomic institutions that link agricultural water and food. Using plastic films has slowed the processes of evaporation and altered the hydrology of the soil. The very nature of the plants being grown has been altered by the introduction of seeds from a national infrastructure of plant breeding and extension. These modifications to plants allow types of plants that would not previously grow in the valley to be grown in Dingxi. The introduction of maize has required the use of national as well as local commodity markets to mediate between crops and food. These changes did not occur on their own or out of market conditions alone: various state actors, including provincial research institutes, township governments, the county agricultural bureau, have backed each of these steps. Unlike the emergence of vegetable markets in the upper valley, these steps were largely coordinated between government agencies, with the provincial agricultural ministry organizing lower level bureaus.

The case of maize agriculture reinforces two core themes about the hydrosocial transformation of the Zuli Valley. First, like potato marketing, this case illustrates that when the aleatory political ecology of water is viewed in broad terms that consider the forces that impact human relationships with water, many state actors whose policy portfolios do not include the
management of the biophysical resource of water are also engaged in forms of water governance. The expansion of maize agriculture has been supported by the provincial agriculture department with the help of state scientific organizations. Neither of these bureaucracies includes water in their portfolios, but both have been actively engaged in reducing the potential for a shortage of water.

Second, because the origins of poverty are located in aridity, the solutions to that problem are rendered technical through water saving agricultural technologies. In this way the extension of the market economy into regions of western China arrives in the guise of neutral technology. Maize agriculture is presented by local officials as being a form of technology. Like water cellars, this relatively low-tech solution is wrapped in the trappings of modernity when it is promoted by state actors. Despite this technical veneer, maize agriculture has radically shifted social relations in the valley. Peasants have become engaged in new forms of economic relationships through national markets to obtain grain. This is, in fact, exactly what Wang and Bai (1991) had proposed, the extension of the commodity economy into previously subsistence areas. However it has not been conducted under the guise of building markets, but rather as technical agricultural extension.

I have identified irrigation and potato agriculture as disciplinary and security based approaches respectively, both of which govern the potential for water shortages in the Zuli Valley. Maize is somewhat more difficult to identify in terms of these two types of expression of power through the management of nature. Like potato agriculture, it does not require the movement of water itself or for the state to actively regulate where water will go. Yet elements of nature are directly regulated, albeit not directly by state actors. Evaporation, one part of the hydrological cycle, is arrested. Additionally the nature of plants has been changed. In these ways,
maize agriculture seems more a disciplinary approach to managing water. Foucault (2007) pointed out that disciplinary and security approaches to power continue to coexist, and this seems to be quite the case with maize agriculture, which has exhibited a mixture of the two.
Chapter 6. Conclusions

6.1. Development in the Nation

Chapter 3 illustrated the multiple ways that discourses of development and modernization in China have marked some areas as being backwards while marking others as being modern or up-to-date. This categorization of some places as backwards and others as modern has allowed for national development with the goal of modernization. As explored in Chapter 2, post-colonial scholars have argued that modernity is the telos of both the nation and development as a global economic process.

I have examined four types of categorization that have been used to mark some spaces as backwards in the current PRC: ethnicity, westernness, rurality, and poverty. Minzu was examined in depth because it is the form of categorization that has received the most academic attention with respect to national identity. I have examined the latter three as they have been discursively constructed and implemented through policy primarily in the Reform and Opening Period (though each set of hierarchies has its antecedents in the Maoist era or earlier). These ideas were formed in the early years of the Reform and Opening Period as thinkers such as Fei Xiaotong (1985) Wang and Bai (1991) and Wang and Hu (1999) began grasping how to deal with China’s regional inequalities under new market conditions.

These forms of classification shared several traits. First, each form of classification was hierarchically organized around the idea of modernity, with some groups presented as closer to an ideal modernity. Second, the ideal form of modernity presented in each was linked to being more Chinese. Third, each of these forms of classifications has been simultaneously a form of formal classification and an informal hierarchy. Finally, each of these forms of classification has
been explicitly *territorialized* by affixing the traits of backwardness associated with each category to particular spaces within the Chinese nation. In this way places have come to be constitutively seen as backwards. This territorial classification of backwardness has constituted these places as spaces in need of development in the form of active intervention by state actors.

Minzu has not been a major factor in my own research. Dingxi has, however, been classified as backwards through all of the forms of hierarchical spatial classification examined other than minzu. It was classified as western through the Three Wests Project and later the Open Up the West Campaign, it is classified rural administratively (and through the New Socialist Countryside and the rhetoric of the Three Rural Problems), and impoverished through the 592 poverty counties system. Each of these forms of classification has been a reason why state actors must pursue development in Dingxi, and that development has centrally been focused on alleviating the risk of water shortage.

Others have identified that certain places and regions within a nation may be labeled as backwards for the purposes of creating national identities (Mitchell, 2002). Johnson and Coleman (Johnson & Coleman, 2011) have similarly examined how some regions come to be defined as backwards within a broader national identity. Similarly Mitchell has examined how classes of people, namely peasants, are defined as an constitutive internal other with respect to the nation, and how this description as being backwards and outside the nation makes them suitable subjects for development. This study illustrates how the processes of categorizing regions as backwards is transferred into making individuals as subjects who identify as backwards and in need of development.

The response to this classification is that Dingxi has actively embraced being poor. Both peasants and local government officials have been interpellated by the discourse of poverty, and
now use poverty as their primary means of identifying vis-à-vis the nation-state. This identity as impoverished is acted out in ways that are both daily and ritualized. Peasants identify with themselves as poor through the denial of personal wealth to outsiders, and identify their progress from being backwards through a rigorous professing of belief in science (xiangxin kexue). Local leaders have been interpellated to represent the identity of being representatives of their localities which are impoverished and backwards. The ideology that has interpellated these people is one of nationally framed poverty, but it is specifically one of poverty and backwardness based on a schema of geographic categorization related to the nation. Within this geographic categorization, the role of Dingxi as a place, and peasants in Dingxi, is to be backwards.

This categorization and spatial partitioning of Dingxi as a place of backwardness has lead state actors in Dingxi to attempt to overcome this backwardness through development. Much of this development has been focused around the expansion of GDP, improving people’s living conditions, and creating a ‘middle class society’ (xiaokang shehui). However, in other ways this development has been aimed directly at transcending the forms of classification that mark Dingxi as backwards. Chapter 5 (section 5.5.2-5.5.4) demonstrated that Dingxi’s potato development programs have been as much about creating the image of Dingxi as an urbanized, central, and modern place as they have been about the direct marketing and expansion of potatoes. A major element of the potato development strategy of Dingxi has been to focus on making Dingxi an urban space, a potato capital (shudu) instead of the more rural seeming potato hometown (tudou zhi xiang). Dingxi’s potato-centered urban planning bears similar marks, hoping to bring the rationality of a modern, urban, zoned market economy to the field of agriculture. These attempts to create Dingxi as a central urban space also show up in the Potato exhibition hall, which emphasizes the science, mechanization, and modernity of Potatoes in Dingxi. Potatoes then are
not just a means of economic growth. They are also a way in which state leaders in Dingxi hope to make Dingxi a more modern place by moving Dingxi through the various hierarchical categorizations of modernity that place Dingxi at the periphery of the nation. Yet despite the urban oriented development that has attempted to transcend these categories, the categorical form of knowledge that have placed Dingxi as backwards will likely continue to place Dingxi as a backwards space. Because these categories are relational, Dingxi will likely always be catching up with the more modern, urban, and less categorically impoverished East. These forms of categorization place Dingxi in constant progress towards a national ideal of modernity that it will never achieve.

Drinking water projects also aim to create new forms of modernity by making households’ water supplies reliable, while increasing dependence on the state for water provision. Providing running water to rural areas was underlain by the logic that rural households, like urban ones, should have access to modern, secure and convenient water sources. Providing modern running water would be one way that these peasants would be transformed into new middle class subjects. Yet Chapter 4 showed that peasants, while adopting the rhetoric of modernity surrounding running water, particularly in the areas of water dependability and convenience, have found alternate ways of providing secure and modern water rather than depending on the state. These alternative forms of water have been less means of resisting state power than expressions of apathy towards state power.

6.2. Aleatory Political Ecologies

This dissertation has used the aleatory as a lens through which to study the political ecology of water. Examining the aleatory in the political ecology of water draws on Foucault’s (2007) engagement with the aleatory, which Chapter 2 argued was a central way that Foucault
conceptualized nature. The aleatory is the contingent or the chancy; in terms of water the aleatory can be understood as the element of risk of a shortage of water (the opposite, the risk of flooding, is something that I have not examined here). While considerations of risk and chance have played a role in the political ecology of water as part of a broader understanding of water (Bakker 2002; Birkenholtz, 2009; in press), taking an aleatory approach calls for placing risk, chance and contingency front and center. This perspective on the political ecology of water examines how the shortage and unpredictability of water are governed, by whom, at what scales, and to whose benefit. This dissertation used this framework to examine the political ecology of water for both drinking water and agricultural water.

6.2.1. Drinking Water

Chapter 4 illustrated that for drinking water state development interventions have fundamentally shifted the social relations mediating the risk and contingency inherent in depending on rainwater as a domestic water supply. Prior to the provision of water cellars, households dealt with potential water shortages through water infrastructure that was shared with their neighbors including shared water cellars and wells, and borrowing water from relatives and neighbors in times of crisis. The promotion of improved water cellars shifted this water management largely from these informal social institutions to households themselves, who were increasingly able to manage water needs under a broader set of circumstances. This was accompanied by the gradual introduction of small-scale and informal markets in hauled water.

While studies elsewhere have emphasized the exploitative nature of markets for hauled or trucked water, I have argued here that these markets in Dingxi have had a fundamentally stabilizing impact on household water supplies. This difference arises because the power relations with respect to water shortage that such trucked water has engendered have been far
different in the Zuli valley than in other case studies. While in other examples the lack of water, and the production of water scarcity have led to those who control supplies having great power, in the Zuli valley such water is supplemental to rainfall. Moreover the market mechanisms that provide such water appear to be based primarily within socially embedded households and other institutions, rather than through larger scale institutions. Most water hauling is done on a small scale and there are numerous potential sources. Thus, the institutions that trucked water have not concentrated control of water scarcity in the Zuli valley as it has in other cases.

Modern piped drinking water supplies have attempted to shift the locus of managing water scarcity from the individual household (where it has largely developed since the advent of improved water cellars) into a state-controlled hydraulic apparatus. This control of the risk of water is presently executed at the scale of the river valley, but the Yintao project is intended to shift the scale at which water scarcity is mediated to that of the nation. Yet, as of 2010 the running water program had proven unreliable for actually regularly providing water. As a result households have not been interested in connecting to the running water system. However, the introduction of running water in some households in the valley has drastically reduced the price of hauled and purchased water, leading to reduced risk of scarcity for residents of the valley overall. Thus running water has ameliorated the risk of shortage of domestic water for rural households, but not in the ways that were intended by project planners.

Finally, this dissertation has argued that the introduction of improved water cellars and the provision of piped drinking water worked through different logics of power. Improved water cellars worked through Foucauldian (2007) apparatuses of security: they worked with the existing environment, and did not seek to directly regulate the natural world; they managed and mitigated risk, rather than seeking to abolish it; and finally they were fundamental centrifugal
forms of power insofar as they relied upon the dissemination of knowledge and power. Piped water, in contrast, can be understood as an instance of disciplinary power: drinking water is directly regulated and controlled by state actors; the intention of the project is to eliminate the risk of water shortage, not merely ameliorate it; and it is based on a system that centralizes both control of water, and knowledge about how water will be managed into the hands of state actors.

These two technologies have then expressed state power in very different ways, which has resulted in peasants reacting quite differently to the two technologies. Improved water cellar projects empowered peasants by giving them increased control over their own water supplies. State provided running water, on the other hand, has left peasants dependent upon state water provision, which has proven unreliable. In this way state water provision actually leaves peasants with somewhat a greater risk of water shortage than they previously experienced. This change in power relations of water technologies can at least partially explain peasant apathy towards connecting to running water. Peasant apathy is then not merely a case of backwardness or conservatism (as it is often seen as, see Lu, 2006). Rather such apathy towards state water provision may be viewed through an aleatory lens as a form of resistance to state power over water provision. Because state water provision replaced risk of water shortage that arises from variable rainfall with risk of water shortage that arise from an undependable state water system, it has been met with forms of passive resistance from peasants.

6.2.2. Agriculture

The management of agricultural water has similarly involved a series of interventions that have aimed to govern the aleatory. These interventions have been intended to reduce the severity of drought, particularly the early spring droughts that lead to small grain crop failures in the region.
Early efforts to manage agricultural water after the founding of the PRC focused on managing the unpredictability of water through state provision of irrigation water. This water initially came from sources within the Zuli valley. During the Great Leap Forward, and over the following 20 years, attempts at dam building were largely unsuccessful. Beginning in the mid 1970s, the local water bureau constructed eight dams that were usable for approximately the next 20 years. Early efforts to manage water aimed to regulate water across both space and time. Water was spatially regulated between the upper Zuli Valley, which received greater rainfall, and the lower Zuli Valley. Temporally, water was regulated between the late summer monsoon and the drought-prone early summer when agricultural water was needed. The planned Yintao project is intended to further spatially regulate water by transferring water from the Tibetan Plateau to Gansu province.

The provision of irrigation water can be understood as a form of regulatory power expressed through water. Water was controlled by active state regulation: allowing water to come at some times but not at others and moving water from one place to a different designated place. Moreover, the provision of irrigation water was centralizing of both the biophysical resource of water and knowledge about how to manage it. Knowledge about irrigation was centralized within the local water department. This situation differs from Mitchell’s (2002) description of state backed irrigation efforts in Egypt that shifted knowledge away from farmers and towards the state because farmers in the Zuli valley had little to no knowledge of irrigation to begin with. Nonetheless, this approach does represent a centralization of knowledge about how to deal with the potential shortage of water. Peasants in the Zuli valley did have strategies to deal with potential unpredictable water shortages, most notably planting a variety of staple crops that could mature at different times of year. But ultimately efforts to manage the aleatory nature
of water through irrigation have proven unsuccessful. Seven of the eight dams that constituted the irrigation system completed in the mid-late 1970s have since silted to point of being unusable. Water does still sometimes come through the irrigation works, I was told by interviewees in village one. But when such water arrives it cannot be predicted (it is generally only in years which already have much rain), and therefore it does not reduce the risk of potential drought.

Irrigation efforts using tubewells in the upper valley have similarly been a process of trying to manage the risk of drought through the disciplinary regulation of water. Cabbage farmers in the upper valley reported that while they would generally irrigate a crop 3 times each growing season, they did so according to the conditions of their plants. If there was sufficient rain, they would not irrigate. Fossil groundwater (which is slowly being depleted) is then used as a buffer against potential water shortages, rather than as a constantly needed input. Like surface water irrigation, groundwater irrigation has relied upon state actors determining when what water can be where. Also like surface water irrigation, groundwater irrigation has been based upon the centralized knowledge of how water has been controlled.

In contrast to the disciplinary approach to managing the aleatory nature of water seen in irrigation schemes, the promotion of potatoes as a climate appropriate cash crop relies upon governing through apparatuses of security. The promotion of potatoes relied upon accepting the variability and chance of when water will come. Instead of attempting to regulate when water will be available to crops, potatoes regulate when crops will require water. With potatoes, the peak water demand was shifted from early summer to late summer, to better “go with nature and the seasons.”
Creating potatoes as an alternative cash crop was an act of governance through the active creation of markets. This was achieved through the promotion of circulation, which Foucault (2007) identified as being a central tactic in the deployment of power through apparatuses of security. The system that these policies to promote potatoes created, including the construction of marketing and storage facilities, seed breeding, and the promotion of transportation, did not bound control of the system that managed water scarcity through potatoes. Instead such efforts interacted with market actors over which they did not have complete control. The case of potatoes then shows that power over the aleatory nature of water may be expressed in diffuse ways. Under potato agriculture control of how the potential for shortage of water was managed was not consolidated in the state, but rather ways of adapting to climatic conditions were facilitated by state actors.

Finally, in the case of expanding maize agriculture we see traits of both disciplinary power and apparatuses of security. Biophysical water is directly regulated through a state-backed technology, but this is done in situ at farmers’ fields by preventing evaporation with films. Similarly, the biophysical nature of maize cultivars has been altered to allow them to flourish in eastern Gansu, which was previously too arid to grow maize. Maize agriculture also required the introduction of national markets for maize to mediate between the crops that farmers grew and the food that they ate. These markets, for both maize as a cash crop and food for the farmers to eat, required the promotion of national circulation.

The aleatory nature of agricultural water has then been governed by a variety of state actors working through a variety of disciplinary techniques and apparatuses of security. These actors have shifted the risk and contingency associated with rain-fed agriculture into other forms
of risk, either the risk of a state-back irrigation scheme failing to provide water, or the risk of price shifts associated with market agriculture.

Examining both agricultural and domestic water from an aleatory approach allows one to see changes in human-water relationships in ways that conventional approaches to understanding water management might not. Examining drinking water from the aleatory perspective allows us to see the act of peasants not connecting as a case of political action. Understanding the politics of how risk and knowledge have been redistributed by state policies for both improved water cellars and running water allows us to understand the motivations for peasant apathy towards running water. When viewed through an aleatory perspective, the improved water cellar programs of the 1990s and early 2000s substantially reduced the risk of water shortage, while the provision of piped water into individual villages has provided peasants purchased water at lower prices and further reduced risks of shortages. Hauled water, which in other cases has been an exploitative institution, did not have a similar effect in the Zuli Valley because those who owned trucks did not control the risk of water shortage. Ultimately the case of the Zuli valley then is somewhat unique in that several development programs to provide stability to domestic water supplies have increased the choices available to peasant households for domestic water. Peasants in the Zuli valley now have a choice of how to manage the risk of water shortage, something peasants in Rajasthan (Birkenholtz, forthcoming) or residents of urban Guayaquil (Swyngedouw 2004) may not have.

In agriculture the aleatory framework allows us to see some policy interventions as water governance that would not be treated as cases of water management (Jones 2010). The clearest case of this is the introduction of markets for potatoes, which though conducted with the goal of reducing the risks of aridity fall far from traditional definitions of biophysical water
management. Maize cultivation, which relies upon a series of water saving technologies, also has an ambiguous relationship with traditional concerns of water management, which emphasize the allocation of biophysical water. In each of these cases the aleatory framework allows us to identify as water governance something that a political ecology of water concerned primarily with the biophysical resource of water may not. In this an aleatory approach helps to fulfill the promise of the hydro-social approach by emphasizing that social elements far removed from biophysical water still govern how humans relate to water.

6.3. State in China

How we understand the very multiplicity of actors who have engaged in governing water in China is a final contribution of this dissertation. The Fragmented Authoritarianism framework has identified that a cacophony of voices from several different functional bureaucracies and administrative levels contribute to policy making in China. Yet this is a paradigm that has mainly been concerned with the effect that the form of the state has on policy making and policy implementation. By shifting from examining water policy to examining water governance, a new realm of both actors and governmental techniques is brought to bear on how we think of the state relating to water in China.

First, when we conceptualize water governance instead of policy, functional bureaucracies apparently distant from questions of water become involved in the governance of water. Others have identified that functional bureaucracies other than those of water resources have interests in water related issues, for example the Ministry of Environmental Protection’s interest in water quality (Mertha, 2008; Nickum, 2010). However, in the examples of agricultural water management, such management has been overseen by groups not connected in any way to the biophysical resource of water including the Provincial Department of Agriculture and central
poverty alleviation authorities. Moreover, many of the groups creating policy, including the Neiguan town government, have had governance effects altering how farmers relate to water far beyond their territorial boundaries.

It is not only the number of actors governing water that has increased in this study, but also the ways that they have governed water. Others have identified the Reform and Opening Period as introducing governmental logics to state administration in China, many of which operated by managing the markets in new ways (Jeffreys, 2011). This case study illustrates that such use of markets may be a means of managing not only people, but also natural resources such as water. Agricultural water is governed through the markets by allowing peasants to grow cash crops that may be better suited to the hydrological conditions of their area, such as potatoes or hybridized maize.

It is worth considering the applicability of the programs discussed in this dissertation to China more broadly. Dingxi is a case that is both exceptional and prototypical. Dingxi is unique in the legions of state visitors of have come to see it over the years, and the special programs that have been implemented there. Dingxi was identified as one of the ‘three wests’ in 1983 in a set of anti-poverty prescriptions that would later be adapted to form China’s broader poverty alleviation programs beginning in 1986. Dingxi is sometimes a case that is called dianxing, a Chinese expression that means both a typical or representative case, and a prototypical model. Dingxi fits this description well. Dingxi it taken as a typical place that is representative of Northwest China. It is viewed by state actors and academics as representative in its cultural norms (including rustic, unshaven peasants), its poverty, and the causes of that poverty in aridity.

Equally importantly Dingxi has been taken as a representative example and model of a place that is backwards and in need of remediation. Chapter 3 discussed the various ways that
Dingxi has been classified as a backwards space. Dingxi has been taken as an example of an impoverished, western, and rural area. While there are many other areas that are western, impoverished, and backwards, Dingxi has received particular attention as an example of these hierarchical forms of backwardness, and as a result has received particular scrutiny as a model of how state development alleviate these problems.

As such Dingxi has been a key space for state actors to perform development through the alteration of the environment. The ill fated first attempted at the Yintao project, of which Dingxi County was to be a primary beneficiary, was a performance of state power over nature through disciplinary mechanisms that aimed to alter the environment of Gansu through the transformation of nature. This failed project was to be a model of how a modern socialist state could transform nature through labor. In recent years and the focus of national strength has shifted towards scientific achievement, the Yintao project has again been started, but this time as a model of the scientific power of modern China. During the Reform and Opening period the state power was expressed through new techniques of governance. These approaches emphasized promoting commerce and adapting cropping systems to local climate conditions. The creation of Dingxi as the potato capital of China is but one example of how state power as expressed through governmental approaches of circulation has been put on display in Dingxi.

Given the exceptional nature of Dingxi, one may ask what the applicability of my case study of Dingxi is to other poor or arid regions of China. While Dingxi is exceptional in the degree to which its projects have been touted, as a case of a dianxing region of arid northwest China it is both typical and prototypical of the region more broadly. Insofar as projects in Dingxi are exceptional, they are exceptional in their degree and how they are displayed. There are quite active projects to extend drinking water cellars throughout rural northwest China, and the rural
drinking water security project of which Anding district’s piped water expansion is a part is a nation-wide program. In this way Dingxi is ultimately more emblematic than exceptional: like other regions of China, it is poor and having its poverty alleviated through a variety of state backed program, but these changes are on greater display in Dingxi than elsewhere.

I end with a particular moment that struck me in Dingxi, but also offers hints as to the limitations of this study. After a day of interviewing in Village Two the village guide and my field assistant rode a motorcycle down from a cluster of houses that were among the most remote that I had worked in. Wanting to take in more of the breathtaking views, I told my companions that I would walk back to the village center. As I walked I ran into a farmer whom I had interviewed earlier in the day. He was in his early 40s and illiterate. The farthest he had ever been was the local town (zhen); he had not even been to Dingxi city before. I offered him a Lanzhou Black Label Cigarette, but he preferred to smoke the local tobacco from a long pipe. He then asked me if I had heard about the floods in Shaanxi. I had, and I asked him how he knew about them. He had heard of them on the TV news he said. As we squatted looking out over the incised mountains of the loess plateau, he told me that China’s problem was not that there was not enough water, but that there was too much water in some places, and not enough in others. There was too much water in Southern Shaanxi, but not enough in Dingxi. If only some of that water could come here. His statement was strikingly similar to the official statements of the Chinese Ministry of Water Resources, yet it was delivered by an illiterate peasant. This statement reframed the availability of water in national terms, and this reframing came to this peasant through the medium of television. This was an important reminder that state-backed development schemes in agriculture and water are but one of the cacophony of voices hailing
peasants in Gansu into a national subjectivity. Water has been central to how development has worked for Dingxi, but it is just one force among many.
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### Appendix 1 Survey Instrument

#### 个人信息

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</tbody>
</table>

#### 家用水情况

1. Where do you get your water for each of the following needs: 你喝什么水？下列的几种用水是从什么地方得到的？

<table>
<thead>
<tr>
<th>Use</th>
<th>现在</th>
<th>五年前</th>
<th>二十年前</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinking 饮水</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laundry 洗衣服</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bathing 洗澡</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household washing 打</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooking 做饭</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic Animals 家畜</td>
<td></td>
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</tr>
</tbody>
</table>

#### 水源

您水窖的储水量是多少？您的水窖是什么时候安装的？水窖的集水多少平米？

有井的话 几米深？什么时候挖？投资都少？还有水？

在您生活里一直有家里的水窖 / 井，还是以前有其它的水源？有 / 没

是什么？__________ 花多少时间？__________ 几公里？__________
水日常用量
Use 从下列的用法，按您家的用量最大排列。

<table>
<thead>
<tr>
<th>饮用</th>
<th>做饭</th>
<th>家畜</th>
<th>洗衣服</th>
<th>洗澡</th>
<th>打扫</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

您家每天用几桶窖水

<table>
<thead>
<tr>
<th>人吃 (几桶每天)</th>
<th>家畜 (几桶每天)</th>
<th>斤/桶</th>
<th>每天共用 (斤)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

自来水: 每个月用几方自来水? ______

Cost of water 水价
一立方米水价格多少? ______
您投资多少联系自来水网? ______
那个包括劳动吗？ 你可以估计花多少时间安装？有 / 没
您投资多少安装水窖？ ______
那个包括劳动吗？ 你可以估计花多少时间安装？有 / 没
劳动？ _______________

自来水
通自来水吗？ 有 / 没
通了多长时间？ ______

每个月停水停了几次？

准备通？有 / 没  为什么？

自来水比以前有什么好处？哪一个是最重要的？

4. 6 近十年里您有缺水的情况吗

农业 Agriculture
1. Cropping Patterns/ 种植模式—填地表

1. How much land to you cultivate? 您种植几亩地？
   1.1 退耕的占多少？
1.2 一共有多少地？
1.3 您租几亩地？
1.4 您借给别人用您的地吗？

5. (按住回答)
以前不种（玉米，土豆，菜）现在种，这时为了什么原因？

以前种（小麦，土豆，）现在不种，这时为了什么原因？

6. 您的平均收成多少？（按住回答）现在的产量更比以前高是为了什么原因？

7. How much fertilizer do you use? 您加多少化肥
   7.1 从哪儿买？ 镇上___ 私人家___别的（什么地方）________
   7.2 是什么牌子的？ 不知道___
   7.3 如果比以前用的多一些，为什么？

8. How much pesticide do you use? 您加多少农药？
   8.1 从哪儿买？ 镇上___ 私人家 ___别的（什么地方）________
   8.2 是什么牌子的？ 不知道___
   8.3 如果比以前加的多一些，为什么？

9. What type of seeds do you use 您种植哪一种的种子？
   9.1 为什么种___（按住回答 玉米，土豆，菜，等）？

   9.2 从哪儿买（按住回答 玉米，土豆，菜，等）？？
1.b Irrigation and Ag Water Management

您的农田灌溉吗？是的话，您什么时候灌溉了？

a. 您有几亩水地？灌什么植物？—— 填表

2. How often do you irrigate your fields? 您每年几次灌溉？几月开始？

3. For long each time 每次多久？

4. How do you know when it is time to irrigate? 您怎么知道应该浇水？

5. Do you have your own pump or do you share it with others? 您有自己的水泵还是跟别人共用一个水泵？

a. 如果共用的话，几家共用？

b. 如果共用的话，您每个月可以灌溉多少次？

6. Estimated flow 水泵的估计流量？

7. How much do you pay for electricity for the pump? 水泵的电费多少？

8. Films 您使用地膜吗？

a. 使用的话，使用多久了？

b. 使用的话，在什么作物上使用？填表

9. 您花多少买了地膜？

10. 国家帮助您买吗？

11. 使用膜的收成多少？

12. 无膜的收成多少？

13. 从哪儿学到地膜的技术？

I.C Agricultural Marketing 农业销售

1. 您买不买（按柱回答 玉米，土豆，菜，等）？不买的话有着做什么？

a. in what place? 您的收成是在什么地方卖的？
b. 您自己需要拉吗？运费多少？

c. At what time of year? 每年什么时候卖？

2. Do you always use the same buyer, or does the buyer change each year? 您一直卖给同一个人或者每年随便卖给不同的人？ 是谁？

3. What was the prices you sold your crops for last year? How did these compare to previous years? 最近卖的价格多少？比上年卖的物价高不高？为什么那个价格改了？

4. 近十年里为了农业，包括家畜，种地，您贷款／借货吗？

Household Economy and Livelihood 家里经济于生活条件

2.A Income and Expenses 收入于花费

1. Does anyone in your household work outside the community?

您的家有人出打工吗？

1a. Where? 哪里？_______________

2. Do you earn income from anything other than agriculture? 除了农业以外您还有其它的收入吗？

3. Can you estimate your annual income? 您会估计您的年收入吗？_______________

<table>
<thead>
<tr>
<th>收入源自</th>
<th>年收入</th>
</tr>
</thead>
<tbody>
<tr>
<td>退耕还林</td>
<td></td>
</tr>
<tr>
<td>养家畜</td>
<td></td>
</tr>
<tr>
<td>种地</td>
<td></td>
</tr>
<tr>
<td>打工 (/___人)</td>
<td></td>
</tr>
</tbody>
</table>
4. Living expense? 日常花费

孩子近2年里学费和住宿费是多少（第一页）。

您大部分的食物是买的吗？是 / 否 您每月买几袋面粉？ 您每月花多少钱买食物？
其它的东西？

你没年买煤炭吗？ 几吨 多少钱

2. B Assessment of living standards 生活条件评估

Agriculture and production 农业及生产

<table>
<thead>
<tr>
<th>农业设备</th>
<th>有？</th>
<th>年</th>
<th>价格</th>
<th>下乡？</th>
</tr>
</thead>
<tbody>
<tr>
<td>手扶拖拉机</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tractor / 拖拉机</td>
<td></td>
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<td></td>
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<tr>
<td>San Lun / 三轮车</td>
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<tr>
<td>摩托车</td>
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<tr>
<td>汽车</td>
<td></td>
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</tr>
<tr>
<td>家畜</td>
<td>几头</td>
<td>自己吃的</td>
<td>卖的</td>
<td></td>
</tr>
<tr>
<td>驴</td>
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<tr>
<td>羊</td>
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<tr>
<td>牛</td>
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<tr>
<td>鸡</td>
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<td></td>
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<tr>
<td>猪</td>
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</tbody>
</table>

Household 在您家里有没有下列的东西？用电子下乡项目买吗？

<table>
<thead>
<tr>
<th>东西</th>
<th>有？</th>
<th>下乡？</th>
<th>东西</th>
<th>有？</th>
<th>下乡？</th>
<th>东西</th>
<th>有？</th>
<th>下乡？</th>
</tr>
</thead>
<tbody>
<tr>
<td>电视</td>
<td></td>
<td></td>
<td>DVD</td>
<td></td>
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<td>音响</td>
<td></td>
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<tr>
<td>洗衣机</td>
<td></td>
<td></td>
<td>冰箱</td>
<td></td>
<td></td>
<td>太阳能热水器</td>
<td></td>
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<tr>
<td>沙发</td>
<td>电脑</td>
<td>家里多少锅</td>
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<tr>
<td>手机</td>
<td>固话</td>
<td>电饭煲</td>
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</tr>
<tr>
<td>电磁炉</td>
<td>电水泵</td>
<td>沼气池</td>
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<tr>
<td></td>
<td></td>
<td>煤气灶</td>
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</tbody>
</table>

House 您房子有几个房间Rooms 几房间 ____ Est. Size 您估价您的房子是几平米 ____

砖 / 土 地板 ____
新农村项目帮助您建房子了吗？ ____ 付还多少？ ____