

# The Paradoxes of Environmental Policy and Resource Management in Reform-Era China\*

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**Abstract:** Over the last 5,000 years serious environmental problems—deforestation, desertification, erosion, and widespread pollution of air, land, and water—have prevailed throughout most of China, brought about by a diverse set of social and political contexts. In this paper I focus on an enduring contradiction associated with the post-1978 reforms, namely accelerated environmental resource degradation in rural areas amid unprecedented national economic growth. Declining entitlements to assets and social capital in China's rural village populations are a crucial aspect of altered state-peasant relations, as these are increasingly mediated by the market during China's transition to a hybrid economy. This has resulted in changing patterns of resource use, impacting both the environment and peasant livelihoods. A brief assessment of China's postrevolutionary environmental policy and management practices provides the context for detailed case studies in Henan Province. These examples highlight the relationship between political-economic changes and environmental policy and management. Contrary to reform rhetoric, rural peasants' embracing of reform policies does not necessarily optimize their welfare or promote sustainable use of resources. The case studies reveal alternative pathways for villages, ones that ought to be brought into the policy debate spotlight.

**Key words:** China, environmental resource management, policy, political ecology, entitlements, social capital, property relations, vulnerability, reforms, villages, rural development, peasants.

Within the context of contemporary China's much-heralded economic success in socialist transition, extraordinary economic growth has until recently overshadowed

some of the nation's more intractable problems, particularly those of environmental management. Decollectivization and privatization in the reform era have led to intensification of the environmental degradation found in prerevolutionary and Maoist China. The combination of massive sustained growth with simultaneous environmental degradation and social stratification—unintended consequences of the transition from a state-planned socialist economy to a state-interventionist capitalist economy—points to the need to assess subsequent changes in environmental management.

Environmental policy anywhere can only seek to change environmental management indirectly through encouraging, prohibiting, or introducing new ways of using or conserving resources. Such policy sets up levers, but these have to be pulled by

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local actors themselves: peasant farmers, forest officials, entrepreneurs, local officials, and so forth. These actors all have their own agendas—economic, social, and cultural. They also compete with each other, ideationally and materially, and are shaped by social relations in which they are enmeshed (Sargeson and Zhang 1999, 98).

Environmental policy, of course, has little control over these social relations and the conflicts associated with them. Indeed, the social transformations which China is experiencing are so profound, so rapid and contradictory, that the state, through its environmental policy, has had difficulty in identifying the root structural causes of its environmental problems, let alone mitigating them. The processes of collectivization (1949–78), followed by decollectivization and market reforms (1978–present), have a political dynamic of their own. Myriad environmental outcomes, often unforeseen, have resulted. Environmental policy has therefore tended to be reactive and detached from the social causes of environmental problems. It has not addressed—and perhaps, within the limitations of environmental policy as presently articulated and enacted, cannot address—those aspects of the ongoing social transformation which are driving environmental change in China.

In this article, I begin by theorizing the changing social relations of production and subsistence within China, contrasting the collective and reform eras. This exposé on Chinese peasants' changing entitlements and access to assets leads to a historical overview of China's environmental policy and management. I argue that rather than using the standard *communist-collective* versus *market-private* dichotomy to structure policy thinking about China, we ought also to recognize a range of other alternatives, in particular those where, within a market economy, there continues to be a significant level of collective organization of production and exchange. I then present a structural analysis of environmental resource use in three villages in Henan Province to suggest that these alternatives

in fact exist on the ground, and that they appear to offer prospects for the improvement of rural livelihoods.<sup>1</sup> Through these examples, I aim to highlight how broad structures of the Chinese political economy intertwine or articulate with localities to create particular social entitlements, vulnerabilities, and environmental ramifications. Understanding this complex process allows us to perhaps envision an environmental policy where the divide between policy rhetoric and reality in practice is bridged rather than serving to maintain the status quo. Such an environmental policy would better advance the interests of those living the reality of China's environment.

I carried out long-term research in the three Henan Province villages from 1989 to 1997. My methods varied by village conditions and relative access. In both Nanjie and Beixu villages I interviewed the village leaders, as well as ten random households, during multiple-day visits. I physically surveyed the villages, their industries, and agricultural areas, while simultaneously interviewing people as they worked. In Beixu village, I interviewed workers in the brickworks, most of whom were not from the village. In Nanjie village, I interviewed workers in the instant noodle factory, flour-mill, and bakery. In contrast, in Village 3, I did participatory ethnographic research and observation. During four extended visits I lived with one family of seven in a typical walled compound. I participated in fieldwork, harvesting, transport, and processing, primarily of corn. I completed a detailed physical survey and mapping of the village and its infrastructure and had repeated interviews with approximately 70 percent of the villagers. I also interviewed the county leadership that represents Village 3 and surveyed the market town, grain-buying station, and other commodity

<sup>1</sup> This reverberates with work on other countries and socioeconomic formations that talk of renegotiating market relationships from below (Bebbington 1996; Szelenyi 1998). This might be described as a social economy or "third way."

outlets. In addition, I did brief surveys of nearby hamlets to study kinship networks and labor reciprocity.

## Changing Entitlements and Environmental Policy

I analyze China's transformation in terms of four concepts: entitlements, communal capital, property relations, and vulnerability. By analyzing the transition with these concepts, I attempt to provide a new window into China's evolving environmental policy—revealing both its limitations and the prospect of creating policy that reduces the vulnerability of those most at risk. China's social transformation has unfolded largely outside of the central state's environmental policy purview. The state has sought to issue environmental edicts in a manner totally detached from this process. Each of these four concepts is contentiously debated in the literature, and I therefore outline and interconnect them briefly before returning to a more detailed discussion of China's environmental policy.

The concept of *entitlements* is used creatively by theorists to help explain the relative vulnerability of people under stress from "natural disasters." These theorists focus upon famine and hunger in sub-Saharan Africa and South Asia (Drèze and Sen 1990; Blaikie et al. 1994; Bohle et al. 1991; Watts and Bohle 1993; Swift 1989). This concept has yet to be applied to China under socialism or in its more recent transition to a market-oriented economy. Entitlements can be defined as the right to make a claim on a person or an entity. In other words, entitlement describes the relationship between a claimant on an asset (rural peasants, urban laborers), an institution that grants access to the asset (the state, social norm, community institution), and the asset (tangible or intangible) itself. Thus, entitlement is a three-way relationship.

Theoretically, the distinction between productive resources (understood as tangible assets) and access to those productive

resources can be understood as an entitlement process, albeit one that is socially mediated and conditioned. Income opportunities are another kind of asset (intangible) that help define livelihood strategies, but they are not entitlements since they are mediated through the market and social connections. The confusion of terminology results from the evolving but eclectic and personalized use of the major concepts in the literature. Membership in a group, for example, gives an individual entitlement to assets. This is either formalized or understood through community regulation and social norms, as asserted by Leach, Mearns, and Scoones (1999). Incorporating the moral economy into entitlement analysis is further advocated by Gore in his argument that competing notions of legitimacy and "unruly" practices challenge legally established rules, determining people's command over commodities. In his study, power relations and discursive practices are instrumental to entitlement analysis, and entitlements are seen as a result of an active process of negotiation in which unruly practices are central to transforming formalized access (Gore 1993). Nonetheless, the notion remains of a set of claims, rules, and expectations underpinned by formal custom or legal instruments.

Blaikie (1985) and Watts (1991) discuss access to resources in a broad way that incorporates the role of the state and globalization trends, avoiding an excessive and narrow focus on proximate causation. Using a dynamic approach in which social aspects of political economy may precipitate entitlement crisis, Blaikie et al. (1994, 86), in their access model, extend Sen's (1981) rather economic entitlement concept to encompass socially derived resources which can be called upon by individuals according to the current allocative rules of the society. Extending Sen's "relations and flows of surplus," they link local actors—such as moneylenders and landlords—to international changes in currency valuation, food grain prices, and imports. Watts, too, moves away from a static notion of entitlements by revealing enti-

tlements as a terrain of struggle within societies in which group interests (defined by class, caste, gender, age, and ethnicity) are in contradiction (Watts 1991). In the later work of Watts and Bohle (1993), they contend that entitlement analysis should include long-term political, economic, and social processes along with the structural notions of “capability” and “totality of rights.” They argue for inclusion in entitlement analysis of a process by which a broader range of rights are contested and defined (“empowerment” and “enfranchisement”). Furthermore, they point out the benefits of examining the distribution of entitlements and the ways they are reproduced under specific circumstances.

I incorporate *social capital* into this analysis because of its importance in China’s postrevolutionary history. Access to basic needs and the specific natural resources involved in their fulfillment is dependent, among other factors, upon the creation and deployment of social capital. This second major concept is defined here as forms of nonstate, nonprivate assets created through collective action, socially controlled and accessed through cultural and juridical measures (Muldavin 1997; Dickenson et al. 1996, 260). A particular kind of social capital produced under the commune system of postrevolutionary China is *communal capital* (Muldavin 1997).<sup>2</sup> Examples of communal capital range from agricultural implements for large-scale production, agro-processing facilities, education and health facilities, to soil erosion control measures—all constructed through collective labor, by definition. During the collectivist period, the state provided the conditions for the creation of communal capital through material redistribution and successful ideological conversion from household-based to col-

lective organization of production. For example, previously privately held capital assets were redistributed among groups of poor peasants, who were then encouraged to use them collectively. Redistribution also allowed peasants to operate in a less vulnerable situation and coordinate their efforts toward the creation of, for example, windbreaks, terraces, and other anti-erosion methods. The benefits of these improvements would be captured collectively, hence their classification as communal capital (Muldavin 1997).

Given the growing role of the market and private property over the last two decades in China, it is important to address the concept of shifting *property relations* in order to help analyze the changing social relations of production and subsistence and their effects on the environment. Redefined property relations were central to the creation of peasants’ entitlements to basic needs on the commune and to ensuring social capital. Chinese collective agriculture had many similarities to traditional common property regimes, in that land control was divorced from both individual and market yet was overlaid with an economic and political centralism that directed production and planned distribution (Schlager and Ostrom 1992).

In the subsequent reform period, there was a fundamental change in property relations and entitlements to assets, and therefore a deterioration of the conditions under which communal capital was previously reproduced and called upon by all members of the population. This led to an increase in *vulnerability*, the final concept, defined as “a combination of factors that determine the degree to which someone’s life and livelihood is put at risk by a discrete and identifiable event in nature or in society” (Blaikie et al. 1994, 9–10). Underpinning this loss of entitlements for many was a restructuring of property relations that defined sets of rights and obligations which form part of these entitlements. For example, communal land tenure and the labor point system ensured distribution of the products of land and

<sup>2</sup> Similarly, Swift (1989) breaks down the entitlement bundle into assets, tangible and intangible. Through this he also introduces the idea of collective assets, so important in the China case both before and after market reforms.

labor to all. When land became de facto privatized in different ways, these rights were no longer assured, entitlements fell away, and vulnerability increased for many.

Building on Blaikie and Brookfield (1987), Swift resolves the problem of differentiating poverty from vulnerability by introducing the notion that many tangible and intangible assets are directly related to community expectations of reciprocity which can be drawn upon in a crisis (Swift 1989, 11). Thus, households with equivalent levels of poverty can have different levels of vulnerability, because intangible household assets (such as assistance from neighbors and kin networks) are not typically included in poverty statistics but nonetheless offset some vulnerability. Whereas poverty statistics often represent a snapshot of current household conditions, *relative* vulnerability is based upon the complete set of variable assets, both physical and social, available to the household and its individual members over time.

China's period of socialist agriculture (1952–78) is completely different from any other case study used to inform the work of the above authors. Still, when entitlement analysis is applied to the socialist context, the focus is constructively redirected from the strictly economic and material to intangible and social aspects. Examples range from identifying noncommodified forms of exchange (reciprocity claims, assets); to state political commitment to the well-being of peasants (intangible assets); to individual claims to goods and services by virtue of membership in socialist institutions such as commune, brigade, and team (collective entitlements); as well as the distinctly social yet materially based communal accumulation process and resulting communal capital (Muldavin 1986), such as soil conservation, irrigation systems, and productive infrastructure—Swift's (1989) "collective assets" and Blaikie's (1985) "access to collective resources."

In the transitional reform period (1978–84) Chinese policy instigated a devolution of risk and responsibility away from the collective to the household and

individual. In this respect, the new exposure that peasants continue to experience is similar to, though much more severe than, the dynamic of market penetration undoing traditional common property regimes elsewhere in India, Africa, and Latin America (Peet and Watts 1996; Schlager and Ostrom 1992). In the prereform period, the market did not operate in the allocation of entitlements, the state being the primary actor. But entitlements in China's recent history of transition are increasingly determined through the market, though an imperfect one. Despite the state's retreat from a commandist economy (Kelliher 1997; Zweig 1997; Hussain and Stern 1994), a contradiction emerges between its desire to maintain control while allowing the market to take over the allocation of resources. The impact of decollectivization upon resource use is mediated through altered livelihood strategies. At the macro level, the changing relations between state, peasants, and markets both constrain and enable alternative strategies (Muldavin 1998). With decollectivization in China, certain state-guaranteed entitlements for individuals declined. For example, the state once provided for those who could not work "five guarantees" of food, clothing, shelter, education, and decent burial, as well as access to health services (Aziz 1978, 66). Furthermore, the crucial entitlement of land access was redefined along contractual lines originating with male heads of households (Selden 1998; Kung and Liu 1997). This had adverse implications for the entitlements of women as well as households, who lost out in the competition for securing official land rights, receiving either less land or land of lesser quality (Judd 1994; Griffin and Zhao 1993; Khan et al. 1993; Riskin 1993).

Sustainable livelihoods are those which allow individuals to recover from stress and shocks, maintain their capabilities and assets, and provide long-term opportunities and benefits for the next generation (Chambers and Conway 1992). Batterbury and Forsyth (1999) see sustainable livelihoods as an extension of Sen's entitlements

concept, which focuses on individual access to resources rather than that of the community. They argue that a strengthening of institutional capacity alleviates vulnerability and pressure on natural resources, thus maintaining sustainable livelihoods. In China, market devolution, by decreasing institutional capacity, has severely impaired the prospect of sustainable livelihoods for many peasants (Muldavin 1998).

As entitlements for women, children, elders, and some households are undermined and disappear, it is up to the individual in an uneven and imperfect market to find a viable livelihood strategy. Access to resources and assets, the basis of livelihoods, are now primarily achieved through the market under competitive circumstances, and therefore are uncertain. Secondly, livelihoods are guaranteed through the building up and expenditure of social capital—directly connected to control over various assets and access to an array of resources (Bebbington 1999; Kelliher 1997). Market primacy, particularly for households with less-powerful social networks, profoundly changes people's livelihood strategies, encouraging short-term opportunism as people seek to lay claim to and consume public goods (e.g., timber, grazing lands, potable and irrigation waters). For those households with particularly valuable forms of social capital—for example, networks into local officialdom—accessing this social capital becomes an individualistic accumulation strategy. In either case, as the future becomes more highly discounted, in an uncertain and conflictual social environment, sustainable forms of development are severely undermined (Redclift 1987, 36; Muldavin 1998). This supports Leach, Mearns, and Scoones' (1999) contention that dynamic and changing institutional contexts determine people's access to and control over resources, which, in turn, influences resource use and the course of environmental change.

The loss of access to collective entitlements and resources cannot often be palli-

ated through the opening up of other entitlements. This is because the poor have neither the political networks in local officialdom nor the social capital deriving from expectations of collective responsibility for food security. Nor can they successfully pursue claims upon shrinking common property resources. Furthermore, they are much more vulnerable to the encroachment of more well-off peasants and entrepreneurs upon common property, from which the poor have drawn important resources with which to augment their livelihoods. This is because they are politically weak, geographically dispersed, and usually function within informal cultural organizations (e.g., kinship groups). As in many other parts of the developing world, a major risk aversion strategy of the poor is to rely on common property (Shanin 1987). Privatization, both *de facto* and *de jure*, then, has immensely unequal social impacts. With marketization, familial rights of access are lost or codified, ending previous access through common property regimes (Bromley 1987; Ostrom 1990; Schlager and Ostrom 1992). Privatization also has a serious gender component in rural China, since land is passed to the male head of household, thus squeezing women out of previous entitlements that were accessible through familial and collective rights (Judd 1994). In China's case, the abrupt transition from state property, previously underpinned by collective social capital, to quasi-private property has led to a huge "free-rider" problem, degenerating to a virtual "open access" situation without regulation. Because the policy climate is so volatile, peasants simply do not know what the state will do next, whether it will abrogate or return their rights to assets (Muldavin 1993). Thus their livelihood strategies shift accordingly. Uncertainty in peasants' entitlements, and risk to the resources which form part of them, leads them to overconsume and despoil local resources in an attempt to exploit them before someone else does. For example, if a powerful peasant cuts and sells trees from a hillside that was previously managed col-

lectively by a village, others in the village are encouraged to follow suit for fear of being left with nothing. The result is rapid mining of hitherto communal assets, destroying the productive base upon which future development might occur (Muldavin 1986, 1992).

In assessing changing vulnerability in reform-era China, the reasons why vulnerability has increased for some and decreased for others within China's new hybrid economy is central.<sup>3</sup> One explanation may be found in seeing the asset status of rural communities not as static but as an evolving "prime determinant of vulnerability" (Swift 1989, 13). For some, state entitlements (e.g., minimum provision of food, clothing, health services, and housing) have decreased, while for others, exchange entitlements (e.g., the ability to produce agricultural or manufactured goods for the market) have increased. Those who bear the burden of decreased state entitlements are often not those who get the benefit of increased exchange entitlements, as the case studies will illustrate. This applies in particular to elders, pensioners, and those with little to exchange, since household wealth is increasingly connected to the characteristics of the household and its comparative advantages over others (i.e., its internal makeup and the dynamics of age, gender, and skills of available labor power). Freedom of market participation belongs to those who have something to sell. Yet the shift to market mechanisms for allocation and signals in decision making concerning all resources is occurring within what is still state-directed development.

Thus, changing entitlements, property relations, and the nature and deployment of social capital have brought important

changes in resource use and environmental management. Increased vulnerability has led in some instances to a desperate ecocide, with encroachment into forests, movement of cultivation up steep slopes, overgrazing, and the despoliation and destruction of fragile environments (Blaikie 1985; Muldavin 1996a). The fulfillment or denial of entitlements can lead to such environmental degradation. Thus, environmental policy must incorporate environmental justice, since it may otherwise criminalize the already vulnerable by denying entitlements derived from natural resources (Blaikie and Sadeque 1999). An understanding of these issues can provide important insights for the formation and implementation of environmental policy.

### **China's Social Transformation and Environmental Policy**

Serious environmental problems—deforestation, desertification, erosion, habitat loss, and widespread pollution of air, land, and water are the most obvious manifestations—have prevailed throughout most of China for over five millennia, brought about by a diverse set of social and political contexts (Elvin and Liu 1998; Smil 1984). Here I address a number of enduring contradictions in the more recent history of Chinese environmental policy. During the last 50 years, the state has become increasingly aware of environmental problems; it has recorded them, studied them, and enacted an almost endless stream of environmental edicts at the central, provincial, and local levels. But the edicts are almost universally ignored in practice. Why? Through an analysis of entitlements I outline here one possible answer to this difficult question.

Environmental policy, if it is to reach its social and biophysical objectives, must address the underlying structural aspects of resource use and degradation (Blaikie 1989). This requires an understanding of the linkages between socioeconomic conditions and resource use—why and how peo-

<sup>3</sup> In Russia, the nominal creation of a market economy has not brought an actual increase in many exchange entitlements to the vast majority, and yet it has brought a breakdown in state entitlements. This helps explain problems central to Russia's contemporary quandary (Selden 1998).

ple use resources the way they do, and what the implications of that use are (Kasperson and Dow 1991; Rieger 1978). Without such an understanding, environmental policy is reduced to a series of technocratically determined and politically vacuous edicts, usually of a punitive yet myopic nature, running counter to existing social relations. The Chinese state has had, at various times, an ability unparalleled by any other state in Asia to control the social relations shaping its environment, often with catastrophic outcomes (e.g., the Great Famine of 1961–63 (Becker 1996)). But since 1978, ironically, it has lost that control amid an often chaotic scramble for economic growth, with serious implications for sustainable management as well as the provision of a minimum level of basic material needs for the most vulnerable. For example, rapid deforestation in the Yangtze and Songhua river watersheds since the late 1970s has resulted in catastrophic flooding in the 1990s, with immense economic destruction and loss of life (Zhang 1985). In this section, I examine changing entitlement provision and access to assets within the context of the state's environmental policy, gauging the often conflicting demands of China's evolving socioeconomic transformation and sustainable resource management.

In China, an "environmental policy" existed under the Xia (2100–1600 B.C.), Shang (1600–1066 B.C.), and Zhou (1066–256 B.C.) dynasties (Dunstan 1996; Vermeer 1998; Elvin and Liu 1998).<sup>4</sup> The state has long played a role in trying to adjudicate the conflict between pressures for economic intensification and necessary ecological and social stability (Osborne 1998, 203). But what might be termed contemporary environmental policy was only initiated in 1932 under the Guomindang administration (Elvin and Liu 1998; Vermeer 1998). Thereafter, a number of laws and regulations were promulgated,

and the state has since maintained a certain amount of continuity in environmental policy. But two critical junctures brought substantial changes in environmental policy: the creation of modern China in 1949 and the economic reforms of 1978.

### **China under Maoism: State Environmental and Natural Resource Use Policies, 1949–1978**

Historically, the majority of Chinese peasants have had a weak claim even on subsistence—the end goal of their entitlements—let alone surpluses generated through their labor. Following the revolution in 1949, the state took control of major industrial and commercial assets, as well as responsibility for providing certain entitlements. The role of the state in terms of natural resources shifted to an implied responsibility for environmental management, including the creation of numerous regulations concerning soil and water conservation, potable drinking water guarantees, and the protection of forests (Ross and Silk 1987, 65–66).<sup>5</sup> Peasants gained collective entitlements to land, social welfare, education, health care, and improved means of livelihood. From the late 1940s through the first years after the founding of the People's Republic of China, land reform (the redistribution of land held by landlords and wealthy peasants to landless and land-poor peasant households) was the principal entitlement that brought the new controllers of the state immense legitimacy. State respon-

<sup>4</sup> See Elvin and Liu (1998) for informative discussions of China's environmental history.

<sup>5</sup> Forestry policy provides an interesting example of the changes in environmental policy following the founding of modern China. The forestry ownership system was reformed along with land reform after 1949. The general policy was as follows: large forested areas belonged to the nation, and smaller forested areas belonged to towns, villages, or private owners. The woodlands that originally belonged to small individual landowners or peasants remained in their hands. Active government support reportedly helped motivate these peasants to manage their forests in a fairly sustainable manner (Zhang 1985).

sibility had as its counterpart peasant accountability to the state, its representatives, and plans. Under a policy of "land to the tiller," the claim on land became recognized, and in the process land turned into an entitlement for peasants. During the subsequent process of collectivization in the latter half of the 1950s, this land asset was slowly enveloped into larger and larger entities. Access to land as an entitlement remained, though primarily through peasant acceptance of the collective labor process and new property relations. The continuous subsistence entitlement of "garden plots," averaging 15 percent of arable land, helped legitimate the shift to large-scale production on the remaining 85 percent of collectively managed lands.

In the early 1950s state policies were heavily influenced by populist peasant demands. Mao had successfully rearticulated peasant claims from consumption-oriented assets to fulfill immediate needs to production-based assets (land, water, and machinery) as part of the gradual process of collectivization. Peasants' legitimate claims on consumption were subsequently channeled through their engagement with the state's productionist goals. The Great Leap Forward (1958–61) was a reversal of these peasant-led populist agrarian policies and the imposition of a top-down blueprint, with disastrous consequences for both the peasantry and environmental management (Becker 1996; Smil 1984). This period witnessed widespread pollution, deforestation, the draining of lakes, mass extermination of "pests," and the building of large-scale environmentally destructive infrastructure projects to increase grain production (Becker 1996; Palmer 1998). The resulting natural disasters and famines devastated the peasantry and brought an end to many of the most ill-conceived policies. An incipient environmental policy had first been initiated in China with the 1956 "Regulations of the Protection of Mineral Resources" to ensure the maintenance of water quality against industrial waste and the 1957 "State Provisional Program on Water and Soil

Protection," which addressed soil erosion problems (Palmer 1998). In the period 1962–65—following the Great Leap Forward—such regulations were resuscitated and rationalized with improvements based on lessons from earlier agricultural and industrial mistakes. This included an expansion of individual household production and local markets to help overcome the widespread food shortages and famine and a restrengthening of a peasant voice in policy debates (Hsu 1995).

The Cultural Revolution's first period (1966–72) once again emphasized growth at all costs, with unattainable goals for industrial expansion and increased grain production causing serious ecological damage despite environmental regulations. Peasant life was ideologically interpreted as central to political discourse, while the state simultaneously strengthened its top-down control over land use decisions and environmental management. Control was reimposed over exchange of household-produced surpluses in small local markets, though a significant percentage of land assets, in the form of garden plots, remained under household control. Maintaining their average 15 percent of arable land even during the Cultural Revolution shows the importance of a privately held subsistence entitlement for state legitimacy with peasants.

An important turning point came in 1972, when three critical events brought an explicit environmental awareness to major policy circles. First, a red tide in the Bay of Dalian caused substantial shellfish and aquatic production losses. Second was the Beijing fish market pollution incident. Fish from Guantian reservoir, sold to the capital city of Beijing, were found to have high levels of toxic chemicals in their flesh because of massive industrial pollution of the reservoir. The State Council, under Zhou Enlai's direction, formed an investigation and treatment committee. This was the first top-level state acknowledgment of widespread pollution problems. Third, the United Nations Conference on Health and Environment, held in June of 1972, had an

important impact on the development of an environmental protection organization in China. The Chinese delegation returned from the conference with concrete recommendations for the leadership, and the State Council responded with a series of decrees (Qu 1994). The UN conference provided the impetus for China to create environmental policies regardless of the fear that First World states would use environmental issues to impede its economic potential. China's environmental bureaucracies, such as the State Environmental Protection Administration, have their origins in the historic 1972 UN conference. The incorporation of the environment in national planning was another important result (Ross 1998).

During the last years of the Cultural Revolution (1973–76) there was a strengthening of environmental awareness and regulatory work, with the first national conference on environmental protection held in Beijing in August of 1973. Representatives from all over the country used this opportunity to bring evidence of extensive environmental problems to the attention of the leadership in Beijing, resulting in 11 regulatory decrees. These covered problems ranging from water and air pollution, to agricultural chemicals and loss of species, to proximity of industrial plants to residential areas. The conference suggestions were approved by the State Council in November of 1973, putting in place "Several Rules on Protecting and Improving the Environment," the first purely environmental law since 1949 (Palmer 1998). An environmental protection group was formed under the State Council, and in 1974 the State Council set a goal of controlling pollution in five years and solving it in ten years. One of the primary difficulties identified was the "irrational" geographic distribution of industries. It was officially acknowledged that this placed immense structural obstacles on any efforts to reverse or control environmental pollution from industrial sources (Qu 1994). Hence, the combination of acute episodic and longer-term

environmental problems (Smil 1984) stimulated the beginnings of an explicit environmental awareness by the state. Despite this growing awareness, the following period witnessed an intensification of these and other intractable environmental problems.

### **China under Market Reform: Decollectivization and Its Impact on the Environment, 1978–1996**

Another turning point in China's ongoing structural transformation occurred in 1978. By emphasizing the problems of the previous period under Mao, the state and new leadership created the much-needed political support, both nationally and locally, to implement a range of new policies. Many of these policies (decollectivization, for example) were only begun on a national level in 1982, but were essentially completed by 1984. With the implementation of the Household Responsibility System, which divided all land into household-controlled plots, there was a dramatic change in entitlement structures for the peasantry. The state exposed sectors of the peasantry to economic forces far beyond local control. To cope with the subsequent increase in risk and vulnerability, peasants responded (where possible) by diversifying their livelihoods (Ronnås 1993). Uncertain property relations beset by free-riding also reflected a declining sense of community and common property management of resources. The maintenance of communal capital assets (such as irrigation ditches, terraces, forest and grassland reserves, windbreaks, erosion control infrastructure, and so on) is one cornerstone of local state legitimation. The neglect of common property goods seriously undermined productive capacity, further increasing the vulnerability of the peasantry (Smil 1999, 1998; Muldavin 1992, 1986; Hinton 1990).

The late 1970s also ushered in a new level of central government attention to the environment with passage of the Environmental Protection Law in 1979. This significantly increased regulatory

activity, although the power of local environmental agencies was very limited (Jahiel 1998). In the early 1980s, the central state began a slow retreat from command of the economy, increasingly relinquishing land use and environmental management decisions to the market and local governments (Walder 1992; Huang 1990). Environmental policy building suffered its greatest setback during the 1982–83 Deng administration structural reforms that streamlined the Chinese bureaucracy (NEPA 1988). The Environment Protection Office was made subservient to the Ministry of Construction, obstructing environmental protection efforts well into the 1990s (Jahiel 1998).

With the process of decollectivization begun on a wide scale, there was a corresponding deregulation of environmental management and a significant loosening of land use decision making as collective assets were either formally sold off to individual households or informally commandeered by them (Muldavin 1986). Decommunization, accompanied by a return to populist appeals for individual and household control over production, struck a responsive chord among peasants, but it was happening within a risky, unstable, and undeveloped market context. While peasants' immediate direct control over production increased, indirectly their control has been substantially reduced in land and resource management decisions as the market has replaced collective action. This loss of control is apparent as peasants shift to less sustainable production practices in this highly competitive environment, despite their knowledge of resulting long-term problems. Any other choice is difficult given the increased vulnerability they are experiencing. The structural factors behind this behavior are discussed and theorized more fully in the next section, together with examples from the accompanying village case studies of unsustainable practices on the part of knowledgeable peasants.

The current problems faced by forest management in Yunnan province are a

good window into the general structural environmental problems (Zhao 1993). As in many other forested areas of China, Yunnan's forests are under enormous pressure from peasant demands for land to use in basic food production. That is, many of the poorer peasants have become more vulnerable to food shortages in recent years and are obliged to put additional forest land into cultivation illegally. Officials simply look the other way, as enforcement of the regulations would lead to serious hardship for these peasants. Their entitlements, hitherto collectively ensured, are now seriously eroded. In turn, this has led to what Blaikie (1985) calls desperate ecocide—a dramatic term perhaps, but one that adequately describes the environmental implications of increasing socioeconomic differentiation. Furthermore, the policy of privileging economic growth above sustainability has led to a reluctance to invest in environmentally safe road construction, adequate industrial and domestic waste treatment, and longer-term investment in the planting of trees for watershed protection (Smil 1993; Zhang 1985). The resulting high sediment loads in most of the larger rivers led to record floods in 1998 and 1999 ("China's Record Floods" 1998; Laris 1999).

Another important reform-era economic activity, which has profoundly affected land use and environment, is the Township and Village Enterprises (TVE) system. TVEs are an attempt by the state to address the problem of conflicts between excess labor in the countryside and limited capability of urban areas to absorb additional labor (Vermeer 1995–96; Sichuan Jingji Shehui Wenhua Fazhan Zhongda Wenti Duice Yenjiu Zhongxin 1995; Odgaard 1992). The TVE policy attempted to fuse and overcome the predominant binary economic structure of countryside and city, agriculture and industry, as exhibited in the case study for Village 1 below. TVEs, which have developed rapidly, have contributed much to the improvement of farmers' living standards since 1979. In 1990, total

output value from the TVEs accounted for 30 percent of national output by value.

But the TVEs have also led to many environmental problems. Development of the TVEs resulted in extensive transformation of large areas of croplands into industrial facilities. Furthermore, there has been a shift away from subsistence food crops to crops providing raw inputs for local industries, such as textiles and cigarette production. Together, this has intensified pressure on the remaining fields planted to subsistence crops. Additionally, it is expected that as of 2000, TVEs are predicted to be responsible for 50 percent of all pollutants nationally (Vermeer 1998). Due to lack of necessary technology and skills, the TVEs excavate coal, minerals, sand, stones, and construction materials in a wasteful manner which often seriously pollutes air and water and degrades the environment. After excavation, they fail to restore land, so erosion is usually very heavy. Nonetheless, these enterprises frequently manage to obtain preferential treatment and relaxation of existing regulations by local state representatives dependent upon TVE tax revenues.

Paradoxically, while the reforms brought deregulation in many spheres of production, environmental laws were strengthened on paper. The 1979 Environmental Protection Law of the PRC (NPC 1979) was strengthened from provisional to permanent status in 1989 (NPC 1989). On paper the 1989 law was a significant improvement on the earlier version (Palmer 1998). It expanded the specific responsibilities for environmental protection at all levels of government, created the Five New Systems (*xin wu zhidu*) for pollution control, and added strong sanctions to help improve enforcement (Ma and Ortolano 2000). China's Agenda 21, a "white paper" created following the Rio conference of 1992, provides official positions on China's implementation of environmental policy changes (State Planning Commission and State Science and Technology Commission 1994). Many environmental laws and national plans

delegate the implementation of policies to municipal and county authorities, however, and local governments and enterprises are expected to provide the capital for state-planned projects (Jahiel 1998). As a result, many regulations are poorly or unevenly enforced (Vermeer 1998).

Additionally, the implementation of environmental policies is largely concentrated in urban state-owned industries and neglectful of village-owned rural industries, reflecting China's institutional and economic division of urban and rural areas. This is exemplified by the 1997 *Ninth Five-Year Plan for Environmental Protection and Distant Targets for the Year 2010*, which is almost exclusively focused on urban and state-owned industrial sectors. The rural industrial and agricultural sectors with serious nitrate surface and groundwater pollution, for example, as well as unregulated pesticide use, have largely been ignored by this plan. Generally, large sections of industry managed by TVEs are outside the control of the State Environmental Protection Administration, escaping environmental monitoring and regulation enforcement (Vermeer 1998). Thus, comprehensive national legal provisions for environmental protection are bypassed and have almost no impact in rural areas.

While this brief and generalized account of social transformation and national environmental policy over the past 50 years exposes some overall trends, actual manifestations on the ground cannot be discussed in the same manner. A high degree of *heterogeneity* of environmental outcomes is apparent. The interpretation and implementation of national and provincial environmental regulations and guidelines varied enormously across space and time and were mediated by state, provincial, and local politics. Also, the socioeconomic processes outlined above (socioeconomic stratification, a reduction of communal capital ensuring the meeting of basic needs for all, and an altered distribution of entitlements) developed with varying intensities and speeds in different parts of the country. Likewise, agricultural systems and

environmental conditions are highly variable, adding to this overall unevenness.

In sum, China's historic reality has more continuity than change in its ultimate direction and sets of environmental outcomes (Smil 1984, 1990; Purdue 1987; Edmonds 1994; Vermeer 1998; Elvin and Liu 1998). What have changed are the policies, organization of production, and the social and political contexts under which people have access to their resources (Lamouroux 1998). In the recent past it has been characterized as a commandist paradox of man over nature, development at the expense of environment (Smil 1984; Dunstan 1996). Now it is increasingly characterized as an unregulated, unruly market-inspired loss of command that has brought about a continuation of the same environmental problems, some at higher rates, others at lower rates—still justified by growth and development (Smil 1990; Muldavin 1997).

Simply stated, while the Chinese central government has maintained commandism in the political realm, it has attempted to put in place an *apolitical* commandism in the environmental realm. This has led to a series of technical decrees that are often unrelated and do not take into account the essentially political nature of environmental management. This is ironic given China's postrevolutionary highly politicized social context (Ma 1994). The political nature of environmental management is clearly demonstrated by continuous power struggles over issues directly linked to it, such as land control and ownership, relations of production, and mobilization of resources. And so, modern Chinese environmental policy has a peculiarly dated and statist feel. On the one hand, it is technical in its rhetoric and fails to engage the fundamentally political character and diverse circumstances of China's environmental reality. On the other hand, it employs policy initiatives, many of which are driven by implicit political agendas and faded exhortations out of touch with China's environmental and social realities. Hence, while the state is acutely aware of severe

environmental problems, its edicts and policies have little impact on the ground in reducing identified environmental degradation. Lastly, China contains an immense diversity of environments, a broad range in degrees of regional autonomy and thus differentiated local relationships with the central government, and an often underestimated cultural and historical heterogeneity that makes generalization difficult (Oakes 1996; Chai 1996). Beyond the difficulty of generalization of outcomes, there is the further real difficulty of formation and implementation of even the most well-meaning environmental policies within this complex political mosaic.

Given the current evolution of national environmental policy, I now turn to what has occurred at the local level of rural villages. Have the reforms, through their transformation of peasants' access to resources and entitlements, produced vulnerability and environmental degradation despite claims to the contrary? Have the developmentalist goals of the state, and its technical and apolitical definitions of environmental problems and solutions, truly failed to overcome the significant environmental problems facing China's rural majority? These research questions cannot be answered for the whole country, but the three village case studies below from Henan Province provide examples of the nuanced mosaic of China's rural reality.

### **Case Studies from Henan Province**

The three case studies in Henan Province show the great diversity across even this small geographic region, which is steeped in historical importance. Henan Province is at the heart of Chinese civilization, the center of its agricultural heritage, and the founding place of Han culture and centralized administration. Four thousand years of continuous use of these lands bordering the Yellow River prevents any quick analysis based on such a short period of study as seven years (Purdue 1987; Elvin

and Liu 1998). Nevertheless, these case studies show three outcomes from among the enormous heterogeneity that is rural China under reform—three separate and distinct outcomes under unified national and provincial environmental policies and legal decrees. As such, I make no claim that these case studies are in any way representative of rural China as a whole; they simply suggest the diversity of pathways following decollectivization.

Treated as three points on a continuum, the villages discussed here range from a successful transition and relatively benign environmental outcome, to the breakdown of institutions, severe environmental degradation, and organized resistance.<sup>6</sup> Village 1 (Nanjie) is a recently proclaimed model “reunified” village that has undergone rapid industrialization, completely transforming the livelihood strategies of all of the villagers (Kaye 1994; Kou 1998). Whereas in the past the village was primarily agricultural, today only 2 percent of its residents are engaged full time directly in agricultural production. Village 2 (Beixu) is a model, partly decollectivized “agroecological” village that has purportedly maintained and improved sustainable production practices, while still diversifying peasant income opportunities for its residents. This has been done through a combination of indigenous technology, intensive tree planting, and new industrial activities such as brick making. Village 3 is not a model village. On the contrary, with decollectivization and privatization it has experienced rapid resource degradation, as infrastructure declines through lack of investment and production and resource

use practices intensify. The resulting deterioration in livelihoods has not been ameliorated through an expansion of income opportunities. This has led to labor out-migration as well as state delegitimation, visible through small but everyday forms of resistance.

### **Village 1: Nanjie, A Model New Collective Village**

The challenge then is to build short-term pragmatic and realistic responses that work from contemporary contexts, and do so in a way that is coherent with and builds towards longer-term utopias that are already immanent within the strategies and hopes of popular sectors. (Bebbington 1996, 105)

Nanjie Village, located near Luohe City in Henan Province, provides a relatively unusual case study in postreform China. Unlike most villages, Nanjie chose to decollectivize on paper and in name, but then continued to collectively farm and kept all of its industry within the village collective, refusing to contract out any village assets to individual households. Despite its historically contingent and spatially specific outcome, such a refusal to implement reform policy has many other examples in rural China resulting in locally specific instances similar to Nanjie (Oi 1995; Lin 1995; Yep 1998; Sichuan Jingji Shehui Wenhua Fazhan Zhongda Wenti Duice Yanjiu Zhongxin 1992). In a clandestine manner, Nanjie became an experiment in collective production within an increasingly market-oriented economy. The village diversified livelihood strategies through land conversion to value-added uses, such as expansion of village collective enterprises. The result was immensely successful, so much so that in the early 1990s Nanjie was finally recognized by the state and was held up as an important model (Kaye 1994; Kou 1998; Henan Nanjiecun Group Co. 1999). But as a model, it is a paradox, demonstrating that while the shortcomings of reform policies were countered by maintaining collective production

<sup>6</sup> Although Villages 1 and 2 are identified by name in this discussion, I have not provided names or identifying information (population, area, etc.) for Village 3 in an effort to protect individuals who took part in the research surveys and interviews. Villages 1 and 2 do not require the same level of anonymity due to their widespread recognition as “model villages,” as well as the numerous interviews and surveys conducted there.

and distribution, new environmental problems were created through its very success.

In terms of agriculture, Nanjie's increased production has not come without environmental problems. Increased productivity has been achieved primarily through a rapid increase in the use of fertilizers. Combined with a corresponding dependence on pesticides, this has many potentially negative environmental and public health impacts. On the industrial front, the rapid expansion of unregulated village enterprises has encroached on the limited arable land, while utilizing occupationally hazardous processes. In addition, many of these industries contribute to significant air, water, and soil pollution—"externalities" that are ignored in the ever-expanding production statistics—while giving Nanjie another advantage in the market. Further land conversion has resulted from new housing constructed for all villagers. This loss of arable land results in further intensification of agriculture on remaining lands, while the soil and water table of land converted to industrial purposes is severely polluted by chemical effluent.

Because of its success in achieving production growth, providing social welfare, and guaranteeing the livelihood of its population, Nanjie's leaders have not been forced as of yet to attend to the significant environmental impacts of their chosen development path. Recent scrutiny of the village by higher authorities may lead to a reassessment of this model (and should be seen in the context of political struggles at the highest levels of government), but is unlikely to result in strict implementation of existing environmental regulations. Nanjie's political importance as a model almost guarantees its ability to adopt such regulations only in the realm of rhetoric, and not in reality. In fact, Nanjie has become a pilgrimage site for China's old and new Left (Eckholm 1999).

Thus, Nanjie represents the best that can be expected of collective entities within an increasingly competitive market-oriented and risky economy, and yet it

embodies contradictions that limit its applicability throughout China. Nanjie's success comes through exploitation and marginalization of people from other places—both neighboring villagers and migrant laborers. But as a step along the way, it challenges assumptions about both markets and collectives, showing how local control and empowerment can be enhanced within a market context through collective production organization.<sup>7</sup> The collective provides a framework within which all of the village's households are able to prosper through the spreading of risk, efficient use of all forms of capital (communal, money, and human), and the expansion of livelihood opportunities without a massive increase in vulnerability.

Nanjie peasants' access to an expanding set of assets are guaranteed through maintenance of a system of entitlements, despite state withdrawal from the broader economy (Eckholm 1999). The enhancement of the strong sense of community is also critical in the preservation of these entitlements, as reciprocal arrangements (intangible assets) are continued and social ties strengthened through the overall growth in community control and regulation of resources. Further, the maintenance of common prop-

<sup>7</sup> Bebbington (1996) argues that rather than just discard "the modern" as fundamentally disempowering of local peoples, the adoption of certain practices (such as chemical use in agriculture) can be both empowering and community enhancing. In the case of Nanjie, the maintenance of collective institutions and their articulation with an increasingly competitive market need not necessarily lead to the kinds of socially and environmentally destructive practices critics of the market, myself included, often predict. The strengthening of community provides both a unique buffer and potential comparative advantage to the community in its competition with other producers. Without either the market or the collective, Nanjie Village would be in a worse situation. Thus appropriate adaptation to rapid economic changes becomes a crucial element in rural sustainability.

erty institutions in Nanjie, with agricultural production practices socially regulated, for example, provides the potential for relatively benign environmental management, though perhaps only after other productivist goals are met.

On the other hand, contrary to village leaders' official pronouncements, Nanjie is not a model of development for the area, though it is being repeated throughout China. In any particular region, it represents a system resulting in highly stratified incomes between the model village and the surrounding region of subcontracted-labor villages (Sargeson 1999). It is also a model in which the foundation for its success intensifies significant environmental problems. Corporatist/collectivist activity may provide some incentives for environmentally sound policies. But top-down populism also leaves environmental regulation in the hands of those with a strong incentive to maximize surplus extraction for social and political benefit. As such, these understandable goals may lead to interpretation and implementation of state environmental policies in ways inconsistent with the goals of their creators at the national level.

### **Village 2: Beixu, An Agroecological Model**

As a model agroecological village beginning in the 1950s, Beixu is credited with expanding tree planting to cover 30 percent of the total village area of 193 hectares. In this Wuyang County village, all the land is intensively intercropped (averaging 2.46 crops per year), with wheat the most important crop (planted on 79% of the total cultivated area), followed by maize (59%), fruit and grapes (29%), soybeans (17%), cotton (17%), vegetables (17%), tobacco (14%), rapeseed (7%), and sesame (7%).<sup>8</sup> Since 1980, irrigated area

<sup>8</sup> The percentage is greater than 100 because of multiple crops being planted each year, as well as intercropping.

expanded from 17 percent of cultivated land, to 100 percent in 1992. This was achieved through collective investment in wells (a combination of collective capital and labor), one for every 1.4 hectares. As a result, output increased because of the availability of irrigation water despite a serious drought in 1992, unlike Village 3 in this study (Muldavin 1996c). Average output has grown from 4.5 to 12 metric tons per hectare over this same period. Most of this increase in production is attributed to irrigation, improved seeds, increased fertilizer use (growing from 225 kilograms per hectare to 750 kilograms per hectare), more intensified and complex cropping practices, and relatively higher prices for products. Average income also rose from 200 to 850 renminbi yuan (U.S. \$25 to \$104) per person between 1980 and 1992.

In 1980, the collective divided all land among private households and demechanized production. But with stagnant yields in the mid-1980s, the village decided to reunify certain aspects of production while keeping individual contracts for the divided plots. Thus, all plowing and bed preparation is once again mechanized, and the village collective repurchased two large tractors in 1987.<sup>9</sup> Although agriculture is the main focus of the village, animal husbandry, agro-processing, forestry, and fisheries have been incorporated into a complex "ecological" system of production. The village's claim to practice ecological agriculture is somewhat contradicted by practice. Although cropping patterns are more agroecological than in comparable villages in the area, this same system is dependent more than ever on high levels of chemical

<sup>9</sup> The loan for these tractors took five years to pay off, with an average charge of 28.3 yuan RMB per hectare (\$3.48 per hectare) each year, for cultivation. The village's original tractor was sold in 1980 at a heavily discounted price of 500 yuan RMB (\$61.35), when it was deemed useless during the implementation of the Household Responsibility System (Muldavin 1996c).

inputs, particularly chemical fertilizer. The impact of this intensive fertilizer use on soils is mitigated to some extent by the simultaneous use of large amounts of organic fertilizers (methane digester compost, fish pond dredgings, fruit tree clippings, more readily available crop residues, and so on).

Methane digesters have been maintained and expanded from the commune period, incorporating local knowledge into innovative new technologies. Thus, 50 of 352 (14%) households have their own methane pits producing gas and no longer rely on other fuel for cooking, lighting, and heating of water. This has significantly reduced village air pollution and potential health problems common in villages without such innovations (Hricko 1994). It has also reduced village reliance on other non-renewable energy resources. Common energy sources such as coal briquettes, stalks, and wood not only rob soils of scarce organic matter via lost crop residue, transform land through coal mining, or denude hillsides through woodgathering, but the smoke produced adds significantly to villagers' health problems.

Despite the shift to market-oriented production, this village has been able to articulate with the regional economy while maintaining a certain amount of local autonomy and control over resource use. This is possible partially because of strong village leadership in the maintenance and expansion of collective institutions that support such villagewide activities. Although land was divided to households (unlike Nanjie), the new plots have generally incorporated many of the best aspects of agroecology, predominantly in the form of integrated fish farming with multistoried mixed crop agriculture. Fruit trees, berry bushes, and a large variety of plants are interspersed with grain and vegetable crops. Use of some pesticides continues, but the quantities are generally small and only for extreme outbreaks. The ability of the village to maintain these kinds of environmentally sound practices has to do with a number of unique features: (1) a strong

sense of continuity with the organization, technological successes, and knowledge gained during the commune period; (2) effective and legitimate collective governance; (3) strong community participation in resource regulation (through social norms and policing); and (4) the production of marketable commodities that have expanded income opportunities and the ability of the village to maintain entitlements. This has prevented short-term exploitation of resources and assets that might otherwise have resulted from increased vulnerability and risk with entitlement declines.

Some of the contradictions of this village are seen in development which still rests on exploitative labor practices, similar to Nanjie Village. For example, the brickworks hires workers, many from outside the village, on a piecework basis to do the difficult and dangerous work in the brick kilns. In addition, despite providing a significant amount of income for the village, the brick industry is far from ecologically sound, causing extensive air pollution, soil and coal mining for raw materials, and the creation of other toxic waste, which is currently dumped on village commons adjacent to the brickworks.

But Beixu Village illustrates the benefits of a successful partial decollectivization. Continued strong collective institutions and efficient use of productive village assets have enabled the maintenance of crucial social welfare entitlements, buffering households from the emerging market economy. By only allowing access to many assets by collective entities, these resources have not been diverted to consumptive demands of individuals and households. Labor demand is increasing through collective support for expansion of sidelines and limited but significant industrialization. Indigenous technological innovations and maintenance require primarily labor, rather than scarce capital, thus structurally limiting the need for labor out-migration. Only 100 village residents work outside of the village on a regular basis, a relatively small number compared to Village 3

(Muldavin 1996c). Together these factors and choices enable community stability, enhancing some intangible assets (such as reciprocity claims) and thus reducing vulnerability.

Beixu's adherence to environmental regulation is limited to its tree planting campaign over many decades. Other environmental regulations are not acknowledged, with the village's ecological public image providing a buffer to scrutiny. The implicit assumption is that as an agroecological "green" village, the environment is a top priority of all villagers. While in relative terms this may be so, it still leaves open the potential for abuse. The village's brickworks are a clear example of this problem. Still, overall, it could be rightfully claimed that the village does better than most (both in its region and throughout China) in terms of environmental awareness and implementation of environmentally benevolent production practices and technologies. The fact that this is not a response to explicit environmental regulation and policy speaks to the unintended consequences of daily practice by villagers, as well as the challenges to policymakers to achieve intended results. The ability to identify unintended consequences may provide the key to clarifying alternative environmental policies.

### **Village 3: A Hinterland Marginal Village**

Village 3 completely decollectivized in 1982, dividing and distributing all land assets as well as village sidelines and industrial assets to individual households. The village collective was left with few claims to resources and few responsibilities to villagers. Privatizing access to most natural resources, and breaking up and distributing agroindustrial assets to a few households (such as grain mills, tofu workshops, and tractor repair stations) led to rapid social stratification. Access to these limited industrial assets placed a few families well on their way to becoming the new village elite. Peasant loss of entitlements, from the

closing of the health clinic and the increase of school fees to a loss of guaranteed access to irrigation water, led to changing production practices quite different from the two villages already discussed. Individuals sought to rapidly mine communal capital assets—trees, gravel, grasslands, water, ditches, and so on. As collective buffers declined, investment decisions in this increasingly vulnerable context shifted toward short-term goals, such as quick increases in production and productivity through, for example, heavy fertilizer use (for those farmers able to afford it).<sup>10</sup>

In Village 3, agricultural yields have stagnated and declined as a result of changing cropping patterns and techniques, with subsequent soil degradation and growing pest problems. Soil degradation is primarily due to overuse of chemical fertilizers. Peasant farmers complain about "soil burning" from long-term fertilizer use. Because of the loss of soil structure and decline in overall quality, the soils become harder, less friable, and available nutrients diminish despite large additions of chemical fertilizer. The ability of widely used hybrid corn varieties to achieve consistent yield increases is dependent upon optimal field conditions. The combination of growing pest resistance to pesticides and repetitive monocropping intensifies disease and pest problems. As a result of declining availability and reliability of irrigation water, due to the lack of investment in crumbling irrigation works (constructed and previously maintained collectively), agricultural production has become both more intensive and unstable, with complete crop failures two years out of three (Muldavin 1996c).

<sup>10</sup> Collective buffers include, first, entitlements provided by the state to collective entities which limit risk for all households; second, the spread of risk among a large number of households as a consequence of collective organization of production and consumption; and third, the ability of collectives to spread investment and consumption over long terms and thus enable the maintenance of collective capital formation.

During my investigations between 1989 and 1996, the irrigation systems were clearly in disrepair, not only in the village, but throughout the county. Lack of irrigation drastically reduces the efficient use of available chemical nutrients in most crops, rendering additional fertilizer applications useless. The decline in communally maintained irrigation infrastructure and resulting dependence on seasonal rains dramatically increases peasants' risk and susceptibility of the village to natural disasters.

It would also appear that natural disasters enable peasants to compel the state, via moral imperative, to relinquish control over the area's surplus in any given year. For example, in 1996 villagers forced the state to further subsidize agricultural production through easy credit that, by precedent, the state writes off if there is a natural disaster. Hence, it appears that peasant families are increasingly using claims of natural disasters, real and otherwise, to reduce their obligations to the state, just as the state has limited their entitlements—an indirect form of resistance.

The effects of unregulated individual livelihood strategies on the environment are severe in the village. This can be seen in dilapidated irrigation infrastructure, overgrazing of hillsides, destruction of forest resources, an end to investment in erosion control projects, and expansion of cropping onto the most marginal and easily destroyed lands. Attention to environmental regulations is nonexistent. The leadership of the village is almost universally ignored, since few entitlements of any kind still emanate from it or the county. As such, attempts by the county to enforce environmental regulations concerning land use, such as land conversion fees and fines for destruction of tree windbreaks, are resisted as additional forms of unfair taxation. The few village enterprises are taxed but not regulated in terms of polluting effluents. In sum, local village leaders have little legitimacy or real leverage in their attempts to implement environmental policy. County leaders have more power, but they are constrained by ongoing, everyday resistance to

regulation, whether perceived as necessary or punitive in nature.

### Summary of Village Studies

In the three villages studied (see Table 1), Village 1, Nanjie, paradoxically benefited from the reforms by avoiding total decollectivization. But Nanjie features the environmental externalities from industrial pollution that accompany rising peasant incomes. It has also attempted to prevent a resource free-for-all by maintaining social/collective control of resources. Village 2, Beixu, is both a model of the reforms and a favored context via extra investment from the provincial government. Beixu has created agroecological conditions that improve the local environment and uses renewable resources (methane) and increased tree planting, but it also has a brick kiln that is polluting the air and destroying land. Village 3 did not benefit from the reforms because of the high degree of exposure to the new political economy of declining entitlements and degraded collective assets. In essence, there were few buffers to the riskier aspects of the transition process. There is a strong linkage between increased vulnerability due to reduced entitlements and discounting the future, creating Blaikie's (1985) desperate sort of ecocide. Subsequently common property management institutions and mutual trust break down, inducing free-riding and declining legitimacy of the local state.

Villages 1 and 2 were relatively successful in avoiding this precipitous decline. In these two villages, productive assets were preserved by disallowing consumptive needs of individuals to reappropriate assets. Where allowed (Village 3), the shift of assets from production to consumption created vulnerability outcomes similar to the prerevolutionary period. Ironically, Village 3 has agriculture without the environmental impacts of chemicals because of its relative poverty and lack of resources. Few in the village can still afford fertilizers, insecticides, or herbicides. But the declining investment in infrastructure, and subsequent loss of irrigation, has

Table 1

## Environmental Characteristics of Henan Province Case Study Villages

|   | ← Recollectivized  |  | Decollectivized →  |
|---|--|--|--|
|   | Village 1, Nanjie  | Village 2, Beixu   | Village 3  |
| Relative <i>vulnerability</i> of majority of villagers  | <ul style="list-style-type: none"> <li>• Low (medium for surrounding labor-shed villages)</li> </ul>   | <ul style="list-style-type: none"> <li>• Low to medium</li> </ul>  | <ul style="list-style-type: none"> <li>• High</li> </ul>   |
| Characteristics of resource use<br>Agriculture<br>Forestry<br>Land conversion<br>Fisheries                        | <ul style="list-style-type: none"> <li>• Land conversion from agricultural to industrial uses.</li> <li>• Successful industrial diversification increases potential resource degradation.</li> </ul>   | <ul style="list-style-type: none"> <li>• Explicit agro-ecological emphasis on agricultural and industrial development.</li> <li>• Environmentalism, self-reliance, and recycling focus, e.g., in methane production and fisheries system.</li> <li>• Tree-planting campaign throughout village lands.</li> </ul> | <ul style="list-style-type: none"> <li>• Lack of cash or collectively supplied inputs such as pesticides or fertilizers leads to low-input, low-productivity agriculture for most households.</li> <li>• Significant environmental benefits of low-input agriculture offset by soil degradation through over-taxing regimes.</li> </ul>  |
| Environmental pollution & resource degradation outcomes<br>TVEs<br>Agricultural practices<br>Household activities | <ul style="list-style-type: none"> <li>• Village enterprises produce significant effluent discharged into local water supplies, air, and onto soil.</li> <li>• Limited household-level pollution due to continued village-level organization of production.</li> </ul>   | <ul style="list-style-type: none"> <li>• Brickworks destroy lands through mining activities, as well as increase soil, air, and water pollution.</li> </ul>  | <ul style="list-style-type: none"> <li>• Destruction of communal capital via individual claims on formerly collective assets.</li> <li>• Intensified use of local resources, with resulting degradation.</li> <li>• Overuse of fertilizer leads to “soil-burning” and loss of soil fertility.</li> </ul>   |
| Environmental policy<br>Existing regulations<br>Actual implementation   | <ul style="list-style-type: none"> <li>• No explicit environmental policy focus.</li> <li>• Productive assets conserved via collective ownership, limiting infrastructure decline.</li> </ul>  | <ul style="list-style-type: none"> <li>• Only village that explicitly used term “environmental policy” in interviews and in practice.</li> <li>• Agro-ecology and forest planting program.</li> </ul>  | <ul style="list-style-type: none"> <li>• Lack of implementation beyond fines and levies directed toward filling county coffers without parallel provision of services or investment.</li> </ul>  |
| Policies, regulations, and decrees<br>Degree to which decollectivization implemented<br>Constraints and enablers  | <ul style="list-style-type: none"> <li>• Modified decollectivization.</li> <li>• Constraints on profitability and competitiveness cited as resulting from excessive regulation and tax remittances.</li> <li>• High incomes, but via mediation of individual claims to resources through collective units (shareholding) enables maintenance of social welfare and infrastructure investment.</li> </ul> | <ul style="list-style-type: none"> <li>• Partial decollectivization of village assets.</li> <li>• Stable social welfare entitlements.</li> </ul>   | <ul style="list-style-type: none"> <li>• Complete decollectivization.</li> <li>• Increase in fees, taxes, fines imposed by local state constrains household income and investment.</li> <li>• Decline and disappearance of social welfare entitlements and assets increases household vulnerability.</li> <li>• Complete lack of investment in or maintenance of rural productive infrastructure constrains production.</li> </ul> |

led to a significant rise in vulnerability. The result is intensified use of remaining resources. Declining irrigation may in a strict sense bring better environmental practices—dry farming, decreasing salinization, and less “burning” of soils with fertilizers—but it also increases overutilization of other resources to compensate for lower agricultural incomes.

In attempting to explain the geographic variations in levels of collective action across China as a whole, it is important to accept that in each individual case they are historically and politically contingent. For example, we need to examine to what extent these circumstances arise from different conditions in pre- and postrevolutionary China, from varied experiences with collective production, or from uneven patterns of party activity across villages. These questions are important to understand if we seek to generalize from the cases presented. Answers to these questions are beyond the scope of this essay. Still, the analytical framework laid out in this article might help us to understand the uneven geographies of collective action presented by the three villages.

In this sense the incorporation of a village into modern markets is a means of rural survival, though neither without contradictions nor a transformation of what is understood to be rural. This is an option, but not the only one, in the diversity of experiences that now make up rural China. But the revalorization of the collective experience within the hegemonic discourse that overwhelmingly denies its value is an important step in itself, particularly for China's New Left (Eckholm 1999; Bernstein 1998; Sichuan Jingji Shehui Wenhua Fazhan Zhongda Wenti Duce Yenjiu Zhongxin 1995). Our understanding of alternative strategies cannot be limited to visions that ignore the realities which people must struggle with today. But simultaneously, alternative pathways such as that taken by Nanjie must still be seen as limited, as they are embedded within the broader context of China's structural trans-

formation and as they shift the costs of reforms to others.

In Village 2, at the same time that economic growth is now emphasized above all else, a contradictory policy of ecological agriculture is also promoted. The policy aim of ecological agriculture is to achieve optimum economic, ecological, and social benefits (Ma 1984). Chinese ecological agriculture is somewhat different from its Western counterpart, which emphasizes increasing land use efficiency, even sometimes using high inputs of material and energy. The Chinese version, at least in principle, emphasizes increasing use efficiency of inputs, so that costs can be lowered and dependence on inputs lessened (in Western parlance, low-input agriculture). It expressly excludes chemical fertilizer, though as can be seen in Beixu Village, this is often overlooked for the sake of expanding overall production.

In 1984, the State Council advocated a more ecologically sound agriculture in the Second Meeting of National Environmental Protection, drawing up a document advocating that environmental agencies at different levels should cooperate with other governmental agencies to spread eco-agriculture technology and prevent environmental destruction (Ross 1988). The central government's Document No. 1 of 1992 indicated clearly that agricultural development should be focused on low-input, high-efficiency methods and be sensitive to environmental protection. Many other examples of specific environmental regulations related to different productive sectors exist in the contemporary period. For example, Article 5 of the Agricultural Law stipulates that “the state forbids anyone to burn mountain land for cultivation, reclaim land from lakes, and to cultivate steep slopes.” Article 57 stipulates that “the state forbids anyone to denude hillsides, and requires protection of forests, and increased forest coverage.” Article 55 stipulates “special protection for basic croplands.” Article 10 of the Grassland Law stipulates that “grassland plant communities must be protected strictly, and forbids

anyone from reclaiming or destroying grassland” (Guowuyuan huanjing baohu weiyuanhui wenjian huibian 1995; Palmer 1998). The question at issue here is the relative effectiveness of these decrees on the ground. While the laws have played a positive role in protecting agricultural resources and the environment in principle, pressures to fulfill contracts and poor peoples’ necessity to break many of these laws in order to survive have forced officials to turn a blind eye toward many infringements. Beixu Village, despite its obvious achievements in agricultural sustainability, is no exception.

Environmental policy finds no explicit expression or vehicle for implementation, in terms of environmental aspects of resource use, in Village 3. Lack of cash or collectively supplied inputs, such as fertilizers and pesticides, has led to low-input agriculture by the majority of households, with unintended environmental benefits. These are offset by intensified cropping regimes that tax soils and increase erosion. Furthermore, forest and grassland destruction have no external or internal constraints. In communal production brigades, before the reforms, the state’s political capital was built up through collective use of and responsibility for resources, a practice continued in Village 1, Nanjie. This political capital, necessary for imposing unpopular state policies, was lost in Village 3 during decollectivization. By transforming the perception of collective labor from an archetype to a relic of a failed model, the state forfeited in certain cases its hard-won legitimacy, and thus its means to carry out negotiations over crucial resource issues. Accompanying changes included a loss of economies of scale, a devolution of technology, and a lack of institutions concerning property regulation and use. Voluntarist stewardship runs headlong into the “green apple syndrome”<sup>11</sup> and is an

irrational choice at best. Perhaps the eventual emergence of a collective political consciousness will enable social regulation of common property resources. It is too soon to speculate on this rather hopeful outcome, as Village 3 has no such seed of optimism.

### **Policy: The Contradictions between Social Process and Environmental Sustainability**

An extensive literature chronicling changes in modern China already exists (Hussain and Stern 1994). Here I have mapped out one set of diverse local responses to reform, and in particular, the ways in which resource use and environmental policies have played out at the local level. The impact on villages of international economic liberalization is shaped through the shifting evolution of relations between the state, market, and the peasantry. In some cases, local deregulation and diminishing entitlements, with declining investment in social capital, are constraining which development pathways emerge. In other cases, where entitlements and investment have been maintained, the articulation of the local with the global through the market is enabling heretofore unexpected hybrid strategies for improving livelihoods. In either case, local and regional-based societal forces, both formal and informal, play a key role in providing the foundation for alternative development pathways, as well as opportunities for resistance by those who have experienced rising vulnerability.

During China’s transition era, there has been a gradual shift from peasant-state to peasant-market relations and an increasing emphasis on market regulation of land use decisions. This is coupled with a decline in the power of participatory collective institutions at a local level and the receding role of the central state, as local state representatives garner increased power in both obtaining revenue and distributing assets, as well as profits of local government-

<sup>11</sup> This refers to the situation where individuals pick apples green, before they are ripe, out of fear of not getting any at all.

owned productive enterprises. This shift increases local particularism in the ways policies, laws, and guidelines are interpreted, negotiated, practiced, and evolve.<sup>12</sup> Particularism allows for appropriate adaptation of policies across complex geographies, and at the same time opens potential new avenues for corruption and abuse of power. Furthermore, it limits the state's ability to enforce unified environmental policies on a national basis.

Declining peasant access to key tangible and intangible assets appears as a fundamental failure of the state in managing China's transition to a free market. The breakdown of collective action to maintain infrastructure and communal capital has resulted in a rapid degradation in such important infrastructure as canal networks for irrigation, tree farms, and windbreaks ("China Vows to Stop Deforestation . . ." 1998; Muldavin 1983, 1986, 1992, 1996b), as well as social services. It has also led to tremendous socioeconomic differentiation as the state has retreated from the coercive egalitarian principles of the commune period (Chai 1996). By allowing the poorly functioning market to allocate resources, new kinds of motivation have replaced the old, based on corruption, cheating, and individual desires to maximize incomes in the rather chaotic new context. Thus the coercion of the market has replaced that of the state, but with quite different results. Households with labor power have been able to diversify livelihood strategies and minimize risk in the new context. Access to resources has been another important means to expand income and diversify livelihood strategies. In the three case studies presented here, households in villages that have maintained collective institutions and production organization have fared better than most. The exceptions are the limited number of households that gained industrial and sideline assets upon decollectivization and became the new

economic elite. As such, these households have done best in every case study, with the exception of Nanjie, where a breakup of collective goods never materialized.

It is impossible to clearly assess the impacts of the reforms without analyzing the impacts of declining collective institutions on perceived risk and associated decision making on the part of households and individuals. In contemporary China, peasants are engaged in environmentally destructive production practices, sometimes against their better technical judgment. High-input agriculture is accompanied by soil deterioration and an increase in "natural hazards" as infrastructure declines through lack of investment (Muldavin 1992). Declining forests, degraded grasslands, increasing desertification, as well as transformation of coastal zones and remaining wetlands, continue to severely undermine China's environment and therefore threaten long-term productivity.

From huge controversial projects such as the Three Gorges Dam (Holley 1992), to the rapid expansion of highly polluting Township and Village Enterprises over arable land (Vermeer 1995–96; Muldavin 1992), the specter of disaster in the Chinese environment casts a sinister and lengthening shadow. Large corporate entities, from newly independent collectives run on a shareholder basis to transnational corporations setting up far-flung production facilities in rural and suburban areas, tie China's environmental problems into the rapid restructuring of the global economy.

The state too is directly responsible for ongoing environmental destruction, as large state-run enterprises are slow to "green" toxic and outdated processes.<sup>13</sup>

<sup>12</sup> See Peet and Watts (1996) for an exploration of the changing roles of emergent institutions and organizations in the context of shifting configurations of state and market roles.

<sup>13</sup> Despite using most of the monies from the Montreal Protocol set aside to decrease Chlorofluorocarbon (CFC) output worldwide, China's actual production of CFCs continues to rise more than 10% annually. This is becoming a serious liability for China in the donor community (Muldavin 1995).

Decentralization of political and economic authority, accompanying the reforms, has produced uneven opportunities for entrepreneurialism and development by local government entities (Oi 1992; Walder 1994; Unger and Chan 1999; Sichuan Jingji Shehui Wenhua Fazhan Zhongda Wenti Duice Yenjiu Zhongxin 1995). Furthermore, it is unclear whether this "localization" of the state has resulted in an increased voice in environmental policy decisions on the part of peasants (Sargeson and Zhang 1999, 99). In some cases, constrained by severely weakened village-level collective institutions, peasants have become primarily a reactive force, responding to perceived illegitimate acts of local state representatives. With little central government funding, county-level officials increasingly view the peasantry and local resources as their primary means of creating revenue. In this context, surplus extraction often translates into exploitative labor and resource use practices, as when county- and township-level industries act as subcontractors in extensive commodity production chains running from remote Chinese villages to U.S. cities (Vermeer 1998; Muldavin 1992, 1996c). In cases where the local state loses legitimacy, peasants are unwilling to engage in collective activities which support long-term sustainable production for the village as a whole (Unger and Chan 1999).

The assumption that the introduction of private property, individualized household production, and "free" markets would lead to a better allocation of resources, and better decision making regarding long-term productivity, is strongly refuted by the evidence now available from many local areas in China. It assumes a realignment of local political economic power within a regulatory framework and rule of law that would promote policies and practices oriented to the long term—a change that is unlikely to happen any time soon. In some areas, the actual limits on privatization (social and structural) provide the potential avenues to avoid some negative aspects of social and environmental decline. In other areas,

hybrid corporatism (quasi-private/quasi-collective) provides yet another potential alternative to social and environmental decline (Oi 1992; Sichuan Jingji Shehui Wenhua Fazhan Zhongda Wenti Duice Yenjiu Zhongxin 1995).

Although China has increasingly relied on individual entrepreneurship and private enterprise to solve many problems, it would be a mistake to view these individual undertakings as somehow beyond the influence of the strong social context in which they operate. Despite rising mobility, place still greatly defines individuals, families, and clans in rural China (Potter and Potter 1990). Individuals' ties to locality make comparisons with footloose profit-seekers in other countries misleading. A village moral economy still opposes such entrepreneurial behavior, often dictating levels of redistribution of accumulated capital and profits, as well as the provision of social welfare benefits, either directly or through local government entities (Walder 1995; Oi 1995; Bernstein 1998). Further research is needed on community pressure toward responsible resource use by entrepreneurs and small private businesses.

Contemporary China's political economy has led to a spatially diverse range of environmental outcomes, with divergent reasons for serious land degradation and pollution. These difficult problems are more often than not a result of long-term structural challenges, and because of their seeming intractability, may not only require sustained state intervention but also fundamental change in the ways production, distribution, and consumption are carried out and resources are defined and used. In essence, solutions require a major shift in the society-nature relationship—which is easier to diagnose than to rectify.

The implementation of the reforms has witnessed a shift in state environmental mitigation efforts from long-term investment and allocation of state resources to regulatory policies and institutions (from international treaties to the establishment of the National Environmental Protection Agency), combined with market signals to

provide the proper allocation of investment. Yet, there is no cohesive state policy addressing the accelerated destruction of nature and resources in China today. Continued social stratification and changing control over natural resource use has resulted in growing resistance to state policy initiatives within the new order. In the context of China's new hybrid society, new thinking without the blinkers of ideological imperatives, whether left, right, or center, is needed to provide alternatives to the hegemonic modernization discourse. Unintended consequences of the reforms, seen in changing daily practices, may provide the most creative and sustainable options to inform policy. Environmentally oriented alternatives should have as their goal the reduction of vulnerability for China's vast peasant majority, as they not only face the immense difficulties of maintaining livelihoods but also pay the highest costs, no matter what pathway is chosen.

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