

Understanding Social Capital in Response to Floods and Droughts

A Study of Five Villages in Two Ecological Zones of Kompong Thom Province



Analyzing Development Issues

Team and Research Participants

August 2007

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Church World Service provided the cover photos.

Abstract

This ADI study seeks to understand social capital in response to floods and droughts in two ecological zones of Kompong Svay district, Kompong Thom province. More specifically it attempts to document the experience of natural disasters in villages within and outside the Tonle Sap floodplain; to examine the effects of the disasters on agricultural production and livelihood strategies; and to explore the role of social capital in enabling those affected deal with the exigencies of their situations. A survey questionnaire was conducted with 155 households in three villages of San Kor commune, and 100 households in two villages of Domrey Slab commune. In addition focus group interviews were convened with local authorities, local leaders, village men, and village women.

From 2000/1 to 2004/5 households in the San Kor villages experienced severe floods and droughts, while households in the Domrey Slab villages endured severe droughts. Rice yields during the five years of successive natural disasters were abysmally low and forced households in both communes to rely on sources of livelihood other than rain-fed wet season rice production. Households responded to the devastation caused by the severe floods and droughts through participation in networks of bonding social capital with relatives and neighbors, and through involvement in networks of bridging social capital with other villagers. At the same time households were virtually excluded from access to networks of linking social capital with powerful individuals and institutions needed to leverage resources for long-term benefits.

Introduction

Cambodia entered the 21st century with the hope of ushering in an era of peace and prosperity, only to suffer the devastation of floods and droughts for five successive years. The flood of 2000/1 was considered the worst in 70 years. This flood affected 3.4 million people in 19 of the country's 24 provinces and municipalities, and left 347 dead. The government estimated the total physical damages at US\$ 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 tons of milled rice which was about 4 percent of the estimated production loss of 424,000 tons of milled rice.¹

In 2001/2 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 62 people died. Meanwhile drought in the same year left about half a million people with food deficits in six provinces.² In many of these areas people and livestock also suffered a lack of drinking water. In all the irregular rainfall and serious flooding in 2001/2 damaged about 250,000 hectares of rice crop. The total damages of the disasters were estimated at US\$ 36 million.³

In 2002/3 the country was once again ravaged by the combined effects of flood and drought. The government reported the drought experienced that year to be the worst in two decades. While the drought affected the entire country eight provinces were especially hard hit.⁴ More than 2 million people and 134,926 hectares of rice crop were affected. The damages of the drought were estimated at US\$ 21.5 million. Meanwhile several provinces, particularly those situated along the Mekong River, encountered floods in the same year due to the heavy rains throughout Southeast Asia.⁵ 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 2002/3 were estimated at US\$12.45 million.⁶

¹ Chan Sophal, "The Impact of Cambodia's Recent Floods," *Cambodia Development Review*, Volume 5, Issue 1, January-March 2001; Kent Helmers and Sanny Jegillos, *Linkages between Flood and Drought Disasters and Cambodian Rural Livelihoods and Food Security*, Phnom Penh, September 2004; Asian Disaster Reduction Center, *Cambodia Country Report 2003*.

² The food deficit provinces were Battambang, Pursat, Prey Veng, Kompong Speu, Kompong Cham, and Svay Rieng.

³ "The Impact of Flooding and Drought in Cambodia," *Cambodia Development Review*, Volume 6, Issue 4, October-December 2002; Helmers and Jegillos, *Linkages between Flood and Drought Disasters*; Asian Disaster Reduction Center, *Cambodia Country Report 2003*.

⁴ The drought affected provinces included Kompong Speu, Takeo, Battambang, Pursat, Prey Veng, Kompong Cham, Kandal, and Odor Meanchey.

⁵ The flood affected provinces included Stung Treng, Pursat, Kratie, Kompong Cham, Kandal, Prey Veng, and Takeo.

⁶ "The Impact of Flooding and Drought in Cambodia,"; Asian Disaster Reduction Center, *Cambodia Country Report 2003*.

In 2003/4 Cambodia suffered a harsh dry season with lakes in the deepest part of the flood plain completely dried out. While some areas of the country were affected by drought, rice crop losses did not result in a national disaster.⁷

In 2004/5 Cambodia experienced extremely low rainfall with 14 provinces stricken by drought.⁸ Overall 2 million people and 62,702 hectares of rice crop were affected. The World Food Programme (WFP) reported that a half 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 2004/5 drought were estimated at US\$ 21 million.⁹

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. Normal floods likewise have no adverse physical impact on village settlements and only a circumscribed 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 come to occur in Cambodia with greater frequency in the new millennium.¹⁰

Droughts in Cambodia affect a larger geographical area and more people than floods and thus may be considered a more severe type of disaster. Four characteristics of agricultural drought in the country 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.¹¹

⁷ Mao Hak, *Cambodia Country Report for Third Annual Mekong Flood Forum*, 7-8 April 2005, Vientiane, Lao PDR.

⁸ The drought affected provinces were Kompong Speu, Takeo, Prey Veng, Kandal, Kompong Cham, Pursat, Battambang, Bantey Meanchey, Strung Treng, Kompong Chhnang, Kratie, Kompong Thom, Siem Reap, and Kampot.

⁹ Mao, *Cambodia Country Report for Third Annual Mekong Flood Forum*; World Food Programme, *Natural Hazards: Global Overview of Countries of Concern*, August 2005; Oxfam United Kingdom, *Drought in Cambodia: Waiting for the First Rain*, June 2005.

¹⁰ Helmers and Jegillos, *Linkages between Flood and Drought Disasters; Flood Impact on Women and Girls, Prey Veng Province Cambodia*, CARE, Phnom Penh, June 2002.

¹¹ Helmers and Jegillos, *Linkages between Flood and Drought Disasters*.

Responses to Floods and Droughts

A World Bank financed study identified several common coping strategies used by local communities in Cambodia during and after disasters. The research likewise considered the outcomes of these strategies. For example: taking refuge in safe areas during flooding helped to save lives and assets, although such areas were often overcrowded and lacked clean water and proper sanitation. Reducing food consumption was viable only for short periods as it posed serious health risks. Receiving disaster assistance was widespread, however insufficient and unevenly distributed. Harvesting common property resources such as fish and water plants provided poor households with food and earnings, although overexploitation led to their depletion. Selling assets enabled households to buy food and rice seeds and to pay medical expenses, but sales of productive assets such as livestock and land served to drive poor households deeper into poverty. Borrowing money likewise provided short-term relief, while high interest rates precipitated indebtedness and ensuing landlessness. Migrating temporarily to work in other areas emerged as an important source of income for disaster affected households, with remittances providing a safety net for members left at home.¹²

A Cambodia Development Resources Institute (CDRI) report presented to the National Assembly and private sector during the devastating flood of 2000/1 enumerated the likely outcomes affecting rural households struggling to cope with the impact of the flood. These included erosion of savings, declining health, deterioration of capital assets, increased indebtedness and entrapment in the debt cycle, increased reliance on natural resources, increased land sales and landlessness, deepening poverty, and increased rural-urban migration. The CDRI report likewise suggested how coping strategies of flood victims might differ among various classes.¹³

Natural Disasters and Rural Poverty

Poverty assessments conducted by the World Bank and CDRI in recent years have linked floods and droughts in the new millennium to rural poverty. The World Bank Poverty Assessment 2006 notes that covariant shocks such as extreme floods and droughts affect many households at once and are likely to overwhelm social coping strategies based upon support within families and communities. The report maintains that vulnerability to these shocks is exacerbated by: 1) the limited asset base and savings of poor households; 2) the underdevelopment of financial markets for savings, borrowing or insurance; 3) the lack of diversification in many rural households and communities; 4) heavy reliance on common property resources when access to or productivity of these resources is in decline; and 5) a lack of rule of law and guaranteed access to justice in conflicts between the poor and more powerful actors.¹⁴

The Participatory Poverty Assessment (PPA) of the Tonle Sap conducted by CDRI in 24 villages in the six provinces around the lake cogently describes the disruptive effects of floods and drought in 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

¹² Aage Jorgensen et al, *Adaptation and Coping with Natural Disasters by Local Communities in Cambodia*, Nordeco, March 2004.

¹³ Chan, "The Impact of Cambodia's Recent Floods."

¹⁴ *Cambodia: Halving Poverty by 2015?*, Poverty Assessment 2006 Prepared by the World Bank for the Consultative Group Meeting, Phnom Penh, February 2006.

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.”¹⁵

The PPA argues that the situation of the poor and the destitute in the Tonle Sap area is becoming increasingly difficult due to several factors, including 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 resource base around the Tonle Sap is rapidly depleting. This results from overexploitation by outside investors operating in collusion with powerful government officials and by an expanding population 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 or rely on dwindling natural resources, the poor resort to rural wage and migrant labor. The PPA observes that the management of natural resource assets is a crucial component of the government's efforts to reduce poverty and promote well-being of the rural poor. At the same time, the study clearly elucidates the viewpoint of the people living around the lake that governance and management failures have allowed the situation to worsen.¹⁶

A study conducted out of the Helsinki University of Technology in the Tonle Sap area provides insights into the relationship of 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, circumscribed 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 decline in natural resources and rapid population growth will undoubtedly exacerbate the poverty of rural households and result in an increase of people migrating to urban areas.¹⁷

The Moving out of Poverty Study conducted by CDRI in nine villages traces the impact of shocks such as natural disasters and illness on community well-being and household mobility over time. The study argues that these shocks frequently act as triggers for downward mobility or to keep households poor. Between 2000/1 to 2004/5 income from agriculture declined sharply in poorer villages and households. Floods and droughts in these years coupled with lack of good soil and irrigation was primarily responsible for the lower rice

¹⁵ Brett M. Ballard, *The Participatory Poverty Assessment of the Tonle Sap: A Summary of Key Findings*, CDRI Policy Brief, February 2007, Issue 06.

¹⁶ Brett M. Ballard, "Introduction to the Tonle Sap Participatory Poverty Assessment," in *"We are Living with Worry All the Time": A Participatory Poverty Assessment of the Tonle Sap*, edited by Brett M. Ballard, Cambodia Development Resource Institute, Phnom Penh, April 2007.

¹⁷ Marko Keskinen, "The Lake with Floating Villages: Socio-economic Analysis of the Tonle Sap Lake," *Water Resources Development*, Volume 22, Number 3, September 2006; See also Marko Keskinen, *Socio-Economic Survey of the Tonle Sap Lake, Cambodia*, A Master of Science Thesis submitted to the Helsinki School of Technology, Department of Civil and Environmental Engineering, June 2003.

yields and consequent drop in productivity. At the same time poor households earning 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 cross-border to Thailand or to other destinations for jobs.¹⁸ Whether the increased dependence of the poor on local and migrant labor constituted a temporary adjustment or signaled an irreversible shift in livelihood strategies remained to be seen.

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.”¹⁹ 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, indicate the extent to which a society possesses a solid supply of social capital.²⁰

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. Factors such as education, employment, and social class are crucial in 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 that emerge and the direction that access is likely to take.²¹

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 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.²² Clearly stores of structural and cognitive social capital are interlinked for 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

¹⁸ Ingrid FitzGerald and So Sovannarith, *Moving Out of Poverty?: Trends in Community Well-being and Household Mobility in Nine Cambodian Villages*, Cambodia Development Resource Institute, Phnom Penh, 2007.

¹⁹ Robert Putnam, *Making Democracy Work: Civic Traditions in Modern Italy*, Princeton, NJ: Princeton University Press, 1993.

²⁰ Jonathan Grix, “Social Capital as a Concept in the Social Sciences: The Current State of the Debate,” *Democratization*, Volume 8, Number 3, Autumn 2001.

²¹ Grix, “Social Capital as a Concept in the Social Sciences.”

²² Norman Uphoff, “Understanding Social Capital: Learning from the Analysis and Experience of Participation,” in *Social Capital: A Multifaceted Perspective*, edited by P. Dasgupta and I. Seralgedin, Washington, DC: World Bank, 2000.

change would also affect the extent to which individual and collective actors could access resources, articulate interests, and influence decisions.²³

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. Bonding social capital comprises the strong horizontal ties which connect family members, friends and neighbors. Bridging social capital embodies the weak horizontal ties which connect people from different groups and networks with those of similar economic backgrounds. 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. People who enjoy a high degree of well-being normally have strong networks within and across all three types. By contrast, poor people may have strong access to pockets of bonding social capital, but may find themselves excluded from stocks of bridging and linking social capital.²⁴

Bonding with family, friends and neighbors helps to reduce vulnerability and provides a social safety net in times of need. Bridging with people inside and outside the community opens up opportunities for improving livelihoods and mobility. Linking with powerful individuals and institutions allows people to leverage resources for long-term benefits. 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.

Social Capital Research in Cambodia

Social Services of Cambodia (SSC) conducted research in 1999 on the impact of armed conflict on social capital in Cambodia as part of a broader World Bank comparative study. The research finds that while the Lon Nol (1970-1975) and the Pol Pot (1975-1979) periods of armed conflict depleted stocks of social capital they did not destroy it. In the aftermath of the Khmer Rouge regime pre-conflict forms of social capital such as exchange relations and religious associations reemerged and were revived. At the same time the study notes a decline in the 1990s of mutual help and exchange labor practices in favor of cash transactions and rigid reciprocal arrangements. This shift was attributed to the penetration of the market and cash economy.²⁵ The World Bank comparative report suggests that moves toward globalization in Cambodia affected “the transformation of the structure of social capital” diminishing trust and social cohesion. The comparative study argues that while globalization facilitates growth, it also gives rise to increasing exclusion and marginalization, widening the gap between rich and poor within and among societies.²⁶

The Moving Out of Poverty study conducted by CDRI likewise notes that traditional forms of social capital such as labor exchange and mutual assistance had given way to the hiring out of

²³ Grix, “Social Capital as a Concept in the Social Sciences.”

²⁴ Erika Fraser, Allyson Thirkell, and Anne McKay, *Tapping into Existing Social Capital: Rich Networks, Poor Connections*, United Kingdom, Department for International Development (DFID), 2003.

²⁵ Veena Krishnamurthy, *The Impact of Armed Conflict on Social Capital: A Study of Two Villages in Cambodia*, Phnom Penh: Social Services of Cambodia, 1999.

²⁶ Nat J. Colletta and Michelle L. Cullen, *Violent Conflict and the Transformation of Social Capital: Lessons from Cambodia, Rwanda, Guatemala, and Somalia*, Washington, DC: The World Bank, May 2000.

labor and other forms of market transactions. More disturbingly, the study reports that poor and destitute households were locked out of networks which controlled access to markets, the use of natural resources, and community decision-making. Meanwhile, rich households which dominated these networks enjoyed relationships with powerful people, and because of that were able to buy or influence their way out of difficulties and obtain favorable outcomes when conflicts or legal issues arose. The study revealed that financial resources, ownership of land and other assets, access to opportunities and services, and social and political capital were increasingly concentrated in the hands of rich and upwardly mobile households in prosperous communities, while the poorest households and villages were trapped in a cycle of poverty.²⁷

The Participatory Poverty Assessment conducted by CDRI in the Tonle Sap area provides insight into how bonding and bridging networks of social capital have undergone transformation. As mentioned earlier population increase and natural resources depletion in the Tonle Sap area have led to increases in labor migration. As a consequence new forms of bonding and bridging networks have emerged to facilitate the migration process. For example finding work in Phnom Penh in garments, construction, or domestic service takes place through networks of relatives, former workers from the village, or recruitment agents with local contacts. Similarly, trusted brokers who may be friends or relatives arrange work in other provinces of the country or cross-border to Thailand and Malaysia. The study mentions one instance in which 50 families from a village in Kompong Thom province obtained work in Thailand through relatives living in Banteay Meanchey province.²⁸ Clearly social capital research in Cambodia is inseparably linked to the study of social change.

This ADI study 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 agricultural production and livelihood strategies in the zones; and to explore the role of social capital in enabling those affected deal with the exigencies of their situations.

Research Objectives

To document the experience of floods and droughts in five villages of two ecological zones of Kompong Svay district, Kompong Thom province

To examine the effects of floods and droughts on agricultural production and livelihood strategies in five villages of the two zones

To explore the role of social capital in the study villages in response to floods and droughts

²⁷ FitzGerald and So, *Moving Out of Poverty?*

²⁸ K.A.S. Murshid, "Domestic and Cross-Border Migration from the Tonle Sap," in *"We are Living with Worry All the Time": A Participatory Poverty Assessment of the Tonle Sap*, edited by Brett M. Ballard.

Research Methods

The research was undertaken in two ecological zones of Kompong Svay district, Kompong Thom province. Three villages of San Kor commune comprised one ecological zone of the study. 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. Two villages of Domrey Slab commune constituted the other ecological zone. These villages were situated on higher ground outside the floodplain of the Tonle Sap Lake off the eastern boundary of National Road 6 about 8 to 12 kilometers from the San Kor commune market. Overall 155 households were surveyed in the three San Kor villages of Ampil, Chey and Sleng Kpos, while 100 households were surveyed in the two Domrey Slab villages of Sangkum and Vor Yeav. The household sample in Chey was 53, in Ampil and Sleng Kpos 51, and in Sangkum and Vor Year 50. In addition to the survey questionnaire focus group interviews were convened with local authorities, local leaders, village men, and village women. Key informant interviews were likewise conducted with selected village households.

Findings and Analysis

Background

San Kor villages

A total 155 households were surveyed in the three San Kor commune villages of Ampil, Chey, and Sleng Kpos. For the purposes of this study migrant workers were considered part of the households.²⁹ The mean household size of the 155 households interviewed was 6.52, the mean household workers 2.56, and the mean household migrant workers 0.6. Disaggregated by sex, the mean male household members was 3.27, the mean male household workers 1.39, and the mean male household migrant workers 0.25, while comparatively the mean female household members was 3.25, the mean female household workers 1.15, and the mean female household migrant workers 0.34. These figures indicate a rather small labor force in the San Kor household sample, composed almost equally of males and females, supporting relative large households.

Domrey Slab villages

In all, 100 households were surveyed in the two Domrey Slab villages of Sangkum and Vor Yeav. Again migrant workers were considered part of the households. The mean household size of the 100 households interviewed was 5.53, the mean household workers 2.64, and the mean household migrant workers 0.49. Disaggregated by sex, the mean male household members was 2.68, the mean male household workers 1.23, and the mean male household migrant workers 0.23, while comparatively the mean female household members was 2.85, the mean female household workers 1.41, and the mean female household migrant workers 0.26. In contrast to San Kor, these data point to a slightly larger labor force in the Domrey Slab household sample, comprised nearly equally of males and females, with fewer migrant workers supporting somewhat smaller households.

Experience of Floods

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 Sleng Kpos had experienced severe floods in the five year period 2000/1 to 2004/5.³⁰ Overall 152 or 98 percent of the 155 households interviewed in the three San Kor villages had 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 2000/1 and 2001/2. The incidence of severe floods for most households dropped markedly in 2002/3 and was virtually negligible in 2003/4 and 2004/5 (Table 1). In years when households did not encounter severe flooding,

²⁹ This follows Kathie Friedman who conceptualizes households as units that impose a mutual obligation on members to pool resources obtained from a multiplicity of labor forms. See Kathie Friedman, "Households as Income-Pooling Units," in *Households and the World Economy*, Joan Smith, Immanuel Wallerstein, and Hans-Dieter Evers, eds., Beverly Hills: Sage Publications, 1984, 37-55.

³⁰ The three San Kor villages are located in Zone 4 (10 meters above sea level to the National Roads) of Marko Keskinen's Tonle Sap Area topographical categories. Keskinen's other categories are Zone 1 (0 to 6 meters above sea level), Zone 2 (6 to 8 meters above sea level), Zone 3 (8 to 10 meters above sea level), and urban areas. See Keskinen, "The Lake with Floating Villages."

normal flooding usually prevailed. By contrast, the households interviewed in the Domrey Slab villages of Sangkum and Vor Yeav located outside of the Tonle Sap floodplain on the eastern border of National Road 6 had experienced no flooding at all during these years.

Year	Experienced severe flood		Experienced normal flood	
	Number	Percent	Number	Percent
2004/5	3	2%	102	66%
2003/4	9	6%	105	68%
2002/3	58	37%	70	45%
2001/2	134	86%	18	12%
2000/1	147	95%	5	3%
N=155				

Consequence of severe floods

San Kor villages

The most serious consequence of the severe floods experienced in the years 2000/1 to 2004/5 was the death of a family member which occurred in two of the households surveyed. Moreover, 134 or 88 percent of the 152 households which experienced severe floods in the five years studied encountered health problems. While not all of the ailments contracted 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.

Households treated these health afflictions in diverse and multiple ways. Household members bought medicine, went to private doctors, went to traditional Khmer healers or used traditional herbs, prayed to the spirits, went to government health centers, asked blessings from monks or *archa*, and went to hospitals. Some household members did not treat their illnesses.

In addition to the debilitating effects on human health, households attributed losses in agricultural earnings to the severe floods. Among the 152 households which encountered severe floods in the three San Kor villages, 141 or 93 percent 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.

Tellingly, more than one-fourth (43 or 28 percent) of the 152 households affected by severe floods in the five years studied had been forced to move out of their homes. These families sought temporary shelter on higher ground in the houses of relatives, in tents along the road, in schools, or in the commune office. Meanwhile nearly one-half (46 or 45 percent) of the 103 households with children of school age reported that their children were unable to go to school without interruption in years of severe floods. Reasons given for the arrested school attendance were several: parents were afraid that the children would drown, the school was underwater or damaged by flood, the teachers were not available, the children had additional chores to do in the household, or the children had to work to earn income for the family.

Assistance

San Kor villages

In the three San Kor villages surveyed 113 or 74 percent of the 152 households which suffered severe floods in the period 2000/1 to 2004/5 had received assistance in rice, rice seeds, supplies or materials. Recipient households had received assistance largely from the Cambodian Red Cross and to a lesser extent from NGOs, local authorities or political parties, relatives, friends or neighbors, and village associations.

Government agencies and NGOs had organized several responses to the severe floods in the three San Kor villages. These included food-for-work activities for the rehabilitation and repair of community infrastructure, construction materials for village wells, irrigation pumps and fuel, assistance to vulnerable groups, and links to higher government authorities.

Villagers had too organized responses to the severe floods in their communities. These included the rehabilitation and repair of community infrastructure such as canals, water gates, culverts, and roads, the distribution of water among villagers, the sharing of costs for fuel, assistance to vulnerable groups, seeking outside assistance together, reporting to higher government authorities, and attending spirit rituals.

Preparations and precautions

San Kor villages

In years of severe floods more than one half (54 percent) of 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 for placement of 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.

With regard to health precautions most households took steps to prevent health problems. These included sleeping in mosquito nets, boiling and filtering water, cleaning surrounding areas of houses and collecting animal manure, and to a lesser extent using latrines.

With respect to rice cultivation households likewise took steps to reduce crop losses. These involved greater reliance on household labor, shifting to shorter term rice varieties, shifting to flood recession rice, using flood resilient seeds, reducing fertilizer inputs, using irrigation pumps, and delaying rice transplanting.

Once the flooding of the villages had begun households took precautions to ensure the safety of household 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 2000/1. 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. Rice farmers had 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 2001/2, while not as severe, inhibited the villagers from making a quick recovery.

During periods of severe flooding Ampil villagers tried to offset losses of their inundated rice crops by shifting their immediate attention to fishing. Women likewise 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. Household members too worked as agricultural laborers for daily wages in nearby villages. 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 occurring at the turn of the century was protracted. Ampil villagers continued to rely on rice cultivation as their main source of livelihood and in subsequent years, 2002/3 to 2004/5, rice yields were diminished by droughts.

In years of normal flood and drought, rice yields in Ampil village averaged only 720 kilograms of paddy per hectare. Rice harvests in years of severe floods and droughts were even less. Farmers commonly used only one bag of fertilizer on each hectare of their rain-fed rice parcels and minimized labor costs through the use of household and exchange labor. Villagers lacked draught animals and farm tools and, more importantly, a system of canals linking paddy fields to a nearby reservoir. Some farmers tried to augment annual rice harvests by cultivating dry season rice while others expanded paddy rice farms into forested areas. Meanwhile several village rice farmers became landless as debts mounted in the wake of the floods and droughts and eventually forced them to sell their landholdings.

Floods and droughts damaged rice seedlings before transplanting and farmers had to borrow rice seed from storeowners living along the highway to replace the seedlings that had not survived. One *tao* or 12 kilograms of rice seed had to be repaid at the harvest with two or even three *tao* of rice seed. Without collateral villagers could borrow a maximum 30,000 riels (US\$ 7.5) from moneylenders with 10 per cent interest per month. In dire circumstances villagers mortgaged paddy rice land at 200,000 riels (US\$ 50) per hectare. If these loans were not repaid at the end of the crop season the mortgagors risked losing the use of their plots. Rice farmers often mortgaged paddy rice land expecting to recoup previous losses with a bountiful harvest only to experience a successive crop failure. Households sold paddy rice land too to meet the rising health costs of members suffering from ailments occasioned or exacerbated by the recurrent floods and droughts.

In the aftermath of the 2000/1 flood the Cambodian Red Cross (CRC) provided assistance initially to 10 destitute village households and then to an additional 20 vulnerable households. These households were identified by the village chief at the request of the CRC authorities. Political associations too donated supplies to villagers affiliated with their respective parties. The World Food Programme (WFP) supplied rice to households willing and able to participate in a food-for-work project to rebuild the village road. UNICEF built a pump well and provided households with hoes, vegetable seeds, and watering cans. The NGO Hagar furnished households with equipment to distill water. The NGO Shanti Volunteer Association provided villagers with materials to build a school. In large measure, these valuable contributions were one-off activities which required the villagers to meet the challenges of reconstruction primarily on their own.

During times of floods and droughts Ampil households relied principally on their own members to respond to the exigencies 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, disposed households to assist one another. Villagers helped each other to transfer animals to higher ground, to take care of young children, to transport sick persons to health centers, and to ferry students to school by boat. Neighbors likewise shared small portions of rice, fish and vegetables with each other. Understandably endemic poverty in Ampil constrained 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."*

Summary

A large majority of the households surveyed in the three San Kor villages suffered severe flooding in 2000/1 and 2001/2 and more than one-third experienced severe flooding in 2002/3. More than one-fourth of the households interviewed were forced to evacuate from their homes as a consequence of severe flooding and nearly 9 out of 10 households had members who had become ill, most commonly from diarrhea and intestinal ailments. The successive years of the severe floods caused huge and widespread losses in agricultural earnings and prevented villagers from making a swift recovery. Assistance from the Cambodian Red Cross, multilateral agencies, and NGOs was helpful albeit 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 circumscribed by the ability of poor villagers to make exchanges.

Experience of Droughts

From 2000/1 to 2004/5 households surveyed in the San Kor villages of Ampil, Chey and Sleng Kpos had experienced severe droughts. Overall 153 or 99 percent of the 155 households interviewed in the three San Kor villages had experienced a severe drought in at least one of the five years. Similarly, households surveyed across National Road 6 in the Domrey Slab villages of Sangkum and Vor Yeav had experienced severe droughts during these years. In all 98 or 98 percent of the 100 households interviewed in the two Domrey Slab villages had suffered a severe drought in at least one of the five years. Except for the crop year 2002/3 the annual incidence of severe drought was higher among households in the San Kor villages than in the Domrey Slab villages. Overall, the household experience of severe drought reached its peak in the years 2002/3 to 2003/4 (Table 2). When households in the two communes did not experience severe droughts, they usually faced normal droughts.

Year	San Kor villages				Domrey Slab villages			
	Experienced severe drought		Experienced normal drought		Experienced severe drought		Experienced normal drought	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
2004/5	67	43%	66	43%	7	7%	69	69%
2003/4	92	59%	55	35%	41	41%	53	53%
2002/3	67	43%	73	47%	76	76%	21	21%
2001/2	42	27%	66	43%	19	19%	72	72%
2000/1	34	22%	65	42%	9	9%	67	67%
	N= 155				N=100			

Consequence of severe droughts

San Kor villages

Of the 153 households which experienced severe droughts from 2000/1 to 2004/5 in the three San Kor villages, 135 or 88 percent 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 from respiratory illnesses, malnutrition, malaria, skin rashes, dengue fever, and sore eyes.

Households treated these health problems in various and multiple ways. Household members bought medicine, went to private doctors, went to government health centers, went to traditional Khmer healers or used traditional herbs, prayed to the spirits, went to hospitals, asked blessings from the monks or *archa*. Some household members did not treat their ailments.

Besides the negatives outcomes for physical well being, households attributed plunges in agricultural income to the severe droughts. Of the 153 households surveyed which endured severe droughts, 136 or 89 percent reported damaged rice seedlings or rice crops. Household also cited damaged vegetable gardens, lack of water supply, poultry (chicken and duck) diseases, poultry deaths, livestock (cow, buffalo, pig) diseases, and livestock death.

Domrey Slab villages

Of the 98 households which experienced severe droughts from 2000/1 to 2004/5 in the two Domrey Slab villages, 97 or 99 percent 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.

Households again treated these health problems in numerous and manifold ways. Household members went to private doctors, went to government health centers, bought medicine, went to hospitals, went to traditional Khmer healers or used traditional herbs, prayed to the spirits, and asked blessings from the monks or *archa*. Some household members did not treat their illnesses.

Over and above the toll exacted on human health, households ascribed declines in agricultural income to the severe droughts. Among the 98 households experiencing severe drought in the two Domrey Slab villages, 94 or 96 percent 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.

Assistance

San Kor villages

In the three San Kor villages 45 or 30 percent of the 152 affected households surveyed had received assistance in rice, rice seeds, supplies or materials in years of severe droughts. The recipient households had accepted this assistance largely from NGOs and the Cambodian Red Cross and less so from local authorities or political parties, from relatives, from friends or neighbors, from village associations, and from rich and powerful patrons.

Government agencies and NGOs had organized several responses to the severe droughts in the three villages. These included food-for-work projects for the rehabilitation and repair of village infrastructure, construction materials for building wells, facilitating contacts with higher government authorities, the supply of irrigation pumps and fuel, assistance to vulnerable groups, and the provision of water filters.

Villagers had too organized responses to the severe droughts in their communities. These included attending rituals to ask spirits for rain, the rehabilitation and repair of community infrastructure, reporting to higher government authorities, seeking outside assistance together, the distribution of water among villagers, assistance to vulnerable groups, and the sharing of costs for fuel.

Domrey Slab villages

In the two Domrey Slab villages surveyed 45 or 46 percent of 98 affected households surveyed had received assistance in rice, rice seeds, supplies or materials in years of severe droughts. The recipient households had obtained this assistance mostly from NGOs and less so from the Cambodian Red Cross, from local authorities or political parties, and from village associations.

Government agencies and NGOs had similarly organized various responses to the severe droughts in the two villages. These included food-for-work projects for the rehabilitation and repair of basic infrastructure, materials for well construction, links to higher government authorities, the provision of irrigation pumps and fuel, and direct assistance to vulnerable groups.

Villagers had likewise organized responses to the severe droughts in their communities. These included attending rituals to ask spirits for rain, rehabilitating and repairing village infrastructure, reporting to higher government authorities, distributing water among villagers, seeking outside assistance as a group, providing help to vulnerable groups, and the sharing of costs for fuel.

Preparations and precautions

San Kor villages

In years of severe droughts 30 percent of the San Kor village households affected 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 experiencing severe droughts indicated that external agencies had come to the village to discuss drought preparedness.

With regard to health most households took precautions to prevent health problems. These included sleeping in mosquito nets, boiling and filtering water, cleaning surrounding areas of houses and collecting animal manure, and less frequently using latrines. With respect to rice cultivation some households also took measures to curtail losses. These entailed using rice seeds resilient to droughts, relying more on household than on hired labor, using shorter term rice varieties, and using irrigation pumps.

Domrey Slab villages

In years of severe droughts 40 percent of the Domrey Slab village households affected 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 mention, 35 percent of the households experiencing severe droughts indicated that external agencies had come to the village to discuss drought preparedness.

With regard to health most households took care to prevent health problems. These included sleeping in mosquito nets, boiling and filtering water, collecting animal manure and cleaning surrounding areas of houses, and less frequently using latrines and vaccinating children against disease. With respect to rice cultivation most households also took steps to lessen losses. These involved using rice seeds resilient to droughts, relying more on household than on hired labor, using shorter term rice varieties, and using irrigation pumps.

Summary

Except for the crop year 2002/3 the three San Kor villages suffered a higher annual incidence of severe drought in the five years under study than the two Domrey Slab villages. This is notable given that the San Kor villages likewise endured severe floods during the same period. However, incidence of related health problems, again most commonly diarrhea and intestinal ailments, and incidence of income losses due to damaged rice seedlings or rice crops during severe droughts were slightly higher in the Domrey Slab villages. This perhaps accounts for the higher percentage of households receiving assistance during severe droughts in the Domrey Slab villages than in the San Kor villages. Still proportionally fewer households in both communes received assistance during severe droughts than did the households in San Kor which obtained aid during severe floods. Generally, needs were much less visible during severe droughts than during severe floods. Proportionally fewer households surveyed in the San Kor and Domrey Slab villages had made preparations beforehand to reduce the adverse effects of droughts compared to households in the San Kor villages which had made preparations beforehand to minimize the disastrous effects of floods.

Chey Village San Kor Commune

Chey village, situated in San Kor commune near several small lakes within the Tonle Sap floodplain, experienced perennial flooding. The worst floods in recent years occurred in 2000/1 and 2001/2. Waters rose up and covered the higher residential area of the village while destroying rice crops in the surrounding paddy fields. The 2000/1 flood was accompanied by a severe storm which lasted for seven days and nights causing extensive damage to several houses and forcing villagers to remain in their homes with only rice and salt to eat. Unable to produce their own paddy in these years of severe flooding, rice farmers subsisted on “kilogram rice” so called because it was bought by the kilogram as milled rice from Sino Cambodian traders with stores along National Road 6. The years of successive flooding drastically reduced village food stocks and polluted water resources, which in turn occasioned endemic health problems such as diarrhea, dengue fever, typhoid fever, and malaria. Without grass to eat and clean water to drink draught animals too succumbed to disease and death.

While the village school was accessible by boat parents kept their children out of school in the immediate aftermath of the floods for fear that they would drown. Without students in class the teachers took on other jobs and the school was converted into a shelter for cows. This exacerbated the damage to the school building although repair costs were later shared by the villagers. Once flood waters receded village wells and roads were similarly repaired through self-help and food-for-work efforts. At the onset of flooding the Cambodian Red Cross (CRC) had provided rice, clothes, mosquito nets, and tents to destitute households. Political parties had also distributed medicines and scarves to demonstrate their concern. Rapid recovery from the floods of 2000/1 and 2001/2 was nevertheless impeded by droughts experienced in the subsequent three years, 2002/3 to 2004/5, which to varying degrees reduced earnings from rice production.

Chey villagers indicated that among the most disadvantaged groups of people in times of floods were the physically impaired and widows. Persons with disabilities and widows living without support from other household members were seen as particularly vulnerable to the increased workloads and reduced incomes brought on by floods. Villagers cited the example of a 42 year old widow with two disabled children who at the time of the research was herself recovering from stomach tumor surgery. The widow had given birth to her disabled son at the height of the 2000/1 flood shortly before her husband had died. Since birth her son had been confined to a wheelchair. Her daughter, 13 years older than the son, suffered from a childhood affliction which prevented her from doing strenuous work such as carrying water. The widow rented a one-half hectare parcel of wet season rice land and took upon herself all the production tasks including plowing. The household's own one-hectare rice farm had been sold to pay the health costs of her husband. Struggling to repay the debt of her own medical expenses the widow traveled 10 kilometers by bicycle each day to buy and sell fish. The shock of another flood would certainly compound her difficulties.

In 2005 the 112 households living in Chey village were still largely dependent on wet season rice cultivation and fishing. At the same time individual households had differential access to land and fishery resources. The government land distribution program in the late 1980s had allocated rice plots according to household size at that time. Through the years landholdings were bought and sold, consolidated and fragmented, leaving a few village households with holdings of two to three hectares and many others with one hectare or less. About one-fifth of village households had no rice lands at all. Similarly, village households with financial capital and connections were able to subcontract fish lots from owners while households without access to such resources fished in depleted areas or worked as hired laborers for the subcontractors. To a considerable extent the ability of Chey households to meet the exigencies of floods and droughts depended on their varying access to productive resources.

In retrospect the severe flood of 2000/1 marked the break up of numerous Chey households. From that point on migrant work, which previously supplied short-term supplementary wages, became a central livelihood strategy for many households. Young single women increasingly sought out employment in Phnom Penh garment factories. Young men from the village likewise found work in Thailand, although some returned home with stories of being cheated and beaten. Husbands and fathers left their families for months at a time; and in a few deplorable instances took out loans to finance migrant expenses only to abandon their wives and children with the debts that they had incurred. While the personal costs of migrant work were undoubtedly high for the individuals involved, the remittances sent back to the village allowed countless households to survive the devastation caused by the floods and droughts that occurred in the early years of the new millennium.

While Chey residents benefited from several development activities started in the village it lacked a coordinated approach to disaster preparedness and management. To its credit the village development committee (VDC) did its best to coordinate individual efforts but the development agencies were too diverse and independent to adhere to a shared strategy. Church World Service (CWS) supported the construction of wells and school classrooms, rice and cow banks, agricultural training and seeds, and self-help savings groups. UNICEF and Adventist Development and Relief Agency (ADRA) provided wells. The pagoda committee supplied rice loans. The commune council promised to provide an irrigation water pump. But these development projects did not necessarily mitigate the shocks of floods and droughts nor build the capacity of recipients, particularly the impoverished, to deal with their consequences.

Rice Yields 2000/1 to 2004/5

San Kor villages

As a consequence of severe floods and droughts from 2000/1 to 2004/5, average rice yields in the three San Kor villages were generally low and at times reached abysmal levels (Table 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 year period occurred in the crop years 2000/1 and 2001/2 which corresponded to the highest incidences of severe floods experienced by the households surveyed. 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 2003/4 and 2004/5 when the household experience of severe floods was minimal.

Table 3. Average Household Rice Yields in Kilograms 2000/2001 to 2004/5, Ampil, Chey, and Sleng Kpos villages, San Kor commune, June 2005			
Year	Average wet season production (kg)	Average dry season production (kg)	Average total production (kg)
2004/5*	696	166	693
2003/4**	410	180	406
2002/3***	328	0	325
2001/2****	207	480	210
2000/1*****	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			

Intriguingly, average rice production in the three 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 2000/1 and 2001/2 corresponded to lower incidences of severe droughts experienced, while higher average yields in 2003/4 and 2004/5 corresponded to higher incidences of severe drought experienced. 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.

Domrey Slab villages

As a result of severe droughts from 2000/1 to 2004/5, average rice yields in the two Domrey Slab villages were predictably low (Table 4). As a means of offsetting the prevailing dependence on rain-fed wet season rice production, small numbers of the rice farmers sampled had cultivated dry season rice since the crop year 2002/3. Not unexpectedly, the lowest average yields in the five year period occurred in the crop years 2002/3 and 2003/4 which corresponded to the highest incidences of severe droughts experienced by the households surveyed. Of note, more than three-fourths of the households interviewed in the two villages experienced severe droughts in the crop year 2002/3. By comparison, higher average yields were registered in the crop years 2000/1, 2001/2 and 2004/5 when household experience of severe droughts was much lower.

Table 4. Average Household Rice Yields in Kilograms 2000/1 to 2004/5, Sangkum and Vor Yeav villages, Domrey Slab commune, June 2005			
Year	Average wet season production (kg)	Average dry season production (kg)	Average total production (kg)
2004/5*	553	432	595
2003/4**	353	216	363
2002/3***	365	97	367
2001/2****	582	---	582
2000/1*****	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			

Rice Productivity 2004/5

San Kor villages

During the years 2000/1 to 2004/5, households surveyed in the three San Kor villages recorded their highest rice yields in the crop year 2004/5. This notwithstanding rice production in that year averaged less than one-half ton per hectare (Table 5). The low productivity of rice cultivation in the three villages in even the best of years underscored the difficulty of subsistence rice farmers to overcome the shocks of severe floods and droughts previously experienced.

	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

Domrey Slab villages

By comparison, during the years 2000/1 to 2004/5 the households interviewed in the two Domrey Slab villages posted their second highest rice yields in the crop year 2004/5. While the average yield per hectare on the few dry season rice farms was encouraging, total rice production in this year likewise averaged less than one-half ton per hectare (Table 6). The low productivity of rice cultivation in the two villages in even good years demonstrated the hardship of subsistence rice cultivators to recover fully from the shocks of severe droughts encountered in the recent past.

	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

Rice Sufficiency and Reduced Rice Consumption

San Kor villages

In the three San Kor villages 141 or 99 percent of 143 rice cultivating households sampled maintained that their annual rice harvests were not normally sufficient to feed their households through an entire year. The average kilograms of paddy rice needed each year to feed members living at home in 139 of the households reporting was 1,851 kilograms. In

normal times the average rice shortage for the 139 households was 7 months but this jumped to 10.6 months in times of severe floods or droughts.

Not surprisingly, 123 or 79 percent of the 155 households surveyed in the three San Kor villages stated that they reduced their rice consumption in years of severe floods or droughts. A majority of these households perceived that the mother's rice consumption was the most reduced.

Domrey Slab villages

In the two Domrey Slab villages 88 or 92 percent of 96 rice cultivating households sampled asserted that their annual rice harvests were not normally sufficient to feed their households through an entire year. The average kilograms of paddy rice needed each year to feed members living at home in 86 of the households reporting was 1,630 kilograms. Ordinarily, the average rice shortage for the 86 households was 4.4 months but this increased to 8.4 months in times of severe droughts.

Not unexpectedly, 82 or 82 percent of the 100 households interviewed in the two Domrey Slab villages declared that they reduced their rice consumption in years of severe droughts. Most of these households reported that the mother's rice consumption was the most reduced.

Ownership and Rental of Paddy Rice Land

San Kor villages

In the three San Kor villages the number of households that owned paddy rice land in 2000 and in 2005 remained practically constant. However, while the average areas of paddy rice land owned decreased only slightly, the number of households owning 0.5 hectares or less increased by 19 percent. During the same five years, the number of households in the three San Kor villages that rented paddy rice land rose from 13 to 26 percent of the sample surveyed, while the average areas of rented rice land similarly decreased (Table 7). This indicated a decrease in the landholding size of many, amid an increase in the tendency to rent.

	San Kor villages		Domrey Slab villages	
	2000	2005	2000	2005
Average paddy rice land owned*	1.83 ha	1.59 ha	1.23 ha	1.21 ha
Average paddy rice land rented**	0.95 ha	0.70 ha	0.59 ha	0.73 ha
	*N=133 in 2000 and 135 in 2005 **N=20 in 2000 and 40 in 2005		*N=84 in 2000 and 99 in 2005 **N=11 in 2000 and 16 in 2005	

In 2005, 20 of the 155 households surveyed in the three San Kor villages did not own paddy rice land. Meanwhile in the same year 37 households interviewed in these villages owned 0.5 hectares or less. With 20 households absolutely landless and 37 households near landless (0.5 hectares or less), 57 or 37 percent of all households surveyed in the three San Kor villages were paddy rice land deficient. By contrast, in 2005, 28 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 households lacking sufficient land areas for food production and as collateral for loans more likely to suffer further marginalization as a consequence of severe floods and droughts.

Domrey Slab villages

By comparison, in the two Domrey Slab villages the number of households that owned paddy rice land in 2000 and in 2005 increased by 18 percent. However, while the average farm size remained about the same, the number of households owning 0.5 hectares or less increased by 45 percent. Meantime, the number of households in the Domrey Slab villages that rented paddy rice land rose during the intervening years from 11 to 16 percent of those surveyed, while the average areas of rented land likewise increased (Table 7). This revealed that the overall increase in landowners occurred alongside a decrease in the landholding size of others, at a time when renting land for cultivation was on the rise.

In 2005, only one of the 100 households surveyed in the two Domrey Slab villages did not own paddy rice land. However, in that year 29 households interviewed in these villages owned 0.5 hectares or less. With one household absolutely landless and 29 households near landless (0.5 hectares or less), 30 or 30 percent of all households surveyed in the two Domrey Slab villages lacked sufficient paddy rice land. By comparison, in 2005 8 percent of all households surveyed in these villages owned more than two hectares of paddy rice land. Differential access to paddy rice land existed among households in the Domrey Slab villages but was less pronounced than that evident in the San Kor villages.

Selling, Buying, Mortgaging, and Clearing Land

San Kor villages

In the years 2000/1 to 2004/5, 20 households in the three San Kor villages surveyed reportedly sold an average 1.87 hectares or 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 three villages mortgaged to others an average 0.80 hectares or total 20.8 hectares of paddy rice land. Notably, 17 of the 26 households mortgaged their paddy rice land to others as a result of floods or drought (Table 8). The sale and mortgage of paddy rice lands considerably depleted the stock of assets needed by subsistence farmers to achieve a full recovery from severe floods and droughts and still pursue rice cultivation as their primary livelihood activity.

In the years 2000/1 to 2004/5, numerous households in the three San Kor villages surveyed had augmented paddy rice landholdings. A total 14 households in the three villages reported that they had bought an average 0.87 hectares or total 12.18 hectares of paddy rice land. Meanwhile 11 households in the three villages had acquired an average 0.48 hectares or total 5.28 hectares of paddy rice land through mortgage. These numbers paled compared to the 45 households that had enlarged their holdings by clearing an average 1.02 hectares or total 45.9 hectares of forest land for paddy rice cultivation (Table 8). The conversion of forest areas into paddy fields threatened to undermine the watershed so crucial to the regulation of floods and droughts.

Table 8. Paddy Rice Land Sold, Bought, Mortgaged Out, and Mortgaged In and Forest Land Cleared in Hectares in Years 2000/1 to 2004/5, by Household, Ampil, Chey, and Sleng Kpos villages, San Kor commune and Sangkum and Vor Yeav villages, Domrey Slab commune, June 2005				
	San Kor villages		Domrey Slab villages	
	Average areas	Total areas	Average areas	Total areas
Sold*	1.87 ha	37.4 ha	1.17 ha	3.51 ha
Bought**	0.87 ha	12.18 ha	0.60 ha	6.6 ha
Mortgaged Out***	0.80 ha	20.8 ha	0.43 ha	4.3 ha
Mortgaged In****	0.48 ha	5.28 ha	0.79 ha	3.16 ha
Forest Land Cleared*****	1.02 ha	45.9 ha	0.58 ha	20.3 ha
	*N=20 (13% of total 155 n) **N=14 (9% of total 155 n) ***N=26 (17% of total 155 n) ****N=11 (7% of total 155 n) *****N=45 (29% of total 155 n)		*N=3 (3% of total 100 n) **N=11 (11% of total 100 n) ***N=10 (10% of total 100 n) ****N=4 (4% of total 100 n) *****N=35 (35% of total 100 n)	

Domrey Slab villages

By comparison, in the years 2000/1 to 2004/5, three households in the two Domrey villages surveyed reportedly sold an average 1.17 hectares or total 3.51 hectares of paddy rice land. All three households sold their paddy rice land as a consequence of droughts. Similarly, during these years 10 households mortgaged to others an average 0.43 hectares or total 4.3 hectares of their paddy rice land. Here again eight of the 10 households mortgaged their paddy rice land to others as a result of droughts (Table 8). The sale and mortgage of paddy rice diminished the capacity of rice farmers to fully overcome the severe droughts and still pursue rice cultivation as their main livelihood activity.

In the years 2000/1 to 2004/5 several households in the two Domrey Slab villages surveyed sought to increase their paddy rice landholdings. In all 11 households in the two villages declared that they had bought an average 0.60 hectares or total 6.6 hectares of paddy rice land. Moreover, four households in the two villages had acquired an average 0.79 hectares or total 3.16 hectares of paddy rice land through mortgage. By far the largest number, 35 households in the two villages acknowledged that they had cleared an average 0.58 hectares or total 20.3 hectares of forest land for paddy rice cultivation (Table 8). 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.

Summary

The three San Kor and two Domrey 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 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 Domrey Slab villages were at their lowest during the highest incidence of severe droughts. Even in the best of years and despite their location in two distinct ecological zones, rice productivity in the villages of both communes averaged less than one-half ton 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.

Sales and mortgages of paddy rice lands in the San Kor and Domrey Slab villages were predominantly a consequence of severe floods and droughts. The loss of rice farms made it difficult for subsistence households to fully recover from the exigencies of 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, Domrey 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 Domrey Slab villagers an alternative way to expand their landholdings although the practice diminished the natural resource base so important for water management.

**Sleng Kpos Village
San Kor Commune**

Sleng Kpos village, located in San Kor commune, was subject to annual flooding. The devastating flood in 2000/1 lasted for three months and forced residents to seek shelter in the homes of relatives on higher ground outside of the village. Several houses in Sleng Kpos collapsed under the force of the rushing waters and bridges linking the village to the town were completely destroyed. Villagers conducted their own rescue missions with boats ferrying elderly relatives and neighbors to safety. Untold numbers of pigs and calves were swept away by the flood waters. Cows were brought to a nearby plateau and men from the village took turns to guard them. The rice crop for that year was totally decimated.

Sleng Kpos villagers remembered the destructive 2000/1 flood not as an atypical event but as the start of an era of recurrent crop disasters. In 2001/2 flood waters again inundated the village and ruined the entire rice crop. In 2002/3 rising waters from the lakes submerged rice fields and followed by late season drought caused extensive crop damage. In 2003/4 and 2004/5 droughts, which replaced floods as the main source of distress, drastically reduced rice yields. In some years farmers produced only rice seed for the following season and had even to sell jewelry and other assets to replenish this valuable commodity.

Successive crops failures over several years meant that nearly all households in Sleng Kpos reduced their food consumption. During the years of severe flooding most households ate boiled rice only once a day and rice porridge once again as a supplement. Villagers enriched these meals with morning glory or water lilies gathered from ponds. Chronic malnutrition stunted the growth of young children and left them prone to communicable diseases. Pregnant women lacking proper nutrition likewise became more susceptible to prenatal complications. Although rice harvests improved in 2003/4 and 2004/5 most households still suffered food shortages for several months of the year.

The severe flooding occurring early in the new century brought renewed attention to a crucial aspect of Sleng Kpos rice field topography. About half of the village rice fields was located in the lower area near the lakes, while the other half was situated in the upper area. Most households cultivated plots in each of the demarcated areas with the lower portion more acutely affected by rising flood waters. Attempts to cultivate dry season rice on lower parcels proved unsuccessful. Unwilling more and more each year to invest labor and money in the high risk lower plots, households came to leave these parcels uncultivated and limited their rice production to the upper farms. This practice inevitably led to a shift in livelihood strategies as households were compelled to augment their reduced earnings from rice production. In 2005 four-fifths of the 114 village households cultivated their own rice farms. The remaining one-fifth of village households were landless.

Given the proximity of the lakes connected to the Tonle Sap, fishing was an important livelihood source for many Sleng Kpos households. While some household members traveled the 10 kilometers back and forth to the fishing grounds each day, others spent the whole season living by the lakes after the rice harvest was stored. Villagers normally used bamboo traps to catch fish. They were, however, restricted in the areas where they could fish. The entire lake region was divided into fishing lots controlled by private businessmen, and more recently by local communities, who were awarded concessions by the government. Villagers were prohibited from fishing in these lots unless they had sharing agreements with the owners. At the same time, young men and even women hired out their labor to the fish lot owners and pulled nets in the lots for wages. The presence of police effectively enforced the regulations governing the concessions.

The prolonged unproductivity of the village rice regime gave impetus to the outflow of migrant workers from Sleng Kpos. Initially Thailand was a popular destination point and agents came to the village to collect groups of young men in trucks. This changed quickly as a result of widespread mistreatment by Thai employers and police. Workers often returned from Thailand after having been cheated, robbed, and beaten, and without money to repay their debts. Most migrant laborers from Sleng Kpos stopped going to Thailand preferring instead to take advantage of work available in Preah Vihear province. While the pay was much less (only 4,000 riel or one US dollar per day) family members and friends traveled and worked there together without fear of recrimination. Young women from the village also took advantage of work available in the Phnom Penh garment factories earning US\$ 50 to 60 per month. Younger girls worked as domestic helpers in Phnom Penh receiving 50,000 to 60,000 riels (US\$ 12.50 to 15) per month.

Sleng Kpos was hit hard by the 2000/1 flood and the Cambodian Red Cross (CRC) provided all village households with 25 kilograms of milled rice, one scarf, one mosquito net, and one mat. The World Food Program (WFP) subsequently supplied village households with milled rice in food-for-work schemes to repair the village roads and bridges. During the 2001/2 flood the CRC again provided disaster relief assistance but this time to only the most destitute households. Villagers provided shelter and loaned rice to each other at the height of the floods but offered little assistance to one another in the aftermath of droughts which had the appearance of normal times.

Credit

San Kor villages

From 2000/1 to 2004/5, 97 or 63 percent of the 155 households surveyed in the three San Kor villages had borrowed rice or money to buy rice during times of normal or no floods or droughts. Many borrowers had obtained loans from more than one source. By far the highest single percentage of the household borrowers had obtained loans from moneylenders who invariably charged interest. Smaller percentages of household borrowers had received loans from relatives or friends/neighbors who, for the most part, did not charge interest. No one had borrowed from formal banking institutions (Table 9). These trends revealed the huge need to borrow rice or money to buy rice even in normal times, as well as the reliance on moneylenders rather than relatives or neighbors/friends as the predominant source of credit. While the dependence on moneylenders may be explained partially by the diminished ability of relatives or neighbors/friends to supply loans, it likewise suggested that market transactions had triumphed over exchanges of mutual assistance.

The exigency of households to borrow rice or money to buy rice became even more acute in times of natural disaster. From 2000/1 to 2004/5, 141 or 91 percent of the 155 households surveyed in the three San Kor villages had borrowed rice or money to buy rice in times of severe floods or droughts. Again many borrowers had obtained loans from more than one source. As in normal times, the single largest percentage of the household borrowers had acquired credit from moneylenders who charged interest. Smaller percentages of household borrowers had acquired loans from relatives or friends/neighbors who did not ordinarily charge interest. Few households had borrowed from commercial and government banks (Table 9). Once again strictly delineated market transactions prevailed over multi-stranded relationships of mutual sharing.

During the years 2000/1 to 2004/5, 113 or 73 percent of the 155 households in the three San Kor villages had too borrowed large sums of money to recover from the consequences of severe floods or droughts. The principal source of this credit was moneylenders. Relatives, village credit groups, traders/stores, and friends/neighbors likewise provided capital. The

loans from moneylenders, village credit groups, and traders/stores normally entailed interest, while those from relatives and friends/neighbors ordinarily did not.

	During times of normal or no floods or droughts				During times of severe floods or droughts			
	Source of credit		Loans with Interest		Source of credit		Loans with interest	
	Number of household borrowers	% of total	Number of household borrowers	% of loan source	Number of household borrowers	% of Total	Number of household borrowers	% of loan source
Moneylender	63	65%	62	98%	95	67%	93	98%
Relatives	29	30%	4	14%	46	33%	5	11%
Friends/ Neighbors	21	22%	7	33%	41	29%	13	32%
Village credit group/SHGs	14	14%	13	93%	23	16%	23	100%
Trader/Store	11	11%	10	91%	18	13%	17	94%
Employer	4	4%	3	75%	3	2%	2	67%
Village rice bank	2	2%	2	100%	5	3%	5	100%
Commercial/ government bank	---	---	---		3	2%	3	100%
NGO	---	---	---		2	1%	1	50%
	N=97				N=141			

The 113 household recipients of large loans used the money primarily to pay health costs and to re-invest in agricultural production (seeds, fertilizer, and labor inputs). Less frequently, households used the loans to invest in productive activities besides agriculture (e.g. fishing or small businesses), to replenish livestock or start up new livestock rearing, to pay interest on other existing loans, to finance migrant workers, and to repair or reconstruct houses. Despite growing evidence that rice farming was in crisis, the household borrowers of large loans tried to reestablish their lives along lines prevailing in the past.

Domrey Slab villages

From 2000/1 to 2004/5, 47 or 47 percent of the 100 households surveyed in the two Domrey Slab villages had borrowed rice or money to buy rice during times of normal or no droughts. The highest single percentage of the household borrowers had received loans from relatives who did not usually charge interest. Significant percentages of household borrowers had likewise obtained loans from moneylenders and traders who universally charged interest. No one had borrowed from banks (Table 10). The pattern in the two villages disclosed a substantial, though not overwhelming, need to borrow rice or money to buy rice in normal times as well as a mixed reliance on relatives and friends/neighbors versus moneylenders and traders as the main sources of credit. In normal times exchanges of mutual assistance had yet to be subsumed by market transactions.

In the years 2000/1 to 2004/5 the need of households to borrow rice or money to buy rice rose considerably during times of severe droughts and encompassed 82 or 82 percent of the 100

households surveyed in the two villages. By a wide margin moneylenders, despite the interest they charged, became the single largest source of credit during severe droughts. Meanwhile household borrowers continued to acquire loans from relatives and friends/neighbors who, by and large, did not charge interest. Again no one borrowed from formal banking sources (Table 10). Unlike in normal circumstances, relatives and friends/neighbors were unable to meet the expanding need for credit during severe droughts, which was increasingly supplied by moneylenders and traders.

	During times of normal or no droughts				During times of severe droughts			
	Source of credit		Loans with Interest		Source of credit		Loans with interest	
	Number of household borrowers	% of total	Number of household borrowers	% of loan source	Number of household borrowers	% of Total	Number of household borrowers	% of loan source
Relatives	19	40%	7	37%	21	26%	7	33%
Moneylender	17	36%	17	100%	44	54%	44	100%
Trader/store	15	32%	15	100%	21	26%	21	100%
Friends/neighbors	14	30%	9	64%	21	26%	10	48%
Employer	11	23%	11	100%	14	17%	14	100%
Village credit group/SHGs	3	6%	3	100%	10	12%	10	100%
Village rice bank	1	2%	1	100%	4	5%	4	100%
Commercial/government bank	---	---	---	---	---	---	---	---
NGO	---	---	---	---	2	2%	2	100%
	N=47				N=82			

During the years 2000/1 to 2004/5, 70 or 70 percent of the 100 households in the two Domrey Slab villages had borrowed large sums of money to recover from the consequences of severe droughts. The primary sources of this credit were moneylenders, traders/stores, relatives, employers, friends/neighbors, and village credit groups. The loans from moneylenders, traders/stores, employers, and village credit groups usually carried interest, while those from relatives and friends/neighbors ordinarily did not.

The 70 household borrowers of large loans used the money mainly to re-invest in agricultural production (seeds, fertilizer, and labor inputs) and to pay health costs of household members. Less frequently households used the money to replenish livestock or start up new livestock rearing, to repay interest on other existing loans, to invest in productive activities other than agriculture, and to finance migrant workers. The experience of successive droughts notwithstanding, the household borrowers of large loans sought to rebuild their lives along preexisting patterns.

Migrant Work

San Kor villages

In the San Kor villages of Ampil, Chey, and Sleng Kpos members from 91 or 59 percent of the 155 households surveyed left their villages after severe floods and droughts in the years 2000/1 to 2004/5 to work as migrant workers. Migrant laborers were mostly daughters or daughters-in-law and sons or sons-in-law, and less often fathers, mothers, and others living in the household. Clearly, younger adults in the households were better able to take advantage of job opportunities away from home.

Migrant workers from the San Kor villages had worked principally as garment factory employees in Phnom Penh and as agricultural laborers at the Thai Cambodian border. Less frequently, the migrants worked as construction, transport, and domestic workers inside Cambodia and Thailand, as fish laborers in the Tonle Sap, and as agricultural laborers inside Cambodia. The jobs of the migrant workers were thus highly contingent on a strong local garment industry and on a vibrant Thai economy.

Migrant workers from the San Kor villages had gotten jobs by relying on friends or neighbors, relatives, their own selves, and recruitment agents. This indicated that networks built on personal relationships served to link villagers to earning opportunities. A majority of the households considered the work of their migrant members as temporary, others regarded it as permanent, and some looked at it as both temporary and permanent. In large measure, migrant work was not viewed as a first move out of a disaster prone area but as a strategy to rehabilitate and support village livelihoods that had been debilitated and decimated by the shocks of severe floods and droughts.

Domrey Slab villages

In the Domrey Slab villages of Sangkum and Vor Yeav members from 50 or 50 percent of the 100 households surveyed left their villages after severe droughts in the years 2000/1 to 2004/5 to work as migrant workers. Migrant laborers were mainly daughters or daughters-in-law, fathers, and sons or sons-in-law. Mothers and others living in the household were much less involved. Here again the traditional pattern of fathers taking the lead role in finding temporary work outside the village was counterbalanced by the sizable presence of young adult women and men in the migrant labor force.

Migrant workers from the Domrey Slab villages had worked mostly as agricultural laborers at the Thai Cambodian border and as garment factory employees in Phnom Penh. Less often, the migrants worked as construction, transport, and domestic workers inside Thailand and Cambodia, as fish laborers in the Tonle Sap, and as agricultural laborers inside Cambodia. This pattern underscored the relative importance of jobs generated by the Thai economy and by the globally competitive garment industry for the migrant workers from the two villages.

Migrant laborers from the Domrey Slab villages had acquired work by relying on relatives, friends or neighbors, their own selves, and recruitment agents. Here again networks built on personal relationships proved valuable in sustaining livelihoods. A majority of the households deemed the work of their migrant members as temporary, others gauged it as permanent, and some assessed it as both temporary and permanent. For the most part, migrant work was not

seen as a path towards a better life outside the village but as a way to improve the immediate circumstances of those members living at home.

**Sangkum Village
Domrey Slab Commune**

Sangkum was the largest of five villages in Domrey Slab commune with a population of 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 2002/3 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. Ailments such as 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 from 30 to 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 first exhausted their savings to buy rice. Then they borrowed money from relatives and neighbors. Next they approached merchants with stores along National Road 6. The traders charged 10 per cent interest per month and before long borrowers were embroiled in debt. Poorer households without collateral had to have relatives guarantee their loans. Several households mortgaged their farms and a few sold agricultural lands to raise money to pay for health costs or to finance migrant work.

With wet season rice farming decimated by the successive droughts from 2000/1 to 2002/3, 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. While these activities helped to sustain the subsistence of the drought-stricken rice cultivating households, mounting debts and persistent crop failures soon made it clear that only migrant work could generate the earnings needed to overcome the protracted years of drought.

Most migrants from Sangkum worked as agricultural laborers along the Thai Cambodian border. Several members from one household would travel together to take advantage of this seasonal work. Men working deep inside of Thailand were more likely to be cheated by employees or arrested by the police. Groups of men with cows and carts reached as far as Preah Vihear province to cut and transport logs back to the village for sale. Some men found work at construction sites in Phnom Penh. Young women from about 15 households obtained employment at garment factories in Phnom Penh. Since all migrant workers were necessarily able-bodied and mobile, households without such members were, by default, unable to earn from this somewhat lucrative work.

At the time of the severe drought in 2002/3, the Cambodian Red Cross (CRC) provided milled rice and rice seeds to more than 20 destitute households. The villagers helped each other with small amounts of rice or cash. The pagoda committee assisted the elderly. The international NGO Church World Service (CWS) undertook a food-for-work project to dig irrigation canals and reconstruct roads as part of its larger community development program. CWS also built wells, formed self-help savings groups, and provided food to school children. All of these efforts diminished the adverse consequences of the droughts. But only a large scale irrigation scheme would transform the village's rice regime into a reliable and productive livelihood source.

Sources of Cash Income 2005 and 2000

San Kor villages

In the three San Kor villages the sale of fish and fish products was by far the single most important source of cash income in 2005 for the households surveyed as it had been five years earlier in 2000. Wages from agricultural labor and the sale of poultry and poultry products were likewise major sources of cash income in both years. Overall the relative importance of cash income sources had changed little over the five year period except perhaps for a rise in 2005 of the number of households earning from migrant labor remittances (Table 11).

Domrey Slab villages

By comparison, in the two Domrey Slab villages the sale of poultry and poultry products stood out as the single most common source of cash income in 2005 for the households interviewed as it had been in 2000. Wages from agricultural and non-agricultural labor around the village were also important sources of cash income in both 2005 and 2000. By and large, the relative importance of cash income sources had remained similar over the five year interval with the notable exception that the number of households earning from migrant worker remittances had more than doubled. Living outside the Tonle Sap Lake floodplain the sale of fish and fish products was much less pronounced in the Domrey Slab villages as compared to the San Kor villages. By contrast, the sale of logs and the sale of charcoal which were prominent sources of cash income in the Domrey Slab villages were virtually absent in the San Kor villages, (Table 11).

	San Kor villages				Domrey Slab villages			
	2005		2000		2005		2000	
	#	%	#	%	#	%	#	%
Sale of fish and fish products	109	70%	115	74%	21	21%	19	19%
Wages from agricultural labor around the village	82	53%	83	53%	52	52%	48	48%
Sale of poultry and poultry Products	82	53%	84	54%	63	63%	59	59%
Wages from labor (other than agriculture) around the village	60	39%	60	39%	40	40%	39	39%
Remittances from migrant Labor	59	38%	45	29%	39	39%	17	17%
Sale of livestock and livestock Products	51	33%	60	39%	22	22%	25	25%
Sale of crops	48	31%	45	29%	25	25%	21	21%
Sale of manufactured goods bought in market	17	11%	12	8%	9	9%	9	9%
Sale of logs	1	1%	1	1%	32	32%	35	35%
Cash gifts from relatives	1	1%	1	1%	4	4%	3	3%
Sale of charcoal	---	---	---	---	20	20%	19	19%
	N=155				N=100			

Rank of Livelihood Sources 2005

San Kor villages

In the three San Kor villages the households surveyed supported their 2005 livelihoods through a multiplicity of earning activities. Within this range of earning opportunities the households as a whole ranked crop production and the sale of fish, poultry, and livestock as their most important livelihood sources. Of note, local wage work was regarded as more important than migrant work (Table 12). Nevertheless, household ranking of migrant work as an important livelihood source had risen from 35 percent in 2000 to 46 percent in 2005. Given household experience of severe floods and droughts from 2000 to 2005 and the low rice yields that resulted, household reliance on crop production as the most important livelihood source loomed ominous. Without comprehensive measures taken to reduce the consequences of floods and droughts, it was unlikely that villagers dependent on the disaster-prone subsistence rice regime would achieve food security and prosperity.

Livelihood sources	Cultivating rice & other crops		Sale of fish, poultry & livestock		Local wage work		Migrant work		Sale of manufactured goods bought in market		Sale of charcoal & forest products and palm sugar	
	#	%	#	%	#	%	#	%	#	%	#	%
First most important	91	72%	41	32%	14	15%	10	14%	---	---	2	50%
Second most important	21	17%	74	57%	37	38%	14	19%	2	11%	1	25%
Third most important	12	9%	13	10%	30	31%	28	39%	11	61%	---	---
Fourth most important	---	---	1	1%	14	15%	17	24%	4	22%	---	---
Fifth most important	---	---	---	---	1	1%	3	4%	1	6%	1	25%
Sixth most important	2	2%	---	---	---	---	---	---	---	---	---	---
	N=126		N=129		N=96		N=72		N=18		N=4	
% of total 155 households	81%		83%		62%		46%		12%		3%	

Domrey Slab villages

In the two Domrey Slab villages the households interviewed similarly supported their 2005 livelihoods through numerous earning endeavors. Within this extent of earning possibilities the households as a whole assessed crop production and the sale of poultry, livestock, and fish as their most important livelihood sources. Of interest, the sale of charcoal and forest products ranked close to the importance of local wage work and migrant work (Table 13). While local wage work was judged slightly more important than migrant work, household ranking of migrant work as an important livelihood source had risen from 32 percent in 2000 to 43 percent in 2005. Considering household experience of severe droughts from 2000 to 2005 and the diminished rice yields that followed, household dependence on crop production as the most important livelihood source was precarious. Without the provision of irrigation systems, household sufficiency in rice production would remain elusive.

Livelihood sources	Cultivating rice & other crops		Sale of fish, poultry & livestock		Local wage work		Migrant work		Sale of charcoal & forest products and palm sugar		Sale of manufactured goods bought in market	
	#	%	#	%	#	%	#	%	#	%	#	%
First most important	71	77%	9	14%	11	25%	4	9%	4	10%	2	20%
Second most important	12	13%	34	53%	17	39%	7	16%	17	44%	4	40%
Third most important	4	4%	19	30%	10	23%	15	35%	16	41%	3	30%
Fourth most important	4	4%	2	3%	6	14%	12	28%	2	5%	1	10%
Fifth most important	1	1%	---	---	---	---	5	12%	---	---	---	---
	N=92		N=64		N=44		N=43		N=39		N=10	
% of total 100 households	92%		64%		44%		43%		39%		10%	

Rank of Expenditures 2005

San Kor villages

Household ranking of expenditures in 2005 in the three San Kor villages further revealed the subsistence nature of those interviewed. The households surveyed declared that they had spent most of their income on food, health costs, and the repayment of debt. Investments in productive assets and small businesses were minimal (Table 14). A similar trend was discernable in the households' ranking of expenditures in 2000, revealing a protracted experience of subsistence conditions. Not surprisingly, 93 percent of the households sampled reported that they had spent more money in years of severe droughts and floods than in other years.

Expenditures	Food		Health costs		Repayment of debt		Agricultural inputs		Buy assets		Investment in small business	
	#	%	#	%	#	%	#	%	#	%	#	%
Most money spent	143	92%	6	4%	2	1%	2	2%	1	5%	1	4%
Second most money spent	10	6%	78	53%	30	22%	31	34%	2	9%	1	4%
Third most money spent	2	2%	43	29%	60	43%	31	34%	4	19%	7	32%
Fourth most money spent	---	---	18	12%	42	30%	22	24%	4	19%	4	18%
Fifth most money spent	---	---	2	1%	4	3%	3	3%	7	33%	7	32%
Sixth most money spent	---	---	---	---	---	---	1	1%	3	14%	2	9%
	N=155		N=147		N=138		N=90		N=21		N=22	
% of total 155 hh	100%		95%		89%		58%		13%		14%	

Domrey Slab villages

Similarly household ranking of expenditures in 2005 in the two Domrey Slab villages further underscored the subsistence character of those surveyed. The households interviewed ascertained that they had spent most of their income on food, health expenses, and the repayment of debt. Investments in productive assets and small businesses were negligible (Table 15). A comparable pattern was evident in the households' ranking of expenditures in 2000, indicating a lengthy experience of subsistence living. Not unexpectedly, 96 percent of the households sampled maintained that they had spent more money in years of severe droughts than in other years.

Table 15. Rank of Expenditures According to the Most Money Spent by Household in 2005, Sangkum and Vor Yeav villages, Domrey Slab commune, June 2005

Expenditures	Food		Health costs		Repayment of debt		Agricultural inputs		Buy assets		Investment in small business	
	#	%	#	%	#	%	#	%	#	%	#	%
Most money spent	95	95%	6	6%	1	1%	2	3%	---	---	---	---
Second most money spent	5	5%	43	44%	12	17%	35	55%	1	17%	1	25%
Third most money spent	---	---	40	41%	31	43%	12	19%	1	17%	1	25%
Fourth most money spent	---	---	7	7%	28	39%	13	20%	1	17%	1	25%
Fifth most money spent	---	---	2	2%	---	---	2	3%	3	50%	1	25%
	N=100		N=98		N=72		N=64		N=6		N=4	
% of total 100 hh	100%		98%		72%		64%		6%		4%	

Assets

House Construction Materials, Livestock, and Durable Goods

San Kor villages

In the three San Kor villages 122 or 81 percent of the 151 households surveyed which owned their own homes in 2005 had houses built on slits above the ground. This compares to 101 or 69 percent of the 147 households which owned their own homes in 2000. The walls and roofs of the large majority of houses in both 2005 and 2000 were built of bamboo or thatch, although in 2005 there was an increase in walls made of wood and roofs made of ceramic tiles.

In the three San Kor villages 103 or 66 percent of the 155 household surveyed owned livestock in 2005 compared to 101 or 65 percent of the same household sample in 2000. With the exception of water buffaloes average numbers of animals owned had decreased or remained the same in 2005 from 2000 (Table 16). From 2000 to 2005, 73 or 60 percent of 121 livestock owning households sampled had sold animals to raise money to deal with the consequences of floods and droughts.

In the three San Kor villages the 155 households surveyed had collectively owned more durable goods in 2005 than in 2000, although with the exception of bicycles ownership of specific items remained less than 50 percent (Table 17). During the years 2000 to 2005, 25 or 16 percent of 152 household reporting had sold durable goods to raise money after floods or droughts.

Table 16. Mean Number of Livestock Owned in 2000 and 2005, by Household, Ampil, Chey, and Sleng Kpos villages, San Kor commune and Sangkum and Vor Yeav villages, Domrey Slab commune, June 2005				
	San Kor villages		Domrey Slab villages	
	Mean number owned in 2005	Mean number owned in 2000	Mean number owned in 2005	Mean number owned in 2000
Water buffalo*	3.8	2.9	2.1	2
Cow/oxen**	3.3	3.8	1.9	2.3
Pigs***	1.9	1.9	1.7	1.5
Horses****	1	3	2	2
	*N= 5 in 2005 and 14 in 2000 **N= 94 in 2005 and 91 in 2000 ***N= 55 in 2005 and 47 in 2000 ****N= 2 in 2005 and 3 in 2000		*N= 35 in 2005 and 31 in 2000 **N= 55 in 2005 and 44 in 2000 ***N= 38 in 2005 and 38 in 2000 ****N= 1 in 2005 and 1 in 2000	

Domrey Slab villages

In the two Domrey Slab villages 80 or 82 percent of the 98 households interviewed which owned homes in 2005 had houses built on slits above the ground. This compares to 67 or 68 percent of 98 households which owned homes in 2000. The walls and roofs of the large majority of houses in both 2005 and 2000 were built of bamboo or thatch, although in 2005 there was an increase in walls made of wood and roofs made of ceramic tiles.

In the two Domrey Slab villages 72 or 72 percent of the 100 households interviewed owned livestock in 2005 as did the same household sample in 2000. With the exception of cows/oxen average numbers of animals owned had increased or remained the same in 2005 from 2000 (Table 16). From 2000 to 2005, 33 or 40 percent of 83 livestock owning households sampled had sold animals to raise money to meet with the consequences of droughts.

In the two Domrey Slab villages the 100 households interviewed had owned slightly more durable goods in 2005 than in 2000, although with the exception of bicycles and animal drawn carts ownership of particular items was less than 50 percent (Table 17). During the years 2000 to 2005, 17 or 17 percent of 99 households reporting had sold durable goods to raise money after droughts.

Table 17. Assets Owned in 2005 and 2000, by Household, Ampil, Chey, and Sleng Kpos villages, San Kor commune and Sangkum and Vor Yeav villages, Domrey Slab commune, June 2005								
	San Kor villages				Domrey Slab villages			
	2005		2000		2005		2000	
	#	%	#	%	#	%	#	%
Bicycle	114	73%	86	56%	80	80%	67	67%
Fishing boat without motor	75	48%	70	45%	3	3%	1	1%
Animal drawn cart	65	42%	63	41%	56	56%	52	52%
Radio or cassette player	47	30%	28	18%	29	29%	20	20%
Television	40	26%	13	8%	11	11%	10	10%
Jewelry	20	13%	11	7%	6	6%	6	6%
Motorbike	8	5%	7	4%	11	11%	6	6%
Fishing boat with motor	7	4%	5	3%	---	---	---	---
Sewing machine	7	4%	4	3%	---	---	---	---
Rice mill	5	3%	3	2%	7	7%	4	4%
Thresher	1	1%	---	---	1	1%	1	1%
Car/truck	1	1%	---	---	---	---	---	---
CD, VDC or DVD player	1	1%	---	---	2	2%	2	2%
	N=155				N=100			

Summary

With regard to credit, households in the San Kor villages borrowed rice or money to buy rice more frequently than did households in the Domrey Slab villages in both normal and disaster times. Nonetheless, the need of households to borrow to have rice was extremely high in both communes during times of disaster. More than two-third of the households in both communes also 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 that this entailed. The heavy reliance on moneylenders for credit indicated that although informal money supplies prevailed, market transactions had largely replaced multi-stranded exchanges of mutual assistance.

After the severe floods and droughts migrant workers from nearly three-fifths of the San Kor households and one-half of the Domrey Slab households left their villages to augment the earnings of their households. Young adult women and men comprised the largest share of the migrant labor force and worked respectively, for the most part, as garment workers in Phnom Penh and as agricultural laborers in Thailand. Migrant workers relied mainly on networks of friends, neighbors, relatives and recruitment agents to help them get their jobs. A large majority of households considered the work of their migrant members as temporary.

Sources of cash income had changed little from 2000 to 2005 with the noticeable exception that earning from migrant work remittances had risen in the villages of both communes. Earning from the sale of fish and fish products remained paramount in the three San Kor villages situated in the Tonle Sap floodplain. By contrast, earning from the sale of logs and the sale of charcoal were prominent in the two Domrey Slab villages located in proximity to forest areas. Earning from agricultural and non-agricultural wage labor was high in villages of both communes over the five year period.

In 2005, nearly 60 percent of all the San Kor households surveyed, and 71 percent of all the Domrey Slab households surveyed, ranked cultivating rice and other crops as their most important livelihood source. Considering household experience of severe floods and droughts from 2000 to 2005 and the low rice yields that resulted, household reliance on crop production as the most important livelihood source loomed precarious. Without comprehensive water management measures taken to reduce the consequences of floods and droughts, it was unlikely that villagers dependent on the disaster-prone subsistence rice regimes would achieve food security and well-being.

In 2005, household ranking of expenditures in the San Kor and Domrey Slab villages further revealed the subsistence nature of those interviewed. The households interviewed in both communes reported that they had spent most of their income on food, health costs, and the repayment of debt. Investments in productive assets and small businesses were negligible. A large majority maintained that they had spent more money in years of severe floods and droughts than in other years.

From 2000 to 2005, three-fifths of the livestock owning households in the San Kor villages had sold animals to raise money to deal with the consequences of floods and droughts, compared to two-fifths of the livestock owning households in the Domrey Slab villages. At the same time, from 2000 to 2005 much smaller fractions of asset owning households in villages of both communes had sold durable goods to raise money after the floods and droughts.

Vor Yeav Village
Domrey Slab Commune

Vor Yeav village, situated about 15 kilometers east of National Road 6 in Domrey Slab commune, was a war zone until 1997. When peace finally came in 1998 villagers had still to negotiate the landmines laid there by Khmer Rouge insurgents and Royal Cambodian Armed Forces during the years of conflict. By 2003 the Mine Action Group (MAG) had demined the entire village. But as the 21st century dawned destruction by armed conflict came to be replaced with devastation by drought.

Severe droughts impoverished Vor Yeav in 2002/3 and 2003/4. Village streams dried up and water no longer flowed through canals to paddy rice fields. Out of sheer desperation some rice farmers carried water from the streambeds to douse on their parched fields. Normal yields, already extremely low at about 20 *thangs* (480 kilograms) of paddy per hectare, plummeted to even one *thang* (24 kilograms) of paddy per hectare in the two years of severe droughts. Some rice farmers produced no more than the seeds for the subsequent crop season. Food security in the village was seriously challenged as household rice consumption dropped abruptly with rice yields.

During the severe droughts lack of food to eat was exacerbated by the lack of clean water to drink. Village wells dried up and dehydration and use of unclean water resulted in fevers and diarrhea among children. Some children were so weak from illness and lack of food that they were unable to attend school regularly. Pregnant women were similarly vulnerable to deficits in nutritious food and clean water. Other villagers harshly affected by the severe droughts were elderly persons, notably widows and widowers, living without other adult earners in the household.

Seeking to minimize crop damage caused by the droughts, some farmers shifted to shorter term rice varieties which reduced production time by about three months. Others used more drought resilient rice seeds. One villager replying to the query of how to best minimize the adverse effects of droughts captured the response of many: "*Go to work in Thailand.*" Entire households from the village traveled to the Thai Cambodian border to work as agricultural laborers. Some stayed on for months. Mothers and fathers, although aware of potential dangers, encouraged their daughters to look for work in the Phnom Penh garment factories. Village men and women gathered firewood in nearby forests for sale to owners of local charcoal kilns. Men risked the loss of investment capital to cut logs illegally in distant provinces.

Vor Yeav woodcutters normally journeyed to Preah Vihear province to fell timber in groups of two to three with their cow drawn rubber wheeled carts. Before leaving the village each cutter had to borrow from 100,000 to 150,000 riels (US\$ 25 to 37.50) from moneylenders at 10 percent monthly interest for the unofficial payments that were demanded by government agents to gain access and return from the forest areas. Unofficial fees paid at fixed checkpoints and to mobile teams for a return trip reached as high as 150,000 riels for each cutter. Failure to pay resulted in the seizure of hoisting tools or even the logs themselves. Back in the village the cutters stripped and sawed the logs for sale to buyers in San Kor commune. All told the work took about three weeks and each cutter earned from 70,000 to 100,000 riels after deducting the costs of the unofficial fees.

At the time of the severe drought in 2003/4 the Cambodian Red Cross (CRC) provided relief assistance to destitute households and supported food-for-work projects inclusive of all villagers. Church World Service (CWS) provided irrigation pumps although lack of water resources limited their effectiveness. CWS also supplied materials for well construction albeit cost sharing requirements similarly circumscribed beneficiaries. CWS formation of self-help savings groups allowed poor households to access low interest loans and to build incipient support networks. During the severe droughts villagers did provide small rice loans to each other and looked after neighbors in times of illness. Those with better off relatives also had greater access to scarce goods such as clean well water. In the end, though, households had to rely on their own resources and resilience to see them through the hardships occasioned by the severe droughts.

In 2005 several of Vor Yeav's 172 households recalled the ample supplies of water generated by the reservoir and irrigation system built during the Pol Pot regime at the village border in Kompong Thom's Stung district. According to the village chief the reservoir enabled Vor Yeav rice farmers to harvest up to 100 *thangs* (2,400 kilograms) of paddy per hectare before it was destroyed in 1985 over regulation disputes. In 2005-2006 the Asian Development Bank (ADB) financed a US\$ 1.9 million rehabilitation of the reservoir that would irrigate 30,565 hectares of rice land. The village chief asserted that the restored reservoir had the capacity to provide sufficient water to the main canals that traversed the village rice fields. Whether the reservoir would supply enough irrigation water for village rice farmers to cultivate two crop seasons remained to be seen.

Participation in Groups and Communal Activities

San Kor villages

In 2005 members from 120 or 77 percent of the 155 households surveyed in the three San Kor villages belonged to community groups. Membership of the 120 households in various types of groups reached 248 or an average household membership in 2.1 groups. Respondents reported that a high 89 percent of the various types of groups were active. The highest single membership of households was in pagoda associations, which were also the most active type of groups. From 2000 to 2005 household involvement in community groups had increased by 22 percent and the density of membership by 35 percent (Table 18).

In 2000 members from 98 or 63 percent of the 155 households surveyed in the three San Kor villages had belonged to community groups. Membership of the 98 households in different types of groups had totaled 184 or an average household membership in 1.9 groups. Respondents reported that a high 92 percent of the different types of groups had been active. The highest single membership of households had been in pagoda associations, although proportionally credit and wedding or funeral associations had been slightly more active (Table 18).

Table 18. Household Membership in Groups and in Active Groups in 2005 and 2000, Ampil, Chey, and Sleng Kpos villages, San Kor commune, June 2005

	Households membership in groups to in 2005		Household membership in active groups in 2005		Household membership in groups in 2000		Household membership in active groups in 2000	
	# of households belonging to this type of group*	% of households belonging to this type against total membership in groups	# of households belonging to active groups in this type	% of households belonging to active groups in this type	# of households belonging to type of group*	% of households belonging to this type against total membership in groups	# of households belonging to active groups in this type	% of households belonging to active groups in this type
Pagoda groups	66	27%	65	98%	59	32%	54	91%
Wedding or funeral groups	55	22%	50	91%	37	20%	35	94%
Credit or savings groups	48	19%	43	89%	35	19%	33	94%
Health or education groups	47	19%	37	79%	35	19%	32	91%
Livelihood groups	32	13%	26	81%	18	10%	16	89%
Totals	248		221		184		170	

*Individual households may belong to more than one group under each type.

In the three San Kor villages the single most important type of association that members of 119 participant households belonged to in 2005 was credit or savings groups. By comparison, the single most important type of association that members of 98 participant households had belonged to in 2000 was religious groups (Table 19). This indicated the increased importance of credit over the five year period. For the most part the groups deemed as the most important to the household in both 2005 and 2000 did not interact with groups outside the village.

Table 19. Most Important Type of Group or Association* that Members of Households Belonged to in 2000 and 2005, Ampil, Chey, and Sleng Kpos villages, San Kor commune, June 2005				
	2005		2000	
	Number	Percent	Number	Percent
Credit or Savings	38	32%	28	28%
Religious	31	26%	33	34%
Health or education	20	17%	18	18%
Farming, Fishing, or Trade	18	15%	13	13%
Wedding or funerals	12	10%	6	6%
	N=119		N=98	
* This includes only one group (the most important type) from each household.				

From 2000 to 2005 household members in the three San Kor villages had participated in communal work activities; contributing their labor to projects for the benefit of the village. Some of this labor had involved food for work exchanges. Household members had participated in school construction and repairs, had joined in road and culvert construction, had helped with pagoda construction and repairs, had worked on bridge construction repairs, had planted trees, had dug and repaired wells, had dug and repaired canals, and had dug and repaired ponds.

Domrey Slab villages

In 2005 members from 60 or 60 percent of the 100 households surveyed in the two Domrey Slab villages belonged to community groups. Membership of the 60 households in various types of groups reached 105 or an average household membership in 1.7 groups. Respondents reported that 68 percent of the various types of groups were active. The highest single membership of households was in pagoda associations, although proportionally wedding or funeral groups were more active. From 2000 to 2005 household involvement in community groups had increased by 62 percent and the density of membership by 46 percent (Table 20).

In 2000 members from 37 or 37 percent of the 100 households surveyed in the two Domrey Slab villages had belonged to community groups. Membership of the 37 households in different types of groups had reached 72 or an average household membership in 1.9 groups. Respondents reported that 67 percent of the different types of groups had been active. The highest single membership of households had been in pagoda and wedding or funeral associations, although the pagoda associations had been the most active of all groups (Table 20).

Table 20. Household Membership in Groups and in Active Groups in 2005 and 2000, Sangkum and Vor Yeav villages, Domrey Slab commune., June 2005

	Household membership in groups to in 2005		Household membership in active groups in 2005		Household membership in groups in 2000		Household membership in active groups in 2000	
	# of households belonging to this type of group*	% of households belonging to this type against total membership in groups	# of households belonging to active groups in this type	% of households belonging to active groups in this type	# of households belonging to type of group*	% of households belonging to this type against total membership in groups	# of households belonging to active groups in this type	% of households belonging to active groups in this type
Pagoda groups	35	33%	28	80%	23	32%	21	91%
Wedding or funeral groups	24	23%	21	87%	23	32%	11	48%
Credit or savings groups	24	23%	10	42%	15	21%	12	80%
Health or education groups	13	12%	6	46%	8	11%	2	25%
Livelihood groups	9	8%	7	78%	3	4%	2	67%
Totals	105		72		72		48	

*Individual households may belong to more than one group under each type.

In the two Domrey Slab villages the single most important type of association that members of 60 participant households belonged to in 2005 was credit or savings groups. By comparison, the single most important type of association that members of 37 participant households had belonged to in 2000 was religious groups (Table 21). This again revealed the increased importance assumed by credit over the five year period. For the most part the groups deemed as the most important to the household in both 2005 and 2000 did not interact with groups outside the village.

Table 21. Most Important Type of Group or Association* that Household Members Belonged to in 2000 and 2005, Sangkum and Vor Yeav villages, Domrey Slab commune, June 2005

	2005		2000	
	Number	Percent	Number	Percent
Credit or Savings	31	52%	10	27
Religious	19	32%	21	57
Health or education	4	7%	2	5%
Farming, Fishing, or Trade	3	5%	---	---
Wedding or funerals	3	5%	4	11%
	N=60		N=37	

* This includes only one group (the most important type) from each household.

From 2000 to 2005 household members in the two Domrey Slab villages had participated in communal activities; contributing their labor to projects for the benefit of the village. Some of this labor had involved food for work exchanges. Household members had participated in school construction and repairs, had joined in road and culvert construction, had helped with pagoda construction and repairs, had dug and repaired ponds, had worked on bridge construction repairs, had dug and repaired canals, had planted trees, and had dug and repaired wells.

Summary

From 2000 to 2005, household involvement in community groups in the San Kor villages had increased by 22 percent and in the Domrey Slab villages by 62 percent. Meanwhile density of membership in community groups had risen by 35 percent in the San Kor villages and by 46 percent in the Domrey Slab villages. In villages of both communes the highest single membership of households in both 2000 and 2005 was in pagoda associations, although in the Domrey Slab villages wedding and funeral associations were as important in 2000. In 2000 religious groups in San Kor and Domrey Slab were seen as the single most important type of association. By 2005 this had changed with credit and savings groups identified in the 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 as the most important in both 2000 and 2005 in San Kor and Domrey Slab did not interact with groups outside the village. From 2000 to 2005 household members in San Kor and Domrey Slab had participated in communal work activities contributing their labor to projects for the benefit for the village.

Conclusions

The severe floods and droughts that occurred in the study area from 2000/1 to 2004/5 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 Domrey Slab villages to rely on sources of livelihood other than rice-fed wet season rice production. To offset the losses of their rice crops San Kor households in the Tonle Sap floodplain exploited fish stocks in the lake, while the Domrey Slab households cut timber and built charcoal kilns. The sudden shift to these earning sources contributed to natural resources decline. Meanwhile households in both communes relied increasingly on migrant wage labor to support their subsistence. Unable to depend on rice production and constrained by limited opportunities in off farm work, most households had to borrow at usurious rates to ensure their daily survival. Many households likewise had to borrow large sums at high interest 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.³¹

Located on the periphery of the Tonle Sap floodplain households in the San Kor villages experienced both severe floods and droughts, while households in the Domrey 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 Domrey Slab. For example average rice shortages in times of disaster lasted 2.4 months longer in San Kor than in Domrey Slab. Household frequency of borrowing rice or money to buy rice in times of disaster was 9 percent higher in San Kor than in Domrey Slab. Household frequency of selling land as a consequence of disaster was 7 percent higher in San Kor than in Domrey Slab. While the outcomes of severe floods and droughts often resembled one another, for instance diminished rice yields, acute rice shortages, increased incidence of human illness, intensified need of borrowing, and higher rates of distressed land sales, severe floods in San Kor caused more displacement and physical damage than severe droughts experienced in either commune and therefore entailed higher recovery costs.

While differences arising from location in ecological zones were important, dissimilarities among households in the two communes were also related to participation in the market economy. Households in the three San Kor villages lived along the western boundary of National Road 6 close to the expanding San Kor commune market. By contrast the households in Domrey Slab commune lived from 8 to 12 kilometers off the eastern boundary of National Road 6 in what had been an inaccessible war zone until the late 1990s. The heightened involvement of the San Kor households in the market economy was evident in several ways. Selling and mortgaging of land was proportionally higher among households in San Kor than in Domrey Slab (although buying of land was proportionally about the same). Differential access to paddy rice land was too more pronounced among households in San Kor than in Domrey Slab. Compared proportionally to the Domrey Slab sample, San Kor

³¹ Similar trends in the Tonle Sap area and in other parts of rural Cambodia, including Kompong Thom, have been documented in Ballard et al, *We are Living with Worry All the Time”: A Participatory Poverty Assessment of the Tonle Sap*; Keskinen, “The Lake with Floating Villages,”; and FitzGerald and So, *Moving Out of Poverty?*

households had a much higher incidence of landlessness as well as a much higher incidence of paddy rice land ownership of two hectares or more. Household involvement in migrant work generated mainly by the market economy was also proportionally higher in San Kor than in Domrey Slab. These indicators suggested greater social stratification and inequality among households in San Kor than in Domrey Slab with marginalized and vulnerable households in San Kor likely to suffer debilitating consequences from the shocks of severe floods and droughts.

Responses to severe floods and droughts are usefully examined within the conceptual framework of social capital research. 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 to evacuate family members, to watch over animals, to patrol residential areas, to ferry children to school, to distribute water, and to provide small rice loans. Once flood waters had receded households from the San Kor villages likewise worked together to repair community infrastructure such as canals, water gates, culverts, schools and roads. These rehabilitation efforts were often aided by NGOs, UNICEF, and the World Food Program (WFP). 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 San Kor and Domrey Slab villages helped each other to replenish rice seeds, to supply small cash loans, to guarantee loans with moneylenders, to look after the sick, to have access to family wells, and to assist vulnerable groups. In the aftermath of severe droughts bridging social capital in San Kor and Domrey Slab often took the form of households working together in community food-for-work projects supported by NGOs and WFP.

Bridging networks of social capital similarly helped households from both communes respond to the broader demands of social change taking place in their lives. Migrant workers from the San Kor and Domrey Slab villages acquired 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 obtain work as hired laborers. Households from both communes accessed cash supplies of moneylenders in the San Kor commune market to reinvest in disaster-prone rice production, albeit at usurious rates and considerable risk. Households from the Domrey Slab villages similarly relied on moneylenders to provide the cash needed to finance payments to government agents to permit the cutting and transport of logs from Preah Vihear province. Households in both communes acted on the acquiescence 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 a milieu 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 Domrey Slab villages household involvement and density of membership in community groups increased considerably from 2000 to 2005. Following Putnam this would indicate a high level of social capital and civic well being in the village communities. That this was obviously not the case lends credulity 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.³² With respect to the San Kor and Domrey Slab villages it becomes apparent that while households

³² Grix, "Social Capital as a Concept in the Social Sciences."

had access to reserves of bonding and bridging social capital, they were virtually excluded from access to stocks of linking social capital.

As discussed earlier linking social capital represents the vertical ties which connect people with powerful individuals and institutions and allows them to leverage resources for long-term benefits. The major challenge that faced the households in the San Kor and Domrey Slab villages was thus how 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 NGOs and other 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.

Appendix 1

ADI Trainee Researchers

Oung Chantol	Cambodian Women's Crisis Center
Nop Sarin Srey Roth	Cambodian Women's Crisis Center
Yong Kim Eng	Khmer Youth Association
Hok Ly	Cambodia Trust
Tang Kea	Cambodia Trust
Chea Sokny	Rural Association for the Development of the Economy
Ea Dy	Family Health Promotion
Hang Vuthy	Save the Children Australia
Nao Sok	Church World Service
Nhung Polita	World Vision International
Ean Van Roeb	World Vision International
Keo Mara	Cambodia Health Education Development
Morn Borina	Urban Sector Group
Oum Ravy	Khmer Women's Voice Center

ADI Team Researchers

Ang Sopha	Cooperation Committee for Cambodia/ADI Project
Oeur Il	Cooperation Committee for Cambodia/ADI Project
John McAndrew	Cooperation Committee for Cambodia/ADI Project

ADI Research Studies
(www.ccc-cambodia-org)

Growing Old in the Former Khmer Rouge Stronghold of Pailin, November 2006

The Challenge of Living with Disability in Rural Cambodia: A Study of Mobility Impaired People in the Social Setting of Prey Veng District, Prey Veng Province, March 2006

Impact of the Garment Industry on Rural Livelihoods: Lessons from Prey Veng Garment Workers and Rural Households, October 2005

Domestic Violence in a Rapidly Growing Border Settlement: A Study of Two Villages in Poipet Commune, Banteay Meanchey Province, May 2005

Upholding Indigenous Access to Natural Resources in Northeast Cambodia, December 2004

Indigenous Response to Depletion in Natural Resources: A Study of Two Stieng Villages in Snoul District Kratie Province, September 2004

Understanding Drug Use as a Social Issue: A View from Three Villages on the Outskirts of Battambang Town, April 2004

Experiences of Commune Councils in Promoting Participatory Local Governance: Case Studies from Five Communes, March 2004

Labour Migration to Thailand and the Thai-Cambodian Border: Recent Trends in Four Villages of Battambang Province, December 2003

The Impact of the Tourism Industry in Siem Reap on the People Who live in Angkor Park, December 2002

Small-Scale Land Distribution in Cambodia: Lessons from Three Case Studies, November 2001