

ENGAGING FOR THE ENVIRONMENT

THE CONTRIBUTION OF SOCIAL CAPITAL TO COMMUNITY-BASED NATURAL RESOURCE MANAGEMENT IN CAMBODIA



Edited by Arnaldo Pellini

2012

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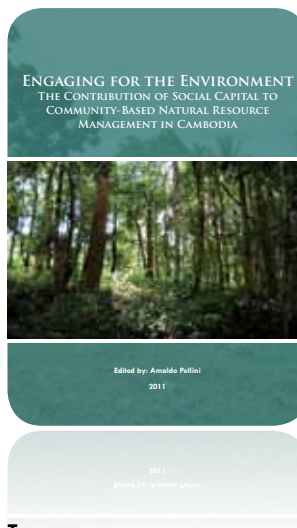
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Chapter IV

UNDERSTANDING SOCIAL CAPITAL IN RESPONSE TO FLOOD AND DROUGHT: A STUDY OF FIVE VILLAGES IN TWO ECOLOGICAL ZONES IN KAMPONG THOM PROVINCE

By: Oeur IL, Ang Sopha and John McAndrew

Introduction

Cambodia entered the 21st century hoping to usher in an era of peace and prosperity, only to suffer the devastation of floods and droughts for five successive years. The flood of 2000-01 was considered the worst in 70 years, affecting 3.4 million people in 19 of the country's 24 provinces and municipalities, and leaving 347 dead. The government estimated total physical damages at USD 157 million. Overall 317,975 houses were damaged and 7,068 were completely demolished. Around 616,750 hectares of rice fields were flooded and of these, 374,174 hectares were destroyed. Total relief assistance by November 2000 amounted to 18,000 tonnes of milled rice, which was about 4 percent of the estimated production loss of 424,000 tonnes of milled rice (Chan 2001); (ADRC 2003); (Helmerts and Jegillos 2004).

In 2001-02, Cambodia was struck by both flood and drought. The flood affected 2.1 million people in many regions still recovering from the deluge of the previous year. Many rice farming households did not have sufficient rice seeds to plant. About one million of the flood victims suffered food shortages. A total of 62 people died. Meanwhile, drought that same year left about half a million people with food deficits in six provinces¹. In many of these areas people and livestock also suffered a lack of drinking water. Overall, the irregular rainfall and serious flooding in 2001-02 damaged about 250,000 hectares of rice crop. The total damages of the disasters were estimated at USD 36 million (Nhim 2002); (ADRC 2003); (Helmerts and Jegillos 2004).

In 2002-03 the country was once again ravaged by the combined effects of flood and drought. The government reported the drought experienced that year was the worst in two decades. While the drought affected the entire country, eight provinces

⁽¹⁾ The food deficit provinces were Battambang, Pursat, Prey Veng, Kompong Speu, Kompong Cham, and Svay Rieng.

were hit especially hard². More than 2 million people and 134,926 hectares of rice crop were affected. The damages of the drought were estimated at USD 21.5 million. Several provinces, particularly those situated along the Mekong river, encountered floods that same year due to heavy rains throughout Southeast Asia³. Nearly 1.5 million people were affected by the floods and 29 lost their lives. The floods decimated an estimated 40,027 hectares of rice crop. The damages of the floods in 2002-03 were estimated at USD 12.45 million (Nhim 2002); (ADRC 2003).

In 2003-04 Cambodia suffered a harsh dry season with lakes in the deepest part of the flood plain drying out completely. While some areas of the country were affected by drought, rice crop losses did not result in a national disaster (Mao 2005).

In 2004-05, Cambodia experienced extremely low rainfall, with 14 provinces hit by drought⁴. Overall, 2 million people and 62,702 hectares of rice crop were affected. The World Food Programme (WFP) reported that half a million people faced food shortages. Oxfam UK noted that people had resorted to selling their land and livestock, taking children out of school to work and borrowing money from local businessmen at high interest rates. The overall damages of the 2004-05 drought were estimated at USD 21 million (Mao 2005); (WFP 2005); (Oxfam United Kingdom 2005).

Nature of floods and droughts

Rural livelihoods in lowland areas of Cambodia are inextricably linked with the annual cycle of flooding. Normal floods improve soil moisture and fertility for agriculture, restore ground and surface water and replenish fisheries and forests. Likewise, normal floods have no adverse physical impact on village settlements, and only a limited effect on wet season rain-fed rice fields. Annual floods become disasters for rice farmers only when they come too early in the crop growing cycle, destroying rice seedlings before transplanting, or come too high for too long, destroying established wet season rice crops. Invariably, rice farmers define disaster floods as those that destroy the wet season rice crop and result in extended food shortages. While a link to global climate change has yet to be established, disaster floods have occurred in Cambodia with greater frequency in the new millennium (CARE 2002); (Helmerts and Jegillos 2004).

(2) The drought affected provinces included Kompong Speu, Takeo, Battambang, Pursat, Prey Veng, Kompong Cham, Kandal, and Odor Meanchey.

(3) The flood affected provinces included Stung Treng, Pursat, Kratie, Kompong Cham, Kandal, Prey Veng and Takeo.

(4) The drought affected provinces were Kompong Speu, Takeo, Prey Veng, Kandal, Kompong Cham, Pursat, Battambang, Banteay Meanchey, Strung Treng, Kompong Chhnang, Kratie, Kompong Thom, Siem Reap and Kampot.

Droughts in Cambodia affect a larger geographical area and more people than floods, and therefore may be considered a more severe type of disaster. Four characteristics of agricultural drought have been identified. These are: 1) unpredictable delays in the onset of rainfall in the wet season; 2) erratic variations in the onset, amount and duration of rainfall across geographic areas; 3) early cessation of rains during the cropping season; and 4) dry periods of three weeks or more during the cropping season which can damage or destroy rice crops without irrigation. Agricultural drought occurs during periods of crop growth, and therefore is a characteristic of the wet season. While some areas of the country experience drought, others may encounter floods. In the floodplains, rice crops may suffer droughts and floods in the same season (Helmerts and Jegillos 2004).

Local responses to floods and drought

Cambodia Development Resource Institute (CDRI)'s Participatory Poverty Assessment (PPA) of the Tonle Sap, conducted in 2005, in 24 villages in the six provinces around the lake, describes the disruptive effects of floods and droughts on the lives of the poor. The study's policy brief succinctly articulates that "the poor and the destitute are increasingly dependent on land and water-based natural resources to sustain their fragile livelihoods. Several years of drought and flooding, along with poor soils and a lack of water management capacity, however, has eroded farming productivity, while people's traditional access to forests and fisheries is increasingly subject to the pressures of a growing population and to conflict with local elites and powerful actors from outside the village. As a result, a greater number of the poor are selling their labor locally or migrating elsewhere within the country or to Thailand and Malaysia in search of employment (Ballard 2007a)".

The PPA argues that the situation of the poor and destitute in the Tonle Sap area is becoming increasingly difficult due to debt, illness, flooding and drought, and a lack of institutional safety nets and protection. The poor often sell their land in response to these shocks and then become landless. Meanwhile, the natural resources base around the Tonle Sap is rapidly depleting from over-exploitation by outside investors operating in collusion with powerful government officials, and by more people cutting wood, collecting non-timber forest products and fishing with illegal techniques. Without sufficient land to produce their own food, and unable to gain access to or rely on dwindling natural resources, the poor resort to rural wages and migrant labor. The PPA observes that the management of natural resource assets is crucial to the government's efforts to reduce poverty and promote the wellbeing of the rural poor. At the same time, the study highlights the viewpoint of the people living around the lake: that governance and management failures have allowed the situation to worsen (Ballard 2007b).

A study conducted out of the Helsinki University of Technology in the Tonle Sap area provides insights into the relationship between water-resources management and poverty. The study observes that people living closest to the Tonle Sap lake are, in many ways, worse off than those living closer to the National Roads, as they depend heavily on common property resources for their livelihoods. People living in ecological zones further from the lake rely largely on rice cultivation, and are restricted by decreasing availability of agricultural land due to population growth. These people situated on the periphery of the floodplain are not prepared for severe flooding and therefore, may experience more adverse impacts from an exceptionally high flood than those living in the lake's immediate vicinity. Lack of occupational diversity within and between villages increases people's vulnerability to sudden environmental changes, as secondary livelihood sources are unable to sustain the sudden and simultaneous shift that takes place when primary livelihood sources fail. The study argues that the decline in natural resources and rapid population growth will undoubtedly exacerbate the poverty of rural households and result in an increase in people migrating to urban areas (Keskinen 2006).

The CDRI Moving out of Poverty Study conducted in 2004-05 in nine villages, including two Kompong Thom villages, traces the impact of shocks such as natural disasters and illness on community wellbeing and household mobility over time. The study argues that these shocks frequently act as triggers for downward mobility or to keep households poor. Between 2000-01 and 2004-05, income from agriculture declined sharply in poorer villages and households. Floods and droughts in these years, coupled with a lack of good soil and irrigation, were primarily responsible for the lower rice yields and consequent drop in productivity. At the same time, poor households earning a living from fishing, forestry and other common property assets were adversely affected by widespread natural resources depletion, and were unable to produce enough rice to compensate for this decline. Poor households offset the loss of income from rice production and natural resources by increasing their reliance on wage work, hiring out their labor locally or migrating to Thailand or other destinations for jobs (FitzGerald, So et al. 2007).

The concept of social capital

The concept of social capital offers much promise in the analysis of how people respond to natural disasters such as floods and droughts. Robert Putnam, whose work helped to popularize the concept, defines social capital as the “features of social organization, such as trust, norms and networks, that can improve the efficiency of society by facilitating coordinated actions” (Putnam, Leonardi et al. 1993). For Putnam, the primary source of social trust is found in norms of reciprocity and networks of civic engagement, which can be measured by people's participation in associations. Density of such associations, gauged mainly through quantitative surveys, indicates the extent to which a society possesses a solid supply of social capital.

Recent critiques of Putnam's approach, employing more qualitative research methods, focus on people's access to stocks of social capital and the context in which social networks are embedded (Grix 2001). Factors such as education, employment and social class are crucial to understanding one's access to social capital, given that participation in associations and networks depends largely on one's resources and social status. Similarly, specific social contexts shape the forms of social capital and the direction that access is likely to take.

The shift from treating social capital as an amorphous entity, measurable by the number and density of associations, to that of identifying various stocks or pockets of social capital in specific social contexts, was greatly aided by the distinction made between structural and cognitive social capital. Norman Uphoff (2000) suggests that structural social capital consists of relationships, networks, associations and institutions, while cognitive social capital pertains to values, norms, civic responsibility, reciprocity and trust. Clearly, stores of structural and cognitive social capital are interlinked, as expressions of human attitudes and behaviors are manifest in social structures. Granting that reserves of structural and cognitive social capital are relational, it follows that a transformation in a society's economic and social structures would shape the types of associations and networks that people develop and rely upon. Social change would also affect the extent to which individual and collective actors could access resources, articulate interests and influence decisions (Grix 2001).

Access to various stocks of social capital in society thus determines, to a large extent, one's social inclusion or exclusion. In this regard, social networks may be classified into three basic types: bonds, bridges and links (Woolcock 1998); (Narayan 1999). Bonding social capital comprises the strong horizontal ties which connect family members, friends and neighbors. Bonding with family, friends and neighbors helps to reduce vulnerability and provides a social safety net in times of need. Bridging social capital embodies the weak horizontal ties which connect people from different groups and networks with those of similar economic backgrounds. Bridging with people inside and outside the community opens up opportunities for improving livelihoods and mobility. Linking social capital represents the vertical ties which connect people with those in positions of power and influence such as banks, government agencies and elected officials. Linking with powerful individuals and institutions allows people to leverage resources for long-term benefits.

People who have strong networks within and across all three types are normally better able to cope with disasters such as floods and droughts. The challenge is to understand how these types of social capital overlap and interact with one another, how members within bonding networks come (or do not come) to extend and enlarge their connections with bridging and linking networks, and how changes in society affect differential access to stocks of social capital in the context of local communities.

Research objectives

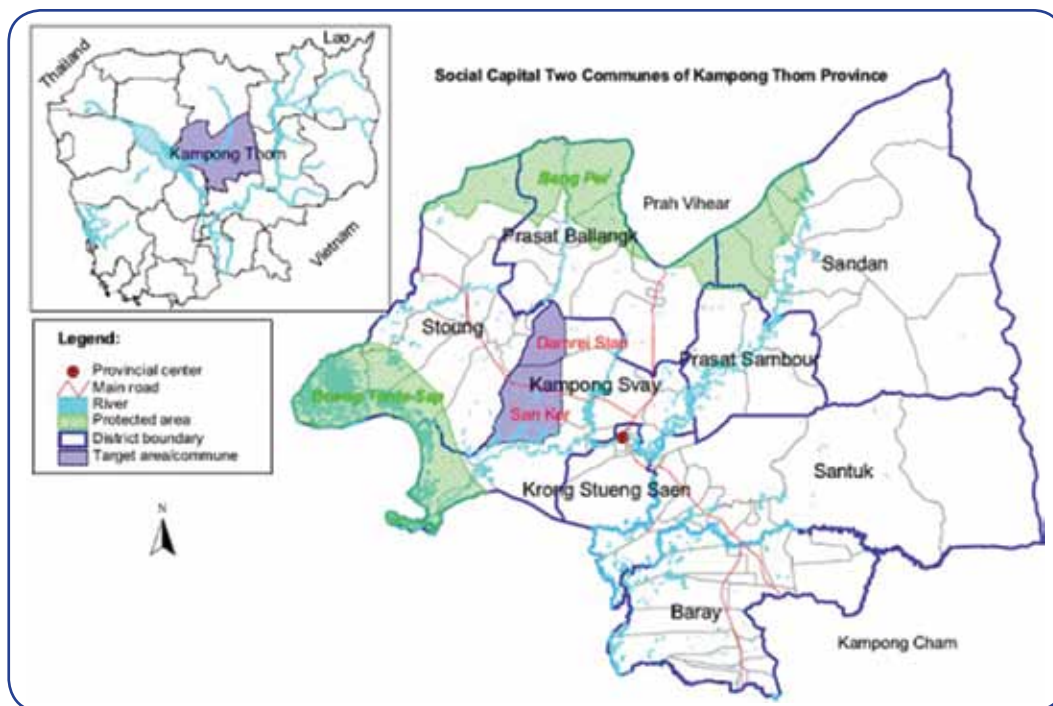
This research seeks to understand social capital in response to floods and droughts in two ecological zones of Kompong Thom province. More specifically, it attempts to document the experience of floods and droughts in five villages of the two zones; to examine the effects of the disasters on rice production and livelihood strategies in the zones, and to explore the role of social capital in enabling those affected to deal with the demands of their situations.

Research methods

The field research for the study was conducted in June 2005 in two ecological zones of Kompong Svay district, Kompong Thom province. San Kor commune was one ecological zone of the study and three of the commune's 14 villages were included in the sample. These villages were located in the floodplain of the Tonle Sap lake along the western boundary of National Road 6 near the San Kor commune market. Damrei Slab commune constituted the other ecological zone of the study and two of the commune's five villages were included in the sample. These villages were situated on higher ground outside the floodplain of the Tonle Sap Lake, off the eastern boundary of National Road 6, from 8 to 12 kilometers from the San Kor commune market, in what was a restricted war zone until the late 1990s (see Figure 4.1).

The San Kor villages selected for the study were Ampil, Chey and Slaeng Khpos, with a total of 155 households interviewed through purposive sampling. The sample included 53 of 113 households in Chey village, 51 of 63 households in Ampil village and 51 of 114 households in Slaeng Khpos village. The Damrei Slab villages selected for the study were Sangkum and Voa Yeav, with a total 100 households surveyed in these villages again, through purposive sampling. The sample included 50 of 199 households in Sangkum village and 50 of 172 households in Voa Yeav village. The completed questionnaires represented 53 percent of the San Kor sampling frame and 27 percent of the Damrei Slab sampling frame. In addition to the household survey, focus group interviews were done with local authorities, local leaders and village men and women. Key informant interviews were conducted with selected village households.

Figure 1: Map of San Kor and Damrei Slab communes in Kompong Svay district, Kompong Thom province



Findings and analysis⁵

Experience of severe floods and droughts

A large majority of the households surveyed in the San Kor villages suffered severe flooding in 2000-01 and again in 2001-02, and more than one-third experienced severe flooding in 2002-03 (Table 4.1). More than one-quarter of the households interviewed were forced to evacuate their homes because of severe flooding, and nearly 9 out of 10 had members who had become ill, most commonly from diarrhea and intestinal ailments. The successive years of severe floods caused widespread damage to rice production and prevented villagers from making a swift recovery. In contrast to the households in the San Kor villages, the households interviewed in the Damrei Slab villages, situated outside the Tonle Sap floodplain, experienced no flooding in the years 2000-01 and 2004-05.

The households surveyed in both communes experienced severe droughts from 2000-01 and 2004-05 (Table 4.2). Except for the crop year 2002-03, the San Kor villages suffered a higher annual incidence of severe drought in the five years under the study than the Damrei Slab villages. This is notable given that the San Kor villages

⁽⁵⁾ A summary of the study findings appeared as Ang, S., I. Oeur, et al. (2007). "Understanding Social Capital in Response to Floods and Droughts." *Cambodia Development Review*. 11(4).

endured severe floods during the same periods. However, incidents of related health problems, again most commonly diarrhea and intestinal ailments, and incidents of rice production losses, were slightly higher in the Damrei Slab villages. Proportionally, a smaller percentage of households in both communes received assistance during severe droughts than the households in San Kor, which obtained aid during severe floods. Generally, needs were much less visible during severe droughts than during severe floods.

The following sections describe the sample households' experience of floods in the San Kor villages and the sample households' experience of droughts in both the San Kor and Damrei Slab villages.



Experience of Severe Floods in the San Kor Villages

Situated in the floodplain of the Tonle Sap lake on the western boundary of National Road 6, the households surveyed in the San Kor villages of Ampil, Chey and Slaeng Khpos experienced severe floods in the five-year period 2000-2001 to 2004-2005. Overall, 98 percent of the 155 households interviewed in the San Kor villages experienced a severe flood in at least one of these five years. By far the most severe flooding occurred for the large majority of households in the years 2000-01 and 2001-02. Severe floods dropped markedly in 2002-03 and were virtually negligible in 2003-04 and 2004-05 (Table 4.1). In years when households did not encounter severe flooding, normal flooding usually prevailed.

The most serious consequence of the severe floods experienced in the years 2000-01 to 2004-05 was the death of a family member, which occurred in two of the households surveyed. Moreover, 88 percent of the 152 households which experienced severe floods in the five years studied encountered health problems. While not all of the ailments were caused by the severe floods, prevailing conditions contributed to their prominence. Household members suffered mostly from diarrhea and intestinal ailments, and less so from respiratory afflictions, malaria, skin rashes, malnutrition, red eyes and dengue fever.

Table 4.1. Household experience of severe or normal floods in years 2000-01 to 2004-05 Ampil, Chey and Slaeng Khpos villages, San Kor commune June 2005

Year	Experienced severe flood		Experienced normal flood	
	Number	Percent	Number	Percent
2004-05	3	2	102	66
2003-04	9	6	105	68
2002-03	58	37	70	45
2001-02	134	86	18	12
2000-01	147	95	5	3
N=155				

As well as the debilitating effects on human health, households attributed losses in rice production to the severe floods. In all, 93 percent of the 152 households which encountered severe floods in the San Kor villages reported damaged rice seedlings or rice crops. Households also sustained damaged vegetable gardens, poultry (chicken and duck) diseases, poultry deaths, livestock (cow, buffalo, pig) diseases and livestock deaths.

More than one-quarter of the 152 households affected by severe floods in the five years studied were forced to move out of their homes. These families sought temporary shelter on higher ground in relatives' houses, tents along the road, schools or the commune office. Meanwhile, nearly half the 103 households with children of school age reported that their children were unable to go to school without interruption in the years of severe floods.

In the San Kor villages surveyed, 74 percent of the 152 households which suffered severe floods in the period 2000-01 to 2004-05 received assistance of rice, rice seeds, supplies or materials. This was largely from the Cambodian Red Cross, and to a lesser extent from NGOs, local authorities or political parties, relatives, friends, neighbors and village associations. While it was helpful, this assistance was limited, compelling households to rely mainly on their own resources for rehabilitation. Reciprocal assistance from neighbors and friends, prominent at the onset of the floods, was limited by the ability of poor villagers to make exchanges.

In years of severe floods, more than half the households affected had made preparations beforehand to minimize the consequences of impending disaster. These provisions included getting access to boats, preparing food stocks, identifying higher ground for household members and animals to live, stocking firewood, preparing hay for animals on higher ground, storing rice seeds for future cultivation, making shelves to place assets, keeping updated on information about floods and even making bamboo floating homes. Of note, less than 15 percent of the households which experienced severe floods indicated that external agencies had come to the village to discuss flood preparedness.

Once the flooding had begun households took precautions to ensure the safety of members and assets. They looked after their property, kept their children in a secure area, took turns looking after animals, took turns to patrol the village, did not overload boats, took turns to patrol relocation areas, locked up valuables in their homes and kept their cows and buffaloes on higher ground.

Ampil Village San Kor Commune

Ampil was one of the poorest of San Kor commune's 14 villages. The 63 households living there in 2005 subsisted mainly on paddy rice farming and fishing. In dry seasons watermelons were grown as a cash crop. Situated on the western border of National Road 6 in a low-lying area of the commune, the village was subject to flooding and droughts. The worst flood in recent memory occurred in 2000-01. The storm that accompanied the flood destroyed five houses. Water rose to people's waists and residents had to use boats for transport. Livestock and poultry drowned. Village rice fields were submerged and rice crops were totally damaged, causing rice farmers to buy milled rice to eat from the market. Due to reduced rice consumption and lack of proper sanitation, household members, especially children, became sick with diarrhea and dengue fever. A flood in the following year 2001-02, while not as severe, inhibited the villagers from making a quick recovery.

During periods of severe flooding, Ampil villagers tried to offset their losses by shifting their immediate attention to fishing in the Tonle Sap lake. Women gathered morning glory and men cut wood in forest areas to earn money to buy rice. Once the flood waters receded, households started to plant watermelon as a cash crop, people worked as agricultural laborers for daily wages in nearby villages and some residents left the village temporarily to work as migrant laborers in Thailand. Young women sought more permanent employment in the garment factories of Phnom Penh. Still, recovery from the floods at the turn of the

main source of livelihood, although their rice yields in subsequent crop years, 2002-03 to 2004-05, were diminished by droughts.

During times of floods and droughts, Ampil households relied principally on their own members to respond to the demands of the situations confronting them. Tasks were normally divided along lines of sex and age and one's position in the household. But the sheer demands arising from the disasters, especially at the height of floods, compelled households to assist one another. Villagers helped each other transfer animals to higher ground, take care of young children, transport sick people to health centers and ferry students to school by boat. Neighbors shared small portions of rice, fish and vegetables with each other. Understandably, endemic poverty in Ampil restricted the capacity of villagers to make reciprocal exchanges. As one villager lamented, "We are all poor together and have little means to help one another."

Experience of severe droughts in the San Sor villages

Households surveyed in the San Kor villages of Ampil, Chey and Slaeng Khpos experienced severe droughts in the years 2000-01 to 2004-05. Overall, 99 percent of the 155 households interviewed in the three villages experienced severe drought in at least one of the five years. Nearly 60 percent of the sample households suffered severe droughts in 2003-04 and more than 40 percent suffered severe droughts in 2002-03 and 2004-05 (Table 4.2). When the sample households in San Kor commune did not experience severe droughts, they usually faced normal droughts.

In total, 88 percent of the 153 sample households in the San Kor villages, which experienced severe droughts in the five-year period, sustained health problems. In large measure these illnesses were related to the harsh circumstances of the severe droughts. Household members suffered mostly from diarrhea and intestinal ailments, and to a lesser extent, respiratory illnesses, malnutrition, malaria, skin rashes, dengue fever and sore eyes.

Table 4.2. Household experience of severe or normal droughts in years 2000-01 to 2004-05 Ampil, Chey, and Slaeng Khpos villages, San Kor commune and Sangkum and Voa Yeav villages, Damrei Slab commune June 2005

	San Kor villages				Damrei Slab villages			
Year	Experienced severe drought		Experienced normal drought		Experienced severe drought		Experienced normal drought	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
2004-05	67	43	66	43	7	7	69	69
2003-04	92	59	55	35	41	41	53	53
2002-03	67	43	73	47	76	76	21	21
2001-02	42	27	66	43	19	19	72	72
2000-01	34	22	65	42	9	9	67	67
	N= 155				N=100			

As well as the negative health effects, households attributed plunges in rice production to the severe droughts. In all, 89 percent of the 153 San Kor households which endured severe droughts reported damaged rice seedlings or rice crops. Households also cited damaged vegetable gardens, lack of water supply, poultry (chicken and duck) diseases, poultry deaths, livestock (cow, buffalo, pig) diseases and livestock death.

In the San Kor villages 30 percent of the 152 drought-affected households surveyed received assistance of rice, rice seeds, supplies or materials in years of severe droughts. This came largely from NGOs and the Cambodian Red Cross, and to a lesser extent, from local authorities or political parties, relatives, friends or neighbors, village associations and rich and powerful patrons.

In years of severe drought, 30 percent of the drought-affected households surveyed in San Kor commune had made preparations beforehand to reduce adverse effects. These preparations included storing rice and vegetable seeds for future cultivation, preparing household food stocks, preparing hay for animals, keeping updated on information about droughts and, in a few cases, digging wells. Of note, less than 20 percent of the households that experienced severe droughts indicated that external agencies had come to the village to discuss drought preparedness.

Experience of severe droughts in the Damrei Slab villages

Households surveyed in the Damrei Slab villages of Sangkum and Voa Yeav experienced severe droughts during the years 2000-01 to 2004-05. In all, 98 percent of the 100 households interviewed in the Damrei Slab villages suffered a severe drought in at least one of the five years. More than three-quarters of the sample households experienced severe drought in 2002-03 and more than two-fifths of the sample

experienced severe droughts in 2003-04 (Table 4.2). When the sample households in Damrei Slab commune did not experience severe droughts, they usually faced normal droughts.

Nearly all of the 98 households which experienced severe droughts from 2000-01 to 2004-05 in the Damrei Slab villages contracted health problems. To a considerable extent these illnesses were linked to the difficult conditions of the severe droughts. Household members suffered primarily from diarrhea and intestinal ailments, and less frequently from malnutrition, malaria, respiratory ailments, skin rashes and dengue fever.



Over and above the toll exacted on human health, households blamed declines in rice production on the severe droughts. In all, 96 percent of the households experiencing severe drought in the Damrei Slab villages recorded damaged rice seedlings or rice crops. Households also reported lack of water supply, damaged vegetable gardens, poultry (chicken and duck) diseases, poultry deaths, livestock (cow, buffalo, pig) diseases and livestock deaths.

In the Damrei Slab villages surveyed, 46 percent of the drought-affected households surveyed received assistance of rice, rice seeds, supplies or materials, in years of severe droughts. This came mostly from NGOs, and to a lesser extent, from the Cambodian Red Cross, local authorities or political parties and village associations. In years of severe droughts, 40 percent of the drought-affected households surveyed in Damrei Slab commune had made preparations beforehand to lessen disastrous

effects. These safeguards involved storing rice and vegetable seeds for future cultivation, preparing household food supplies, gathering hay for animals, keeping updated on information about droughts and, in a few instances, digging wells. Of note, 35 percent of the households that experienced severe droughts indicated that external agencies had come to the village to discuss drought preparedness.

Severe floods and drought - Impact on rice cultivation

The San Kor and Damrei Slab villages surveyed in this study were heavily reliant on rain-fed wet season paddy rice production. As a consequence of the severe floods and droughts, villages in both communes recorded extremely low rice yields in the disaster-prevalent years under the study. Not surprisingly, due to village topography, rice harvests in the San Kor villages were at their lowest during the highest incidence of severe floods while rice yields in the Damrei Slab villages were at their lowest during the highest incidence of severe droughts. Even in the best years, and despite their location in two distinct ecological zones, rice productivity in the villages of both communes averaged less than half a tonne per hectare. Rice shortages, common even in normal times, increased in the two communes during times of disaster and resulted in reduced rice consumption for a large majority of households.

Sangkum Village Damrei Slab Commune

Sangkum was the largest of five villages in Damrei Slab commune, with 199 households in 2005. Situated on higher ground outside of the Tonle Sap floodplain 8 kilometers east of National Road 6, Sangkum remained untouched by flood waters. At the same time, in the first half of the new millennium the village suffered severe droughts. The most serious drought occurred in 2002-03, when entire harvests were lost and households had to borrow to replenish their rice seeds for the next crop season. During these times of scarcity, households drastically reduced their rice consumption which resulted in malnutrition, especially among women and children, and heightened susceptibility to disease. Diarrhea, dengue fever, measles, chicken pox and respiratory afflictions were more prevalent in years of drought.

Rice productivity in Sangkum was low even in years of good harvests. With average rainfall, rice farmers were able to harvest between 30 and 40 thang (720 to 960 kilograms) per hectare. In years of severe drought, rice yields fell to 5 thang (120 kilograms) or less per hectare. Rice shortages, which usually lasted up to six months, now extended for most of the year. Households regularly ate

rice porridge instead of boiled rice and then, often only once a day. Five households were forced to go out of the village to beg for food.

Without sufficient food, households exhausted their savings to buy rice. Then they borrowed money from relatives and neighbors, before approaching merchants with stores along National Road 6 for loans. The traders charged 10 percent interest per month and before long, borrowers were embroiled in debt. Poorer households without collateral had relatives guarantee their loans. Several households mortgaged their farms, and a few sold agricultural lands to pay for medical costs or finance migrant work.

With wet season rice farming decimated by the successive droughts from 2000-01 to 2002-03, Sangkum villagers explored other livelihood sources. Some households attempted to grow dry season rice. Others started to grow watermelons. A few households built charcoal kilns. Women made mats and gathered crickets for sale. Men cut wood in the forests. Some even travelled in small groups to Preah Vihear Province to fell timber and haul it back with their rubber wheeled ox carts. While these activities helped sustain the subsistence of the drought-stricken rice-cultivating households, mounting debts and persistent crop failures soon meant that only migrant work could generate the earnings needed to overcome the protracted years of drought.

Selling and mortgaging paddy rice land in the San Kor and Damrei Slab villages were the predominant consequences of severe floods and droughts. The loss of rice farms made it difficult for subsistence households to fully recover from the severe floods and droughts, and still pursue rice cultivation as their main livelihood activity. Differential ownership of paddy rice land indicated social stratification within San Kor and, to a lesser extent, Damrei Slab villages. Households lacking adequate farm areas for rice production and for use as loan collateral were more likely to experience further marginalization as a consequence of severe floods and droughts. Clearing forest areas for paddy rice cultivation offered many San Kor and Damrei Slab villagers an alternative way to expand their landholdings, although the practice diminished the natural resources base so important for water management.

Rice cultivation impacts in the San Kor villages, 2000-01 to 2004-05

As a consequence of severe floods and droughts from 2000-01 to 2004-05, average rice yields in the San Kor villages were generally low and at times, reached abysmal levels (Table 4.3). With minor exceptions, the rice cultivators in the three villages relied entirely on rain-fed wet season rice production. Not surprisingly, the

lowest average yields in the five years period occurred in the crop years 2000-01 and 2001-02, which corresponded to the highest incidences of severe floods. Large numbers of rice cultivators in these crop years lost their entire crops, which accounts for the depressed average totals. By contrast, the highest average yields attained in the five-year period were recorded in the crop years 2003-04 and 2004-05 when the household experience of severe floods was minimal.

Interestingly, average rice production in the San Kor villages did not, in the identical manner of severe floods, have an inverse correlation to the experience of severe droughts. Indeed, lower average yields in 2000-01 and 2001-02 corresponded to lower incidences of severe droughts, while higher average yields in 2003-04 and 2004-05 corresponded to higher incidences of severe drought. This did not mean that the severe droughts suffered in the San Kor villages had no adverse impact on production, only that the severe floods had more disastrous overriding effects.

Table 4.3. Average household rice yields in kilograms 2000-01 to 2004-05 Ampil, Chey and Slaeng Khpos villages, San Kor commune June 2005

Year	Average wet season production (kg)	Average dry season production (kg)	Average total production (kg)
2004-05*	696	166	693
2003-04**	410	180	406
2002-03***	328	0	325
2001-02****	207	480	210
2000-01*****	120	480	124
*N=125 for wet season, 6 for dry season and 127 for total **N= 102 for wet season, 2 for dry season and 104 for total ***N= 88 for wet season, 1 for dry season and 89 for total ****N= 79 for wet season, 1 for dry season and 80 for total *****N= 80 for wet season, 1 for dry season and 81 for total			

During the five-year period under study, households surveyed in the San Kor villages recorded their highest average rice yields in the crop year 2004-05. Notwithstanding, rice production in that year averaged less than half a tonne per hectare (Table 4.4). The low productivity of rice cultivation in the San Kor villages, in even the best years, underscored the difficulty subsistence rice farmers faced in overcoming the shocks of severe floods and drought.

In 2005, 20 of the 155 households surveyed in the San Kor villages did not own paddy rice land, while 37 households owned 0.5 hectares or less. With 20 households absolutely landless and 37 households near landless (0.5 hectares or less), 57 households, or 37 percent of all households surveyed in the San Kor villages, were paddy rice land deficient. By contrast, 28 households, or 18 percent of all households surveyed in these villages, owned more than two hectares of paddy rice land. Differential ownership of paddy rice land marked a divergence among

villagers, with those households lacking sufficient land for food production and for use as collateral for loans more likely to suffer further marginalization as a consequence of severe floods and droughts.

In the years 2000-01 to 2004-05, 20 households in the 155 San Kor household sample reportedly sold a total 37.4 hectares of paddy rice land. Remarkably, 15 of the 20 households sold their paddy rice land as a consequence of floods or droughts. During the same period, 26 households in the same sample mortgaged a total of 20.8 hectares of paddy rice land to others. Notably, 17 of the 26 households mortgaged their paddy rice land as a result of floods or droughts. The sale and mortgage of paddy rice lands considerably depleted the stock of assets needed by subsistence farmers to fully recover from severe floods and droughts, and still pursue rice cultivation as their primary livelihood activity.

Table 4.4. Average rice land cultivated (in hectares), average rice production (in kilograms), average rice production per hectare (in kilograms per hectare), wet and dry seasons 2004-05, by household, Ampil, Chey and Slaeng Khpos villages, San Kor commune June 2005

	Wet season	Dry season	Total
Average rice land cultivated	1.43 ha*	0.75 ha	1.44 ha*
Average rice production	696 kg**	166 kg	693 kg**
Average rice production per hectare	478 kg per ha***	221 kg per ha	472 kg per ha***
	*N=132 **N=125 ***N=123	N=6	*N=134 **N=127 ***N=125

In the years 2000-01 to 2004-05, some households in the San Kor sample augmented paddy rice landholdings. A total of 14 households in the 155 households sample bought a total 12.18 hectares of paddy rice land. Meanwhile, 11 households in the same sample acquired a total 5.28 hectares of paddy rice land through mortgage. These numbers paled compared to the 45 households in the sample that enlarged their holdings by clearing a total 45.9 hectares of forest land for paddy rice cultivation. The conversion of forest areas into paddy fields threatened to undermine an area so crucial to the regulation of floods and droughts.

Rice cultivation impacts in the Damrei Slab villages, 2000-01 to 2004-05

As a result of the severe droughts from 2000-01 to 2004-05, average rice yields in the Damrei Slab villages were predictably low (Table 4.5). As a means of offsetting the prevailing dependence on rain-fed wet season rice production, small numbers of the rice farmers sampled cultivated dry season rice starting from the 2002-03

crop season. Not unexpectedly, the lowest average yields in the five-year period occurred in the crop years 2002-03 and 2003-04, which corresponded to the highest incidents of severe droughts. In the crop year 2002-03, more than three-quarters of the sample households experienced severe droughts, and in the crop year 2003-04, more than two-fifths of the sample households experienced severe droughts. By comparison, higher average yields were registered in the crop years 2000-01, 2001-02 and 2004-05, when household experience of severe droughts was much lower.

Table 4.5. Average household rice yields in kilograms 2000-01 to 2004-05, Sangkum and Voa Yeav villages, Damrei Slab commune June 2005

Year	Average wet season production (kg)	Average dry season production (kg)	Average total production (kg)
2004-05*	553	432	595
2003-04**	353	216	363
2002-03***	365	97	367
2001-02****	582	---	582
2000-01*****	691	---	691
*N=91 for wet season, 9 for dry season and 91 for total **N= 89 for wet season, 4 for dry season and 89 for total ***N= 82 for wet season, 1 for dry season and 82 for total ****N= 77 for wet season, --- for dry season and 77 for total *****N= 72 for wet season, --- for dry season and 72 for total			

In the crop year 2004-05, the households in the Damrei Slab sample posted their second highest average rice yields in the five years under study. While the average yield per hectare on the few dry season rice farms was encouraging, total rice production in this year averaged less than half a tonne per hectare (Table 4.6). The low productivity of rice cultivation in the Damrei Slab villages, even in good years, demonstrated the hardship subsistence rice cultivators face recovering fully from the shocks of severe droughts encountered in the recent past.

Table 4.6. Average rice land cultivated (in hectares), average rice production (in kilograms), average rice production per hectare (in kilograms per hectare), wet and dry seasons 2004-2005, by household, Sangkum and Voa Yeav villages, Damrei Slab commune June 2005

	Wet season	Dry season	Total
Average rice land cultivated	1.23 ha	0.37 ha	1.26 ha
Average rice production	553 kg	432 kg	595 kg
Average rice production per hectare	451 kg per ha	1168 kg per ha	471 kg per ha
	N=91	N=9	N=91

In 2005, only one of the 100 households surveyed in the Damrei Slab villages did not own paddy rice land and 29 households owned 0.5 hectares or less. With one household absolutely landless and 29 households near landless (0.5 hectares or less), 30 percent of all households surveyed in the Damrei Slab villages lacked sufficient paddy rice land. By contrast, 8 percent of all households surveyed in these villages owned more than two hectares of paddy rice land indicating that differential access to paddy rice land existed among households in the Damrei Slab villages, albeit less pronounced than in the San Kor villages.

In the years 2001-01 to 2004-05, three households in the 100 Damrei Slab households sample reportedly sold a total 3.51 hectares of paddy rice land as a consequence of droughts. Similarly, during these years, 10 households mortgaged to others a total 4.3 hectares of their paddy rice land, with 8 of the 10 households reporting the mortgages were due to droughts.

In the years 2000-01 to 2004-05 several households in the Damrei Slab sample sought to increase their paddy rice landholdings. In all, 11 households of the 100 households sample bought a total 6.6 hectares of paddy rice land. Four households acquired a total 3.16 hectares of paddy rice land through mortgage. Of note, 35 households in the sample acknowledged that they cleared a total 20.3 hectares of forest land for paddy rice cultivation. While converting forest areas into paddy fields provided households with the most accessible way to expand their rice holdings, it destroyed the natural-resource base so critical for water management.

Credit and migrant work

In the years 2000-01 to 2004-05, households in the San Kor villages borrowed money to buy rice more frequently than households in the Damrei Slab villages, in both normal and disaster times. Nonetheless, the need for households to borrow money to have rice was extremely high in both communes during times of disaster. Overall, 91 percent of the San Kor sample households and 82 percent of the Damrei Slab sample households had borrowed to buy rice in times of severe floods or droughts. More than two-thirds of the households in both communes borrowed large sums of cash to recover from the disasters, and many used part of this money to re-invest in agricultural production, despite the risks this entailed. The heavy reliance on money lenders for credit indicated that, although informal money supplies prevailed, market transactions had largely replaced multi-stranded exchanges of mutual assistance.

In the five years under study, members from nearly 60 percent of the San Kor households, and half the Damrei Slab households, left their villages to work as migrant laborers. Young adult women and men comprised the largest share of the migrant labor force, and worked for the most part as garment workers in Phnom Penh and as agricultural

laborers in Thailand respectively. Migrant workers relied mainly on networks of friends, neighbors, relatives and recruitment agents to help them get their jobs. From 2000 to 2005, earnings from migrant work remittances rose in both communes. Generally, migrant work was viewed as a strategy to rehabilitate and support household livelihoods that had been decimated by the shocks of severe floods and droughts.

Participation in groups and communal activities

From 2000 to 2005, household involvement in community groups, that is, the percentage of households with a member belonging to a community group, had increased by 22 percent in the San Kor sample and by 62 percent in the Damrei Slab sample. During the same years, the density of household membership in community groups, that is, the percentage of households with members belonging separately to five specified types of groups, had risen by 35 percent in the San Kor sample and by 46 percent in the Damrei Slab sample⁶. These increases were stimulated largely by external support to local associations. In villages of both communes, the highest single membership of households in both 2000 and 2005 was in pagoda associations, although in the Damrei Slab villages, wedding and funeral associations were as important in 2000. In 2000, religious groups in San Kor and Damrei Slab were seen as the single most important type of association. By 2005, this had changed, with credit and savings groups identified in both communes as the most important. This revealed the growing importance of cash for households in the expanding market economy. For the most part, groups deemed the most important in both 2000 and 2005 in San Kor and Damrei Slab did not interact with groups outside the village.

Conclusions

Located on the periphery of the Tonle Sap floodplain, the households in the San Kor villages experienced both severe floods and droughts, while households in the Damrei Slab villages on higher ground outside of the floodplain, endured only severe droughts. As a consequence, households in San Kor generally suffered more adverse effects from natural disasters than those in Damrei Slab. These included longer average rice shortages, greater frequency of borrowing to buy rice and higher frequency of selling land. While the outcomes of severe floods and droughts often resembled one another, for example, diminished rice yields, acute rice shortages, increased human illness, intensified need to borrow and higher rates of distressed land sales, severe floods in San Kor caused more displacement and physical damage than severe droughts in either commune and therefore, entailed higher recovery costs.

⁽⁶⁾ The five groups specified were pagoda groups, wedding or funeral groups, credit or savings groups, health or education groups, and livelihood groups.

Apart from the distinguishing features arising from their location in different ecological zones, contrasts among households in the two communes were also related to their differential participation in the market economy. The three San Kor villages were located along the western boundary of National Road 6, close to the expanding San Kor commune market. By comparison, the two Damrei Slab villages were located from 8 to 12 kilometers off the eastern boundary of National Road 6, in what had largely been an inaccessible war zone until the late 1990s. In the five years under study, the heightened integration of the San Kor households in the market economy, compared to those in Damrei Slab, was evident in several ways. In San Kor, land sales and mortgages were proportionally higher, differential access to paddy rice land was more pronounced, the incidence of landlessness was proportionally higher, as was the percentage of households with migrant workers. These indicators suggest greater social stratification and inequality among households in San Kor than in Damrei Slab, with marginalized and vulnerable households in San Kor likely to suffer debilitating consequences from the shocks of severe floods and droughts.

Livelihoods transformed

The severe floods and droughts that occurred in the study area from 2000-01 to 2004-05, contributed to a broader process of social change emerging in the Tonle Sap region and other parts of rural Cambodia. Rice yields during the five years of successive natural disasters were abysmally low and forced households from the San Kor and Damrei Slab villages to rely on sources of livelihood other than rice-fed wet season rice production. These included fishing and forest resources and migrant wage work. To offset the losses of their rice crops, San Kor households in the Tonle Sap floodplain exploited fish stocks in the lake, while the Damrei Slab households cut timber and built charcoal kilns. The sudden shift to these earning sources contributed to a decline in natural resources.

Households in both communes relied increasingly on migrant wage labor. In the five years under study, members from nearly 60 percent of the San Kor households and half the Damrei Slab households left their villages to work as migrant laborers. Younger adult women and men were usually better able to take advantage of job opportunities and in large measure, worked respectively as garment workers in Phnom Penh or agricultural laborers in Thailand. In general, migrant work was seen as a way to improve the immediate circumstances of those living at home. But while migrant labor had previously supplied temporary, short-term income, it now became a central strategy for many households.

Unable to depend on rice production and constrained by limited opportunities in off-farm work, most households had to borrow at exorbitant interest rates to ensure their daily survival. Many households had to borrow large sums to pay health costs. Some households sold or mortgaged rice farms to raise cash or repay debts, thereby

undermining their very capacity to recover from the devastation of the floods and droughts, and still pursue rice cultivation as their principal livelihood activity.

Reliance on networks of social capital

Responses about severe floods and droughts gained from focus groups, key informants and survey interviews are usefully examined within the conceptual framework of social capital. With respect to the onset of severe floods, expressions of bonding and bridging social capital were readily apparent. Households in the San Kor villages helped each other evacuate family members, watch over animals, patrol residential areas, ferry children to school, distribute water and provide small rice loans. Once flood waters had receded, households from the San Kor villages worked together to repair community infrastructure such as canals, water gates, culverts, schools and roads. These rehabilitation efforts were often aided by external agencies.

With regard to severe droughts, networks of bonding, and to a much lesser extent bridging, social capital were likewise evident, although less conspicuously visible than those which accompanied the heightened activity of the severe floods. During severe droughts, relatives and neighbors from the study villages helped each other replenish rice seeds, supply small cash loans, guarantee loans with moneylenders, look after the sick, have access to family wells and assist vulnerable groups. In the aftermath of severe droughts, bridging social capital often took the form of households working together in community food-for-work projects supported by external organizations.

Bridging networks of social capital helped households from both communes respond to the broader demands of social change taking place in their lives. Migrant workers from the study villages took jobs in Phnom Penh and Thailand through relationships with relatives, friends, neighbors and recruitment agents. Young men and women from the San Kor villages used contacts with fish lot owners in the Tonle Sap to get work as hired laborers. Households from both communes used moneylenders in the San Kor commune market to reinvest in disaster-prone rice production, albeit at extremely high interest rates and considerable risk. Households from the Damrei Slab villages similarly relied on moneylenders for the cash they needed to finance payments to government agents to permit cutting and transport of logs from Preah Vihear province. Households in both communes acted on the agreement of local authorities in clearing forest areas to enlarge their paddy rice holdings. In the social context of the study area, bridging networks of social capital operated in an environment not immune from exploitation and corruption.

For Robert Putnam, high density of membership and participation in associations is a key indicator of a society's supply of social capital. In the San Kor and Damrei Slab villages, household involvement and density of membership in community groups

increased considerably from 2000 to 2005, largely as a result of external support to local associations. Following Putnam, this would indicate a high level of social capital and civic wellbeing in village communities. That this was obviously not the case lends support to the critique of Putnam's approach. A more promising line of inquiry shifts the focus to research on access to stocks of social capital in specific social contexts. With respect to the San Kor and Damrei Slab villages, it becomes apparent that while households had access to reserves of bonding and bridging social capital, they were virtually excluded from access to stocks of linking social capital. In general, the households interviewed lacked vertical ties connecting people with powerful individuals and institutions that could allow them to leverage resources for long-term benefits.

Villagers in both communes reported a severe lack of information from external agencies on disaster preparedness. This suggests a clear policy imperative for government and development agencies to build capacity in community-based disaster management. In line with this, the major challenge that faced the households in the San Kor and Damrei Slab villages was to extend and expand their bonding and bridging networks of social capital to connect with linking networks of social capital, including those with government. Similarly the challenge for development agencies, beyond simply building capacity in community-based disaster management, was to facilitate villager access to stocks of linking social capital so that they could tap into resources currently denied them and make their voices heard in decisions that affected their lives.

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