

Risk Mitigation and Disaster Management

Among Rural Communities

In Cambodia



May 2001
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Risk Mitigation and Disaster Management Among Rural Communities In Cambodia

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"We must above all shift from a culture of reaction to a culture of prevention. Prevention is not only more humane than cure, it is also much cheaper.....Above all let us remember that disaster prevention is a moral imperative, no less than reducing the risk of war".

Kofi Annan, United Nations' Secretary-General

ACKNOWLEDGEMENTS

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The research was planned and implemented by a team from CARE Cambodia in Phnom Penh and provincial government staff from Prey Veng between November 2000 – February 2001. This coincided with the worst floods in decades in many areas of Cambodia. The team consisted of:

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The research team completed translation of the field notes and visual outputs. The analysis and presentation of findings and recommendations contained in this report were prepared by Noelle O'Brien who also coordinated the research.

The research was funded by DIPECHO and implemented by CARE France through CARE International in Cambodia.

EXECUTIVE SUMMARY

Scope of Study:

The project funded by DIPECHO and implemented by CARE Cambodia took place over a four month period from December to March 2001. The field work focused on 12 villages in Prey Veng province in South East Cambodia. The overall goal to reduce the vulnerability of the rural poor in Cambodia to natural and 'man-made' emergencies by developing and articulating a framework in which development agencies in Cambodia can work to prevent, mitigate and prepare for emergencies before they occur.

Objectives of the Study:

- To investigate the disasters that affect the lives of rural Cambodians
- To investigate how each of the disasters affect rural livelihoods
- To develop an understanding of how people cope during disasters
- To investigate how people cope once the disaster is over.

Main findings and recommendations of the study:

General: Two out of three families interviewed were either poor (borrow food for 1-2 months per year) or very poor (hand to mouth subsistence).

Housing: Traditional Khmer houses have become expensive to build and many families can now only afford to build small houses from bamboo and thatch just raised above the ground. These are susceptible to damage by heavy rain, wind and flooding. These families usually relocate to safer areas which is a frequent and important coping strategy.

Safe Areas: These included, local pagodas and monks' houses, moving to relative's houses, hills, health centers, the local commune office and to route 11. Some families had made provisions for their animals, and only a few of the villages had access to water from pump wells.

Food: Many families reduced their food consumption during the flooding to make food stocks last longer. In all of the villages people were borrowing food or money. Some families ate rice seed that they had stored, whilst others caught fish. The price of rice increased to 750R for milled rice and 350 R unmilled rice. The usual price for milled rice is between 500 – 650 R.

Eighty-five percent of families interviewed drank floodwater without boiling or treating it. Most villagers did not perceive loss of wells as a major problem.

Health Problems: Illness such as diarrhea, respiratory infections, skin rashes and fevers increased significantly during the flooding.

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Transport Problems: Transport by boat was the only means of travel for most villagers during the flooding. Villagers reported that the cost of transport to travel to the market increased.

Distributions: Donations were made from the Government, WFP, CRC, CARE and other NGO's and businessmen, in all the ten villagers that reported flooding. The percentage of families that received donations from village to village varied. The villagers raised many concerns and issues about this system of making donations.

Recommendations for addressing basic and immediate needs during disasters:

Safe areas and shelter – In cooperation with villagers and local authorities the Committee for Disaster Management should identify high areas in or close to villagers, and should develop plans for villagers to move to safe areas and inform them of these routes. Early warning systems should be put in place.

Food – Build the capacity of provincial officials to make rapid needs assessments on the distribution of food, water purification tablets, medicine and shelter in the province.

Water – Adapt well designs by building raised areas around the wells. Use plastic to cover the wells during the flooding. Install wells and toilets at the safe areas. Prepare WATSAN posters to distribute during the flooding.

Health Care – Prepare adequate supplies of medicines at provincial and district hospitals and encourage commune health centers to increase awareness of illnesses, which commonly occur during disasters.

Agriculture: Due to a glut of rice in Indonesia, the global price of rice has fallen to 230 Riel per kilo as compared to 500 – 700 Riel in 1999. Farmers who borrowed money to buy fertiliser and seed have been unable to cover costs through sales of rice and the vulnerability of these farmers has increased.

The 2000 floods affected rice production in 3 ways

- Early floods damaged the dry season crop that was almost ripe for harvesting
- Floods damaged seedlings that were planted for the dry season, and slowly receding waters forced farmers to delay planting the 2001 dry season crop for a month or more
- Most significantly the floods destroyed 95% of the wet season crop in 10 of the 12 villages.

Drought in two of the villages meant that none of the families were able to rely on rice production for their livelihoods in 2000.

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Recommendations: An adequate supply of good quality seed should be made available for farmers to replant after severe floods or droughts. Farmers should be provided with advice on how to apply fertiliser correctly and advice on drying and storage techniques.

Animal raising: The raising of animals in Prey Veng makes up a significant proportion of rural livelihoods. During the flooding, families reported building platforms for their animals whilst others moved to the safe areas with them. Many villages lost cows and buffaloes as a result of the flooding. Families sold pigs and chickens as a coping mechanism. Access to fodder was a problem.

Recommendations: Farmers should be encouraged to vaccinate animals and plant trees and shrubs to act as shelters for the animals. The villagers and local officials should identify suitable safe areas for animals.

Selling labour and migration: Labour in agriculture, construction, and garment factories is a vital source of income. People with no or little income borrow money in advance of working. Payment is as low as 1200 Riels per day (30 US cents) as opposed to the normal rate of 2500 – 4000 Riel per day.

Recommendations: Development projects should include programmes to mitigate the negative social aspects of migration on rural communities. Training programs should be established to develop agriculture and professional skills.

Borrowing and Credit: Borrowing is an extremely important coping strategy for rural families. Interest rates on borrowed money varied from a low of 4-10% in credit organisations and from 10-30% per month from private lenders. Borrowed rice is usually paid back with 100% interest.

Recommendations: The interest rate on post disaster credit should be as low as 5% per year and government policy should develop and regulate policy for post disaster credit. Savings programs should be set up to encourage families to save for emergencies.

Conclusion: During the 2000 floods, most families were able to cope to some extent, but the long duration of the floods and the extreme poverty of the majority of the villagers mean that a significant number of families are being pushed further into the cycle of debt and poverty. This is being exacerbated by the low price of rice. Such high levels of vulnerability in Prey Veng will be disastrous for tens of thousands of villagers should the floods strike again this year.

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Acronyms

AAH	Action Against Hunger
ACF	Action Contre la Faim
ADPC	Asian Disaster Preparedness Centre
AQIP	Australian Quality Improvement Project
CBDP	Community Based Disaster Planning
CBFMP	Community Based Flood Mitigation Programme
CIAP	Cambodia – IRRI – Australia Project
CRC	Cambodian Red Cross
COM	Council of Ministers
CRED	Centre for Research on Epidemiology of Disasters
CWS	Church World Services
DCDM	District Committee for Disaster Management
DIPECHO	Disaster Preparedness ECHO
PD	Provincial Department
ECHO	European Community Humanitarian Organization
EM	Emergency Management
ERG	Emergency Response Group
ERF	Emergency Relief Fund
GIS	Geographical Information System
ICRC	International Committee of the Red Cross
IDP	Internally Displaced
IFRC	International Federation of the Red Cross and Red Crescent
INGO	International Non-Governmental Organization
IO	International Organization
HNI	Health Net International
LNGO	Local Non-Governmental Organization
MCC	Mennonite Central Committee
MoH	Ministry of Health
MoWRAM	Ministry of Water Resources and Meteorology
MRD	Ministry of Rural Development
NCDM	National Committee for Disaster Management
NGO	Non Governmental Organization
Oxfam GB	Oxfam Great Britain
PACT	Program Action Development and Training
PADEK	Partnership for Development in Kampuchea
PCDM	Provincial Committee for Disaster Management
PRA	Participatory Rural Appraisal
RGC	Royal Government of Cambodia
SFKC	Social Fund of the Kingdom of Cambodia
UNDMT	United Nations Disaster Management Team
UNDP	United Nations Development Program
UNHCR	United Nations High Commission for Refugees
UNICEF	United Nations Children’s Fund
UNFPA	United Nations Population Fund

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USAID United States Agency for International Development
WFP World Food Program
WHO World Health Organization

1 Introduction

The 1997 ECHO Programme for Disaster Prevention, Mitigation and Preparedness (DIPECHO) published a Diagnostic for South-East Asia and for Cambodia and recommended that the enhancement of local response and relief capacity and community vulnerability reduction be priority areas. It also recommended that “*Disaster planning, at all levels, including national, has to be responsive to and reflective of community needs*”. A follow up DIPECHO assessment published in October 1999 confirmed that the promotion of community based approaches to risk reduction is still a priority both for managing disasters and linking risk reduction with development. Institutional strengthening was also a priority area.

The DIPECHO strategy is attempting to promote "new thinking" in Southeast Asia which would place greater emphasis on the adoption of sustainable mitigation¹ and preparedness² approaches. CARE, an international NGO with a mission to serve individuals and families in the poorest communities, is both a relief and development agency. CARE is committed to addressing the underlying causes and effects of poverty and vulnerability and therefore within an emergency mandate is committed to preparedness and mitigation. CARE believes that building on local coping mechanisms is critical to both reducing vulnerability and increasing capacity on all levels. This requires a knowledge of what local communities do to cope with emergency situations such as flooding.

1.1 Objectives of the Project

This report presents the findings of a study completed under the Risk Management and Disaster Mitigation Project, funded by DIPECHO and implemented by CARE Cambodia during late 2000 and January – March 2001. The objectives of the project were:

Overall Goal: To reduce the vulnerability of the rural poor in Cambodia to natural and ‘man-made’ emergencies by developing and articulating a framework in which development and emergency agencies in

¹ Actions taken before the event to lessen the impact of the event of people and the environment, e.g. – Flood barriers, building codes for earthquake protection. Mitigation does not necessarily prevent the event it reduces the impact.

² Measures taken before the event to enable the response to an emergency to be better coordinated and managed. These should be based either in a broad understanding of the risks faced by a community or the environment or on a specific hazard (such as a flood plan). Included in these are emergency plans, training, public education, stockpiling and practices.

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Cambodia can work to prevent, mitigate and prepare for emergencies before they occur.

Objective 1: To inform development practitioners (including government and local authorities) in Cambodia of the risk management strategies of the rural poor and to make recommendations as to how these strategies might be strengthened under long term development initiatives.

Objective 2: To inform emergency practitioners (including government and local authorities) in Cambodia of strategies that will reinforce the long-term initiatives of farmers and development practitioners to cope during and after disasters.

Objective 3: To inform development and emergency practitioners of emergency prevention and mitigation strategies in Cambodia.

1.2 Objectives of the study

- To investigate the disasters that affect the lives of rural Cambodians
- To investigate how each of the disasters affect rural livelihoods
- To develop an understanding of how people cope during disasters
- To investigate how people cope once the disaster is over

1.3 Scope of the Study

The study took place over a four-month period from December to March 2001. Fieldwork focused on twelve villages in Prey Veng Province in south east Cambodia. The research team comprised one expatriate project coordinator, four Cambodian researchers employed by the project, one project facilitator and four provincial based staff who were seconded for a two month period during field work.

1.4 Methodology

The study employed a variety of participatory rural appraisal (PRA) techniques which included village level discussions, wealth ranking, preparation of village maps which identified hazardous and safe areas, seasonal calendars, and semi-structured interviews with individual families. While conducting the field research the teams spent 3 to 5 days and nights in each of the villages. Details of the research methodology are attached in Annex 1.

2 Background

2.1 Country Profile³

Cambodia has a low human development index⁴ and at 0.512, it ranks 136 out of 174 countries, which reflects its dramatic recent history of 30 years of war and the legacy of turmoil that continues to pose significant development constraints. The 1998 census recorded an official population of 11.4 million and a population growth rate of 2.4%.

The country is predominantly rural, with an urban population of only 15.7%. The largest city, Phnom Penh, has an estimated population of one million. Agriculture is the dominant economic activity, involving 85% of Cambodian citizens. Large areas of agricultural land are not cultivated or are underutilized because of the continued presence of land mines which remain from the years of civil strife. Large tracts of forest remain but recent studies indicate that these are being exploited at an unsustainable rate.

Infant mortality is high at 104 per 1000 live births⁵ and of these about 40% are the result of diarrheal diseases. In 1998, child malnutrition was estimated at 32% in the provinces and 22% in Phnom Penh. Only 29% of the population has access to clean water. Drug resistant malaria causes more than 10,000 deaths out of 500,000 cases a year. Life expectancy is estimated to be 55 years for females and 51 years for males⁶ and most disease and premature deaths are poverty related. Institutional capacity and management are major issues in the rehabilitation of the country. Legal and judicial systems were re-established after the signing of the Paris Peace Accords in 1991 and the public administration system is still being rebuilt. The United Nations Development Program (UNDP) in 1994 noted that the major constraints to development are the shortage of qualified human resources, the fragile institutional and legal frameworks, and the weak physical infrastructure, problems that persist to date.

The weak infrastructure of Cambodia and widespread poverty leave the country extremely vulnerable to hazards.

³ CARE international's Developing an Emergency Response to a National Disaster in Cambodia

⁴ United Nations Human Development Report 2000

⁵ WHO World Health Report, 1998

⁶ United Nations Human Development Report 2000

2.2 Physical Conditions

2.2.1 Land Area and Topography

The total land area of 181,035km² is bordered by Thailand to the north and west, by Laos to the northeast and by Vietnam to the east and south. In the southwest there are 460km of coastline on the Gulf of Thailand.

The watershed plain of the Mekong and Tonle Sap Rivers comprise approximately 38% of the total land area of the country and is home to almost 87% of the population. The elevation of the valley and delta varies from 2m to 30m. Forest and grassland grow at elevations 30m to 1764 m which cover an area of 112,100km².⁷

2.2.2 Annual Flooding

The Mekong and its tributaries, combined with local rainfall, annually flood 17,100km² or 25% of the plain area.

2.2.3 Climate and Season

May – November	Rainy Season (s-w monsoon)
November – February	Dry Season (n-e monsoon)
February – May	Hot Season (no rain/ monsoon alternate)

During the rainy season there are irregular dry spells that commonly last up to a month and severely reduce rice production in some areas of the country. Wet season rice is grown on 74% of the rice land, 7% of this consists of floating rice and recession rice is grown on about 20% of the rice land as flood waters recede in the early part of the dry season. Dry season rice cultivation is very dependent on the availability of irrigation water.

2.2.4 Rainfall

In mountainous areas, mean annual rainfall varies from 2,000 to 3,000 mm in the east of the country and up to 4,000mm in the mountain ranges of the southwest. In the plains, the mean annual rainfall is 1,400 to 1,600 mm. Annual rainfall fluctuates greatly, increasing by up to 40% in a year of heavy flooding and reducing by 50% in a year of drought.

2.2.5 Temperature and Humidity

The annual mean temperature in the central plain is about 27°C. Mean monthly humidity is over 90% during the rainy season and around 70% during the dry and hot seasons.

⁷ Ministry of Agriculture, Forests and Fisheries (GDIMH)

2.3 Disasters Affecting Cambodia

Cambodia has been affected most recently by severe flooding in 1996 and 2000. Additionally, short dry spells of drought during the wet season have seriously affected crop production and occasional or intermittent plagues of insects and rats also threaten crop production.

2.3.1 Flooding

Flooding, an annual occurrence which is a very important aspect of agricultural production, has the potential to be the source of greatest disaster. Every year the Mekong River rises as a result of heavy rains in the Upper Mekong countries of China, Lao, Myanmar and Thailand. The Mekong overflows into the Tonle Sap Lake, increasing its surface area to four times its normal size which directly floods more than seven kilometers of the surrounding provinces. The Mekong River also floods its banks routinely during the wet season, covering the land on each side of the river in up to four meters of water.

Flash flooding usually occurs as a result of intense localized rainfall during slow moving storms. The incidence of floods shows signs of increasing due to large-scale deforestation and the removal of vegetation which lessens the capacity of the soil for infiltration and retention of water, thereby increasing the amount and pace of run-off.

Flooding of any kind affects water purity and sanitation, increases incidence of disease among people and livestock, and destroys crops and buildings.

2.3.2 Erosion

Erosion is a secondary effect of flooding and hence is a common problem along the banks of the Mekong and the lower reaches of the Tonle Sap. Land which has been cleared of riparian vegetation is especially vulnerable as cleared land is not protected and is therefore easily eroded by the added impact of rainfall.

Erosion causes significant economic losses and exacerbates vulnerability by reducing the fertility of the land, often in prime agricultural areas. Another serious effect of erosion is the siltation of the Tonle Sap, which is becoming increasingly shallow.

2.3.3 Drought

The wet season rainfall pattern consists of two peaks with a series of irregular mini-droughts⁸ which may last for three weeks or more. Crops can suffer from these droughts if no source of supplementary irrigation is available.

2.3.4 Conflict

Almost thirty years of civil strife and the destruction of resources, including human and infrastructural have been a major impediment to the development of Cambodia.

⁸ Nesbitt, H (1996) Rice production in Cambodia. Cambodia IRRI Australia Project.

The continuing presence of landmines has a strong impact on relief strategies and also on preparedness mechanisms. Where mines are present, access for relief teams and local people is either impossible or dangerous. Flooding and fire can cause the mines to become more volatile or to tilt in the ground so that detection becomes far more difficult and destruction more hazardous. Mines are protected in dry weather by firm ground cover but become more susceptible to deterioration when this cover is softened by rain. Mine clearance is a slow and expensive operation.

2.3.5 Other hazards

Examples of other hazards and potential emergencies are destructive storms, pest infestation, such as locusts and other insect pests, rodents, and outbreaks of disease such as dengue, malaria, and cholera.

2.3.6 Vulnerability

Disasters striking Cambodia may have a more serious impact compared to that in other countries because of the particular vulnerability of its people and the weakness of its response structures. The extant subsistence economy has limited means by which to cope with the multitude of problems that result from natural disasters. As Cambodia is not used to preparing for or coping with such disasters in a systematic way, it follows that preventative measures are severely limited.

Rural communities in Cambodia have been coping with disasters in their own ways for centuries and strengthening those traditional coping mechanisms will be an efficient and effective way of mitigating risks and improving disaster preparedness.

2.3.7 Poverty

Cambodia's high levels of poverty compound the risks for the most vulnerable. Few can afford to build up reserves of food, cash savings and other coping or preventative measures. Moreover, given even relatively minor disruption they generally have insufficient surplus labor or capital to restore the damage to their property and infrastructure.

High levels of debt, most often incurred to meet health emergencies⁹ and regularly found amongst the poor in Cambodia, reduce the ability to mobilize and rehabilitate following a disaster. Interest rates are high and when faced with disaster, postponing repayments while enterprises are unproductive may be enough to render the borrower unable to clear pre-existing debts. Pre-existing debt also reduces credit-worthiness and therefore the credit needed to recover from a disaster is often unavailable from the private sector. The economic situation of poor people already in debt and unable to meet repayments may result in relief measures being diverted to pay creditors.

⁹ Oxfam GB, (2000) Results of the Land and Development Investigation Study in Cambodia.

Poverty is also associated with malnutrition. People suffering from malnutrition often do not have the physical reserves of strength or immunity to cope with the secondary effects of disasters such as disease.

2.3.8 Low level of Education

Low levels of education contribute to the population's lack of awareness regarding health, sanitation and water issues, resulting from an emergency. They are therefore more vulnerable to the effects of a disaster. Additionally due to the low population density, the inaccessibility and lack of communication systems in many areas, it is difficult to implement public awareness campaigns and health/vaccination programs.

2.3.9 Demographic Characteristics

With only 47% of the population in the productive age group of 15 to 50, the burden of relief and evacuation responsibilities on active adults is a heavy one.

An additional result of the 30 years of civil strife is the break-down of family and community life, social networks and the subsequent lack of community cohesiveness. This emerges as a problem as there seems to be little sense of 'helping your neighbor' which can increase the population's vulnerability during an emergency.

2.3.10 Recent Disasters

During the period 1986 – 2000, at least 7 natural disasters affected Cambodia. The most severe of these disasters was the flood of 2000, which affected almost 3.5 million people, left a death toll of 347 people, destroyed 7,068 houses and 347,107ha of rice. The upstream flooding in Laos, which swelled the Mekong river flowing into Cambodia was compounded by heavy rains in Cambodia. Fourteen provinces were affected, hundreds of villages were inundated and many villages were left inaccessible and isolated for an extended period.

3 Research

The research focused on Prey Veng Province (Map 1), which lies in the southeast of Cambodia and which shares borders with the provinces of Svay Rieng, Kampong Cham, Kandal and Vietnam. The province, which has a population of 946,042 people, is divided into 12 districts.

3.1 Selection of the Villages

Research villages were selected in co-operation with the Provincial Rural Development Committee. The committee perceives 'disasters' in the province to fall into three categories

- areas that suffer from flooding,
- areas that suffer from drought, and
- areas that suffer from both floods and drought.

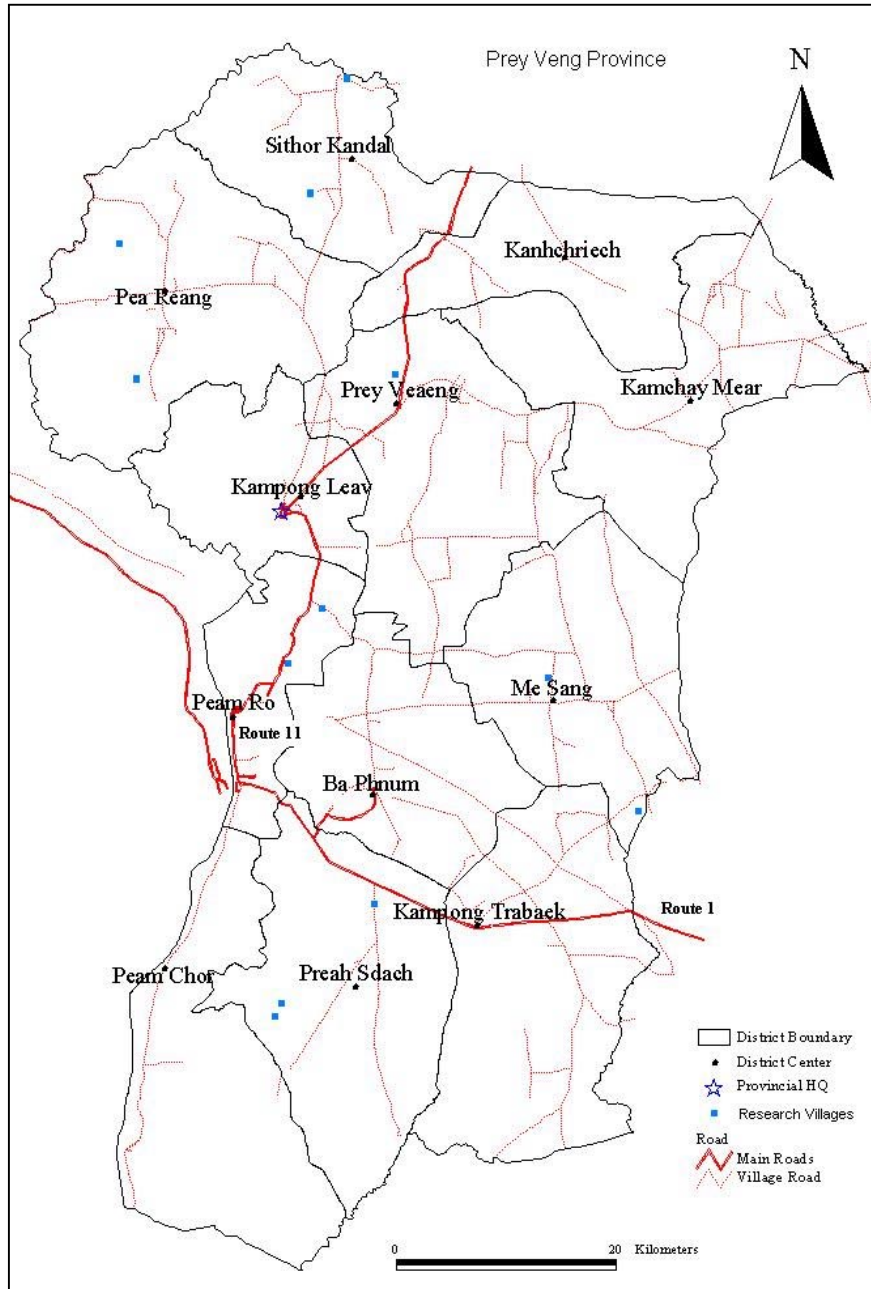
On the basis of these categories, three districts were nominated, Sithor Kandal, Preah Sdach and Mesang. Sithor Kandal district, in the north of the province, floods most years when the Mekong floods. Preah Sdach district, in the south of the province, has areas that flood most years but also areas that suffer significantly from droughts when there is little rain during the wet season. In the east of the province in Mesang district the land rises above the flood plain of the Mekong, so there is little flooding. The research team met with the district and commune officials in Preah Sdach and Mesang districts and after a series of discussions on drought and flooding in those districts, villages were selected.

The project worked in co-operation with two non-governmental organizations (NGOs), Partnership for Development in Kampuchea (PADEK) and Mennonite Central Committee (MCC) and the European Union funded project PRASAC, which have been active in Prey Veng for many years. PADEK has been implementing rural development projects which include credit and savings programmes in Prey Veng since 1989 and requested that the research focus on two villages, Sonanchay in Preah Sdach district and Phnom Kung in Mebon Commune, both of which are affected by combinations of flooding and droughts. MCC is active in Mesang district but has also been working with the Provincial Office of Hydrology (now the Provincial Department of Water Resources) to develop farmer participation in irrigation. Two villages Chrey Krahim and Choung Krouey in Pea Reang District, where MCC project has been active were selected. Research in Sithor Kandal took place in cooperation with PRASAC Prey Veng. Two PRASAC target villages which are affected by flooding were selected, Preak Changkran Krom where PRASAC has been working since 1995 and Tanal village, where PRASAC started working in 2000.

Reports were also received by the project that the closing of national route 11 was having a significant impact on the livelihoods of families living near the road. As a result of these reports, discussions were held with the PRDC and it was decided to

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investigate the situation in 2 villages, Prey Khla and Chouk Chey villages in Paem Ro district.



Map 1: Prey Veng Province

3.2 The Villages

The names and populations of the twelve villages, eleven communes and six districts in which the research took place are summarized in Table 1.

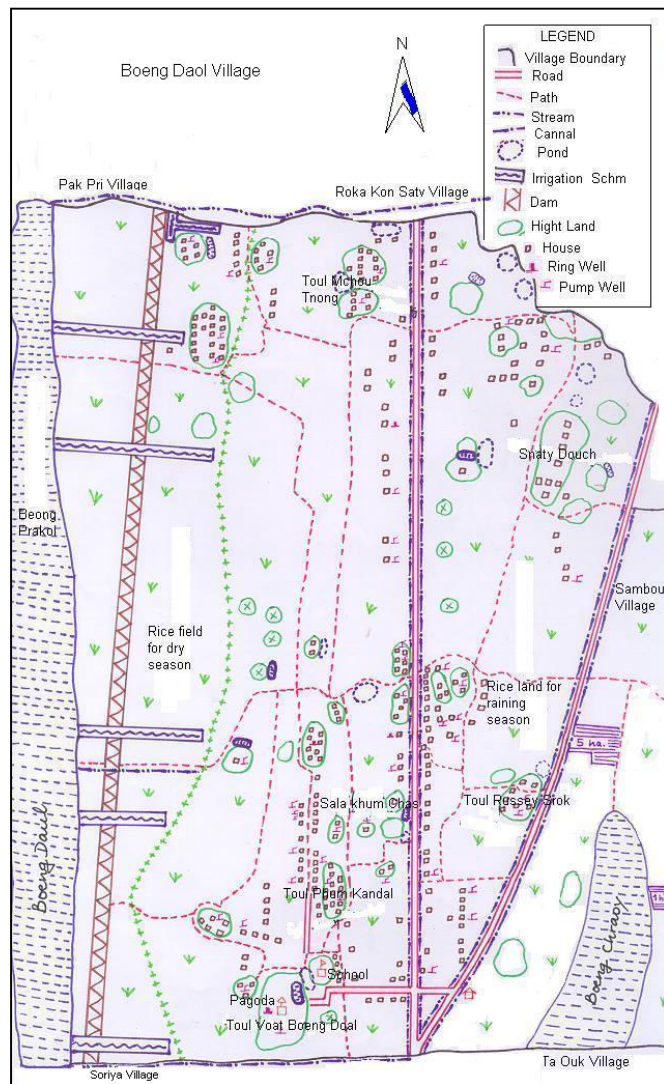
District	Commune	Village	Population (2000)	
			Families	People
Mesang	Angkor Sar	Ponley	367	1765
Mesang	Chi Poch	Samroang Voat	153	703
Peam Ro	Prey Kandieng	Prey Khla	324	1564
Peam Ro	Babong	Chouk Chey	167	825
Pea Reang	Kampong Russei	Chrey Krahem	548	2650
Pea Reang	Reap	Choung Krouey	475	1941
Preah Sdach	Boeng Daol	Boeng Daol	283	1557
Preah Sdach	Boeng Daol	Pak Pri	210	1289
Preah Sdach	Kreang Sway	Sonanchay	147	732
Prey Veng	Mebon	Phnom Kung	147	729
Sithor Kandal	Preak Changkran	Preak Changkran	191	984
Sithor Kandal	Chrey Khmum	Tanal	104	533

Table 1: Research Village Population Figures

3.2.1 Preah Sdach District

Boeng Daol and Pak Pri villages are both in Boeng Daol Commune which lies about 11 km to the south of Route 1 in Preah Sdach district. Almost all families in both villages are involved in rice production. Boeng Daol (Map 2) village has one primary school which has 400 pupils in grades 1-6, but the nearest school to Pak Pri Village is 3km away. The commune has one nurse but no health center. Apart from a food for work road construction project by WFP and repair of the primary school by the Social Fund of the Kingdom of Cambodia (SFKC), there were no development organizations working in the village. Both villages are affected by flooding every year, the severity of which varies from year to year. The 2000 flood lasted almost four months and destroyed much of the wet season crop. Boeng Daol village was better off than Pak Pri as farmers are also able to produce a dry season crop because of the dam which serves the village.

Sonanchay village also in Preah Sdach district but in Kraing Sway Commune, is situated 3km from national Route 1, about 12 km east of Neak Loeung. As in the other villages almost all of the households are involved in rice production. The primary school has 2 buildings, one built by the Social Fund in 1997 and the second built by the Government in 1999. The school caters for grades 1-6. The village normally floods during August and September but the 2000 floods started in July and lasted until October. The flood depth varied between 0.5 and 4.5 m in the village and was 2.5m under the village chief's house. The only accessible safe area was outside the village on the road and at Kraing Sway Pagoda.



Map 2: Sketch map of Boeng Daol Village

3.2.2 Pre Reang District

Chrey Krahim village in Kampong Russei Commune, Pea Reang District is located about 12km from Snay Pul district town and about one hour by moto and ferry from Prey Veng town on a very small path. Choung Krouey village in Reap Commune is about 2km from Snay Pul district town. Almost all families in both villages are involved in rice growing but dry season production is more important than in the villages in Preah Sdach. In Reap Commune, WFP reported that almost 70% of the rice production came from dry season crops and in Kampong Russei, 45% is produced during the dry season. Both villages have primary schools and pagodas.

Chrey Krahim village land floods every year but normally the flooding does not have a major impact because it usually lasts for only a short period of time. The 2000 flood covered all the rice land and all but the high central area of the village and a few small

hills nearby. The rice land in Choung Krouey floods but the village land does not. The most severe flooding here was the 2000 flood but villagers reported that flooding in 1996 and 1993 also had a serious impact on their livelihoods.

3.2.3 Prey Veng District

Phnom Kung Village, Mebon Commune in Prey Veng District, is located 12 km from Prey Veng town, 3 km off the national Route 11. Traditionally the villagers grew wet season rice from May to December but since PRASAC built the irrigation system in 1996 villagers have also grown dry season rice. Flooding affected the village in 1993, 1996, 1998 and 2000, with the 2000 flooding being the most severe. The floods reached 0.3m on the high areas of the village and up to 3m on the rice fields.

3.2.4 Mesang District

Much of the land of Mesang District rises above the flood plain of the Mekong and therefore does not flood. The village of Ponley in Angkor Sar Commune is in the southeast of the district very close to the border of Svay Rieng and about 45 minutes by motorbike from the district capital. The villagers grow wet season rice from July to December but drought during the wet season often affects the crops. Similarly, in Samroang Voat village in Chi Pouch Commune, the villagers grow wet season rice and drought during the wet season has had a bad affect on rice production and the livelihoods of the people in 1998, 1999 and 2000.

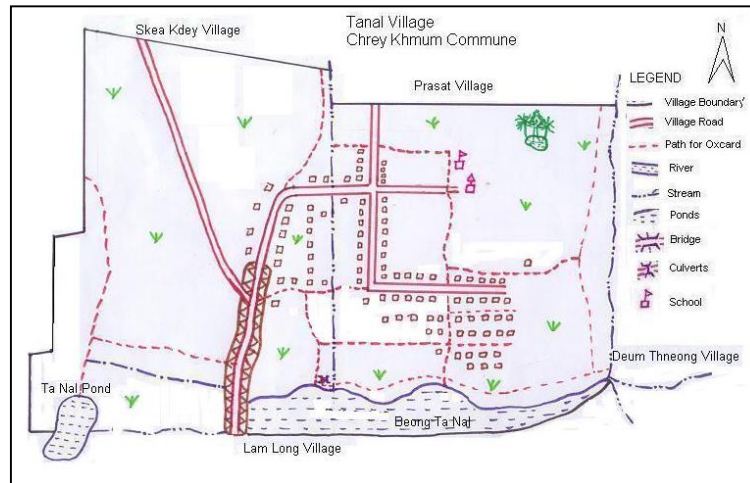
3.2.5 Sithor Kandal

Preak Changkran Krom village is situated on the bank of the Mekong in Preak Changkran Commune in the north of Sithor Kandal District. The commune differs from others in which the research took place as less than 50% of all the inhabitants depend on rice production. Vegetable production is more intense than rice, however many of the villagers are also involved in some rice production. The total land area of the village is 97ha, 17ha of which is dry season rice land, 12ha of which is chamcar¹⁰ land and 15ha of which is houseland. Much of the remaining 53 ha is covered by a lake which is a large fishing lot. As the water recedes in the lake during the dry season, some of this land is also cultivated. The village has one primary school which has 5 teachers. The school building was badly damaged during the 2000 floods but is being repaired using funds donated by a Khmer American. The NGO, Health Net International, support the nearest health centre to the village, at Preak Sandek village. The village floods every year from July to October because it is so close to the Mekong. Normally the flooding does not have a major impact on the livelihoods of the villagers because they cultivate crops during the dry season and harvest in June. However, in 2000 the flooding started in June and destroyed much of the crops. Also the flooding covered the entire village, with depth varying from 0.4m to 5m.

¹⁰ Chamcar is the term used to describe fruit and vegetable gardens in lowland and upland agricultural systems.

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Tanal village (Map 3) in Chrey Khmum Commune, Sithor Kandal District is about 33 km north west of Prey Veng town. Flooding normally affects the village during August and September but in 2000 the flooding started in July and lasted until October and flooded the entire village to about 0.9m on the road, 0.9 – 1.3 m under the houses and 0.95m at the pagoda. One raised area which was prepared beside the canal/stream using soil dredged from the canal was not covered by flood water.



Map 3: Sketch Map of Tanal Village

3.2.6 Peam Ro District

The two villages, Prey Khla and Chuk Chey, in Kampong Russei and Babong Communes, Peam Ro District lie close to Route 11, the main road connecting Neak Loeng to Prey Veng town. Almost all rice production in Babong commune is undertaken during the dry season and in Prey Kandieng district, WFP reported that 42% of all production was done during the dry season.

Prey Khla village primary school was rebuilt by SIDA in 1997 and caters for grades 1-5. There are two pagodas in the village but all the monks live in the new pagoda and the old pagoda is only visited on Buddhist holidays. Chuk Chey village has a new school which only caters for grade one. After grade one the pupils have to go to Babong school. The village has a health centre which was constructed by the Social Fund, has 9 nurses and one doctor. The village also has a new pagoda which was constructed in 1995.

Both villages normally flood during August and September but during 2000 the floods started in July and continued until October, flooding the rice fields to depths of 2.5 to 3.4m and the land under the houses to half a meter. The only areas of Prey Khla that did not flood were the six hills in the village and in Chuk Chey only a few areas of route 11 were not covered with flood water.

Wealth Rankings in the Villages

During the research, the village chief and a group of key informants classified all the families in their villages into one of three categories: very poor, poor and medium.

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Very Poor Families

- Own small house or hut
- Own no rice land or have very small areas which are not sufficient to support a family
- Sell labor and buy food each day using the money earned (“hand-to-mouth”)
- Borrow money in advance of labor to buy food
- They may own pigs, chickens and ducks

Poor Families

- Own a raised house made from thatch
- They have enough rice land to support the family for most of the year but they borrow food for 1-2 months
- Raise animals – cow, pig, chicken and ducks

Medium Families

- Own raised house with zinc or tiled roof
- Have enough land to support the family and sell some rice
- Own cows and buffalo, pigs, chickens and ducks
- Have a television or motorbike
- Do not need to borrow for food

The results of the wealth ranking of all the families living in the villagers are summarized in Table 2.

Village	%Medium	% Poor	% Very Poor
Ponley	13	49	38
Samroang Voat	42	55	3
Prey Khla	44	47	9
Chouk Chey	39	34	24
Chrey Krahem	51	38	11
Choung Krouey	26	63	10
Boeng Daol	27	48	25
Pak Pri	17	26	57
Sonanchay	16	33	50
Phnom Kung	64	24	12
Preak Changkran	49	48	3
Tanal	47	43	10

Table 2: Results of wealth ranking activity

The percentage of very poor families ranged from a low of 3% in Preak Changkran Krom to a high of 57% in Pak Pri village. Three of the villages, Ponley, Pak Pri and Sonanchay classified more than 80% of families as poor or very poor. The percent medium families ranged from a low of 13% in Ponley village to a high of 64% in

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Phnom Kung. Almost two-thirds of all families in the study villages were either poor or very poor.

4 Impact of Disasters on Basic Human Needs

The 2000 flooding in Prey Veng province affected all aspects of peoples lives, including housing, food supply, access to clean water and travel.

4.1 Housing

Traditional Khmer houses are raised wooden houses which are suitable for the climate, cool in the hot season and raised above the ground for the wet season. However, it has become expensive for families to build good quality raised houses, particularly since reforms within the forestry sector have reduced the supply of wood on the local market and the price has increased. As a result many families can no longer afford to build traditional style houses, but build small houses from bamboo and thatch on the ground or slightly raised above it.



Photo 1: House built from thatch on small bamboo stilts

These small houses are very susceptible to damage by heavy rain, strong winds and flooding. The 2000 floods destroyed or badly damaged small houses in 7 of the ten villages which flooded: 2 houses were destroyed and one small house was damaged in Preak Changkran, 2 in Boeng Daol and Pak Pri, 6 houses were destroyed in both Chuk Chey and Prey Khla villages and 15 houses were destroyed in both Chrey Krahim and Sonanchay villages. Box 1 describes the situation of a family from Chrey Krahim Village who lived in a small house that was destroyed by the floods.



Photo 2: Flooded house

Box 1

Long Lat lives with his wife and 3 daughters in a small house made from thatch in Chrey Krahim village. He owned 18a of rice land but sold it to repay money he had borrowed to pay commission in order to get a job in a sawmills in Koh Kong province. When the government enforced the logging ban in 1999, the sawmills closed down and he was left unemployed. Now he survives by selling his labor for agricultural work in Chrey Krahim and neighboring villages.

The 2000 floods created more problems for the family. The flood destroyed their house, and they went to stay with a relative in the center of the village until the flood went down and they were able to repair/ rebuild their house. They lost the opportunity to sell their labor. Since they had no rice stored or money saved, they borrowed 100kg of rice and 0.5 chi of gold @ 20% interest per month. Lat will pay off the rice by working for the person from whom he borrowed the money. He does not know how he will pay back the 0.5 chi of gold.



Photo 3: Roof top above flood water

Relocating to safe areas is a common coping strategy for many Cambodian families during flooding. Families move from flooded houses or damaged houses temporarily

to stay with other family members, relatives and neighbors if they live near houses that do not flood. Others move to stay on high ground on the roadside, at the pagoda or on hills nearby the village. In Boeng Daol, Pak Pri, Sonanchay and Chrey Krahim, families normally move to hills close to the villages. Families at Chouk Chey move to live along the roadside and in Preak Changkran Krom families move to the Wat. Box 2 describes one family who survived because they were able to stay at the pagoda during the floods.

Box 2

Ngin Out and his wife moved to live in Preak Changkran Krom in early 2000. The family has no land but have a small house on the land of another family. Out's wife is blind. They survive by carrying water from the well to people's houses for 200 riels per trip, making between 2000 – 3,000 riels per day.

The 2000 floods caused more problems for Out and his wife because their house was completely covered by the flood and they lost their plates, pots, mats and mosquito nets. They also lost the opportunity to carry water. They had to eat rice porridge with green bananas. The monks at the Pagoda invited them to live at the pagoda for one and a half months. Out made tea for the monks and his wife washed the dishes and the monks gave them food.

After the flooding they started to carry water again and they received some food from a neighbor. Sometimes people ask them to help with ceremonies and they give them some food and money. They could not borrow any money because they would not be able to pay it back.



Photo 4: Mother and daughter under shelter at safe area

The study found that during the 2000 floods, 15% of the interviewed families relocated from their houses in Boeng Daol and Pak Pri villages. One quarter of the families moved in Preak Chang Kran and Prey Khla, 40% of the families interviewed in Sonanchay and Chuk Chey moved and 64% of the families interviewed in Chrey Krahim moved. Box 3 describes a family from Pak Pri who moved temporarily to live on the hill during the floods.

In rural communities most of the house work is the responsibility of women in the families. As a result, any movement during the flooding creates much additional work for the women.

Box 3

Pich Hak, almost 60 years old, lives with his wife and 3 children in Pak Pri village. They are described as a medium family because their land is close to the irrigation system and they can grow wet season and dry season rice. They live in a raised house with a zinc roof. The flood reached almost four meters in the village and flooded the area under their house for four months. Hak moved his 4 cows and 2 pigs to Pros Pok hill, one of three safe areas that the Pak Pri villagers use. Pros Pok hill has 11 families who live permanently there. Many other families also moved their animals to the hill so it was very crowded. Hak borrowed his relatives boat at the beginning of the floods but when the flooding continued he bought one palm tree for 15000R and made a boat from it with the help of a neighbor. He traveled about 3km each day in his boat to collect fodder for his animals. One member of the family always stayed on the hill with the animals. When there was very heavy rain or strong winds the whole family stayed at the hill. Hygiene was a problem on the hill because small children excreted and urinated where they stayed and adults went no further than 20m. After the floods went down, Hak returned to his house with his animals and replanted his rice crop. He bought one cow that was very thin for 100,000R but the cow died about ten days later.

In addition to small houses flooding, the areas under the stilted houses flooded in nine of the ten villages. Choung Krouey was the only village where house land did not flood. As a result of the flooding many families remained in their houses except for essential travel. The safe areas for families and animals are described for five of the villages in Section 5. The other villages, Prey Khla, Phum Kung, Sonanchay and Pak Pri have five, six, eight and three small hills respectively that are used as safe areas for animals and families who have to move during flooding.

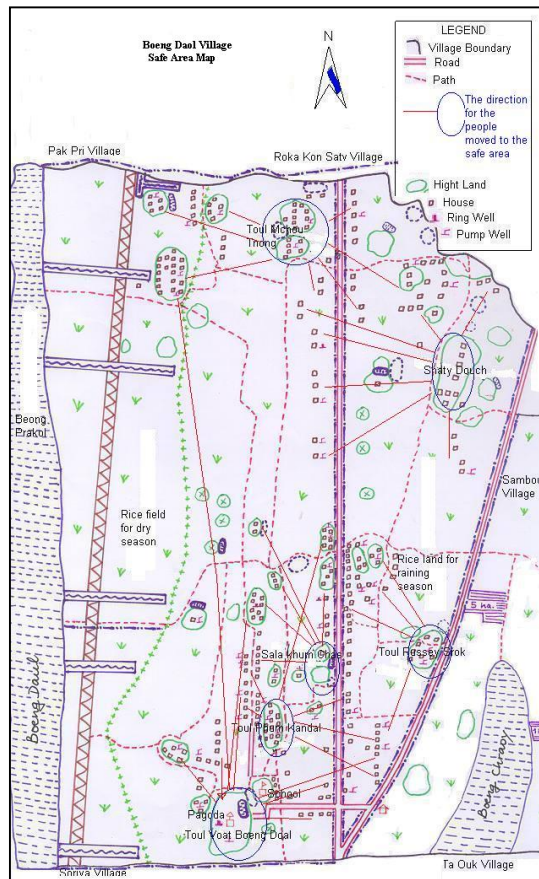
4.1.1 Safe Areas

4.1.1.1 Boeng Doal

The commune chief reported that there are 6 safe areas in Boeng Daol village, the pagoda, four hills where families live permanently and one hill which does not have permanent residents. According to the commune chief, 127 families had to relocate and stay at the safe areas during the floods. The commune chief organised the safe areas for villagers whose houses had flooded and for others who had to move their animals.

Fifteen families moved to one of the 5 hills, Tuol Phum Mochu Thnoeng. Some families stayed with the permanent residents who were friends or relatives and others built small huts for themselves and their animals. Clean water was accessible because

there were pump wells. Twelve families moved to another of the five hills, Tuol Phum Snay Dauch, 20 moved to Tuol Sala Khum Chas and 15 families moved to Tuol Phum Russei Srok. As on the other hill some families stayed with permanent residents and others built huts, and there were pump wells. Tuol Wat Boeng Daol, the largest of the safe areas, was temporary home to 60 households. Some stayed in the monk's house and others built small huts. There was a well at the pagoda.



Map 4: Safe areas in Boeng Daol Village

4.1.1.2 Chrey Krahim

Chrey Krahim villagers are divided into two distinct groups, one at the village centre and a second group at Phum Ta Moah which is almost 3 km away on the other side of the lake. The central area of the main village did not flood but much of the lower land did. Sixty-nine families moved to one of 5 safe areas. Eighteen families moved to live with their relatives or friends who had large houses in the centre of the village. Six families were able to stay with relatives but they kept their cows on the roads in the centre of the village. All families in the centre of the village had access to pump wells.

Tuol Neak Ta Chey is one of the 4 hills which were used as safe areas. There are permanent residents on this hill so families who had to relocate from their houses stayed with those families. Nine families brought their animals to stay in Tuol Neak Ta Knong, 40 families brought animals to Tuol Preah Theat and 6 families brought animals to Tuol Ro Ngieng. On each of the three hills, families built huts to stay in while they guarded their animals and shelters for the cows, buffaloes and pigs.

Twenty families and their cows from Phum Ta Maoh also relocated to the pagoda and school of the nearby village Phum Ta Meng, Prek Anteah commune. Some families stayed in pagoda buildings and others built huts. Most families had sold their pigs before the flooding and so did not have to move them. The wells at Phum Ta Meng were flooded so people could not access clean water.



Photo 5: Chrey Krahim Villager points to the flood-line on the steps of his house

4.1.1.3 Chuk Chey

The safe areas for Chuk Chey village are on national Route 11, the pagoda, the commune office and the health centre. According to the village chief, 60 families moved their cows and buffaloes to the national route but most could stay in their own houses. Three families moved their animals to live on high ground surrounding the commune office, 2 moved their cows and buffaloes to the pagoda and one moved their animals to stay on the land surrounding the health centre.

4.1.1.4 Tanal

The safe area for Tanal village is the high ground beside the irrigation canal in the centre of the village. According to the village chief, 72 families moved their cows, buffaloes and pigs to live on this high ground during the flood. Twelve families had prepared high areas for their animals at their own houses.

4.1.1.5 Prek Chankran Krom

The safe areas for Prek Chankran Krom village are the bridge, one high area named Tuol Ta Am near the river and the pagoda. The village chief reported that 19 families moved their animals to stay on the bridge, 9 families moved their animals to the high ground and 10 households moved their cows and buffaloes to stay in the pagoda because the land around the pagoda also flooded. Other families who had animals kept them on high areas that they had prepared before the flood.



Photo 6: Bridge used as safe area in Preak Changkran Kraom

4.2 Food

The normal Cambodian diet consists of rice, small amounts of fish or meat and vegetables or leaves, three meals a day. Families buy rice in large bags and buy the other food that they need on a day by day basis if they are not self sufficient in food. Families prepare some food for the annual flooding, such as prahok (fermented fish paste), dried fruit and rice. However, many of the very poor families who sell labor for their living can only afford to buy rice on a day by day basis and therefore are not able to stock food in advance of disasters. And since the 2000 floods lasted for longer than usual even the families who had stored food did not have enough.

Families reported that they reduced food consumption to make food stocks last longer in all of the villages. Reports on food reduction varied from 15% of families interviewed in Phnom Kung and Prey Khla to almost 60% of families in Tanal and more than 70% of families in Chrey Krahem and Boeng Daol. Some families ate rice seed that they had stored because they did not have enough food. Others borrowed rice from relatives or neighbors. Families reported that they caught fish with lines or nets from their houses. Households that did not have enough rice sold the fish and bought rice or exchanged the fish directly for rice. However, borrowing food and money was necessary for some families in all of the ten villages studied. The percentage of families that reported borrowing for food and other essential items are shown in Table 3.

Village Name	% of families who borrowed money
Prey Khla	46%
Chouk Chey	30%
Chrey Krahem	84%
Choung Krouey	64%
Boeng Daol	56%
Pak Pri	58%
Sonanchay	35%
Phnom Kung	20%
Preak Changkran	66%
Tanal	20%

Table 3: Percentage of interviewed families who reported borrowing to buy food

Rice prices increased to 750R/ kg for milled rice and 350R/kg for unmilled rice in the villages during the flooding. This price increase particularly affected very poor families who can normally only afford to buy small amounts of rice, such as a ‘tau’ (12kg basket). The usual price for milled rice varies from between 500R to 650R/kg. The price did not go down again to the regular price until after the harvest.

4.2.1 Access to Clean Water

Less than 30% of all Cambodians have access to clean water and this access is further reduced during flooding because many of the wells are flooded and/or become

inaccessible. Problems in accessing firewood also make it difficult for people to boil water. Many people rely on flood water which they collect from outside their houses for drinking, cooking and washing. The results indicated that in the villages where the wells were flooded, as many as 85% of the families interviewed drank flood water without boiling or treating it with chloramine.

Most of the villagers did not perceive the loss of access to wells as a major problem. People who have boats may travel up to 200m from the village to collect cleaner water but many collect the water from outside the door of their house. Villagers reported that they collect water from a river or pond and allow it to settle before drinking and few reported that they would boil it before consumption. Only three of the villages reported that they had received chloramine after the flooding.

One member of staff from the PDRD reported that he had been hired for a six day period over Chinese New Year to distribute chloramine to the villagers through the village chief and health centres in 12 villages and to provide short training for villagers on how to use chloramine. He reported that rather than visit two villages per day, he visited all 12 villages in a two day period and only made deliveries to the village chief. The village chief kept the chloramine at his house or just delivered to families nearby. There was no training on how to use it. This staff member then reported to the provincial department that he had spent 6 days distributing the chloramine to the 12 villages and received payment for the 6 days work.

4.3 Health Problems

Illness such as diarrhea, respiratory infections, skin rashes and fevers increase significantly during flooding. Table 4 shows the percentage of the interviewed families who reported illnesses which they claimed were as a result of flooding.

Village Name	% of families sick from flood
Prey Khla	20%
Chouk Chey	20%
Chrey Krahem	32%
Choung Krouey	28%
Boeng Daol	28%
Pak Pri	5%
Sonanchay	10%
Phnom Kung	10%
Preak Changkran	23%
Tanal	25%

Table 4: Percentage of families who reported illness due to flooding

Box 4

Key Kangna, a 24 year old single woman from Prey Khla, lives alone in a small house made from bamboo and leaves, close to her relatives house. She has 14Ha of rice land and she keeps chickens. During the flooding she reported that she developed a skin problem which she treated with traditional medicine which was available in the village.

Two families who were interviewed had family members who died during the flooding. In Choung Krouey village, the houses and pagoda were not flooded, so the funeral and cremation was carried out as normal. However, in Sonanchay village the family built a raft from banana trees on which they put the body and cremated it. They were unable to have a funeral ceremony until after the floods had receded.

4.4 Transport Problems

Transport by boat is the only means of travel for most villagers during the floods and in the ten villages that flooded, families reported transport difficulties during the flooding. Those who have enough money make boats from sugar palm trees. The biggest problem for many of the families in Prey Veng is the increase in the cost of transport. For example families in Choung Krouey reported that they normally travel to Snay Pul market by bicycle or motorbike, but during the floods they could not travel on the road so they had to pay 500 to 1,000riels per journey to go by boat.



Photo 7: Road cut by flood waters

People also reported that they were frightened when they traveled by boat during heavy rain and strong winds. Hy Khov, a 55 year old widow from Choung Krouey, was traveling from Snay Pul market when the boat sank. She lost the goods that she had with her and complained that she received no compensation from the boat owner, even though she reported the situation to the village or commune chief. After this boat accident she became sick with diarrhea and fever.

4.5 Distributions During the 2000 Floods

Donations from WFP, CRC, Government, NGOs (including CARE) and businessmen were distributed in all ten villages that reported flooding. The percentage of the families who reported receiving donations varied from village to village and families

were not always aware of who had provided the donation. (See Annex 2 for details on the NCDM, CRC and ERG).

Village chiefs reported that they receive information from the province via the district and commune that donations will be made on a certain day. The village chief then nominates the required number of families to go to collect the donations.

Villagers raised many issues about this system of making donations:

- The village chief may be lazy and will only tell his relatives or families who live near by;
- The village chief may nominate poor families that cannot afford to go to the distribution point;
- In some occasions the quantity of food distributed may be so small that it is worth less than the cost of the travel and time spent;
- Families who live far from the village chiefs house may not be aware of donations so he will not bother to take the time to inform them;
- Rich families may have relatives working in the provincial departments and may receive information before the village chief and will go to ask him;
- Local authorities become unhappy when NGOs who bypass the authorities and provide the donations directly to the villagers because they lose the opportunity to profit from the distribution;
- The list of vulnerable families may not be complete or it may be inaccurate.
- Families were angry with the village chief because the poorest families do not receive the benefits during the flood.

4.6 Recommendations for Addressing Basic and Immediate Needs during Disasters

Safe Areas and Shelter

- Emergency and development organizations should work together to build the capacity of national, provincial, district and local authorities simultaneously to increase the capacity to manage disasters.
- In cooperation with villagers and local authorities, the Committee for Disaster Management should identify high areas in or close to villages to which people can relocate during flooding and officially designate them as safe areas for the village. These safe areas are likely to include pagodas, schools and hills. Maps should be prepared of the safe areas for each village and distributed to commune, district and provincial offices involved in disaster management including the PCDM and CRC
- Each village should develop plans for villagers to move to safe areas and inform villagers of those routes.
- Local authorities should protect safe areas from development or destruction for road building etc.
- NGOs should support the local authorities to install appropriate sanitation facilities at the site, e.g. wells and latrines.

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- The CRC should provide training for local villagers on how to manage safe areas during emergencies.
- Projects should increase opportunities for families to build a raised house, for example at Samroang Voat families have a tradition of planting trees for each of the grandchildren so that they will be able to use them as the supports for a new house when they get married.
- The PCDM should act as the coordinator for all the information on safe areas in the province.
- Early warning systems should be put in place.
- The PCDM should investigate the need to distribute tarpolins for shelter at safe areas or to plant fast growing trees and bamboo at safe areas which can be used for shelter in emergencies.
- The PCDM should make plans to respond to disasters: information, documentation of disasters and vulnerability, cooperation, human resources, logistics - transportation, warehouses, procurement and distribution.
- An office should be built or assigned to disaster management in the province and coordination between NGOs, IOs and Government Agencies should be promoted.

Food

- Build the capacity of provincial officials to make rapid assessments of need to distribute food, water purification tablets, medicine and shelter in the province.
- CRC and WFP should continue to help build the capacity of relevant provincial officials to improve the coordination of distributions throughout the province.

Water

- Adapt well designs by building raised areas around the wells and make them strong with cement;
- Install pipes to make the wells higher than flood water;
- Use plastic to cover the wells during the flood;
- Encourage people to collect water in large storage jars;
- Install wells and toilets at safe areas;
- Encourage people to store some firewood so that they can boil water during flooding;
- Undertake public education campaigns on sanitation before disasters occur – which would include information on preparing food hygienically and personal hygiene;
- Prepare appropriate watsan posters and leaflets to distribute during flooding;
- Put measures in place to ensure that there are adequate supplies of chloramine and alum available at provincial level and design distribution strategies and ensure that reliable distribution mechanisms are in place.
- Train village volunteers and staff of health centres and hospitals to raise awareness of the importance of correct sanitation practices during flooding.

Health Care

- Education campaigns to reduce health problems and disease during flooding should be undertaken to help people understand the causes and recognize the symptoms of common illnesses such as diarrhea, colds, typhoid, respiratory infections, skin infections, eye infections and snake bites which occur and provide basic treatment. NGOs and the CRC should be involved in these campaigns.
- Volunteers and key people such as teachers, local officials and village elders should be amongst the people targeted by these education campaigns.
- Prepare adequate supplies of medicines at provincial and district hospitals and commune health centres for emergencies in accordance with the results of a health needs assessment.
- Encourage commune health centers to increase awareness of illnesses which commonly occur during disasters and the preventative measures that can be taken.
- District hospitals should put plans in place to mitigate the affect of flooding on the services they provide such as situating all new health centres and hospitals on high ground which is not likely to flood, preparing emergency plans, installing reliable communications systems and establishing mobile teams who can travel by boat during flooding.
- Mobile team members should be clearly identified, have transportation and finance, know clearly the safe areas and monitor the situation at them continuously, have some staff on stand-by duty at all times during an emergency and have enough medicine and equipment for emergency treatment.

5 The Impact of Disasters on Rural Livelihoods and Existing Coping Strategies

5.1 Agriculture

The livelihoods of the rural communities of Prey Veng Province have traditionally depended almost entirely on rice production, but most families also raise animals and sell labor. The province has 247,500ha of agricultural land on which 219,718 ha of rice are planted. Forest covers less than 10% of the province. 134,099ha of waterways in the province were being managed as 19 fishing lots at the end of 2000 but in accordance with the new sub-decree on community fisheries 83,388ha will be released from lots in June 2001¹¹.

Wet season rice is grown in 9 of the twelve villages studied and dry season rice is grown in 8 of the villages. Table 5 summarizes the agricultural land in each of the villages, the areas of land suitable for wet and dry season crops and the main varieties of rice grown. Farmers in eight of the villages also produce recession rice crops as flood water recedes. Wet season rice is normally planted sometime between May and September and harvested in December or January and dry season crops can be grown between December and June depending on available irrigation water and the height of the land.

Village	Agricultural Land	Wet Season	Dry Season	Variety
Ponley	302ha	302ha	0ha	Traditional
Samroang Voat	160ha	160ha	0ha	Traditional
Prey Khla	421ha	205ha	216ha	Traditional & IR Varieties
Chouk Chey	126ha	0ha	126ha	IR
Chrey Krahim	610ha	227ha	383ha	IR
Choung Krouey	544ha	379ha	165ha	Traditional varieties
Boeng Daol	586ha	411ha	175ha	Traditional & VN504 & IR
Pak Pri	374ha	333ha	41ha	Traditional & IR Varieties
Sonan Chay	219ha	184ha	35ha	Traditional & IR Varieties
Phnom Kung	247ha	202ha	45ha	Traditional & IR Varieties
Preak Changkran	29ha	0ha	17ha	IR
Tanal	172ha			Traditional & IR Varieties

Table 5: Rice land areas in the Villages

According to the WFP crop assessment report more than 90% of all households grow rice in ten of the eleven communes in which the research took place. The only

¹¹ "National Statistics of Fishing Lots to be released" December 12, 2000 Unofficial Translation.

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exception is Preak Changkran Commune which is located on the Mekong. The percentage of total wet season rice derived by WFP in the 2000 crop assessment for the eleven communes in which the research took place, shown in Table 6, concur with the areas reported by the village chiefs.

Commune	% wet season planted area derived by WFP
Boeng Daol	88%
Angkor Sar	100%
Chi Poch	100%
Kampong Russei	45%
Reap Commune	69%
Chrey Khmum	73%
Preak Changkran	0%
Mebon	85%
Babong	1%
Prey Kandieng	42%
KrangSway	100%

Table 6: Wet Season Crop Production according to WFP

In addition to rice seed, farmers must cover the cost of fertilizer, 35,000R per bag, labor for transplanting and harvesting and petrol for pumping water. If farmers buy fertilizer on credit then the price increases to 50,000R per bag. When farmers borrow rice seed, the normal interest rate is 100% for the season.

Prey Veng is normally a rice exporting province, where Vietnamese traders buy rice, transport it to Vietnam and then sell it onto the world market. During the 1999–2000 season large quantities of rice were exported to Vietnam from Prey Veng province. Farmers reported that the price per kg started at 350R and increased to 500R – 700R per kg.

The annual world market for rice is 22 million tonnes and in 2000 much of that market was met by Indonesian rice. As a result there was an insufficient market for all the Vietnamese rice so Vietnamese traders did not buy rice in Prey Veng. As of January 2001, much of the 2000 dry season crop was still sitting in trader's warehouses in Prey Veng. The result being that the price of rice dropped to as low as 230R per kg in some villages, increasing only to a maximum of 350R/kg for unmilled rice at village level.

The reduction in the price of rice has impacted considerably on farming incomes because:

- the price of agricultural inputs such as labor, fuel, and fertilizer have not decreased;
- farmers who repaid their debts after harvest had to pay more rice or sell more rice to pay back the debt; and

- in a few cases farmers reported that they were reluctant to plant rice and therefore less labor was available

5.1.1 Impact of Flooding on Rice Production

The 2000 floods affected rice production in three ways:

- early floods damaged the dry season crop that was almost ripe for harvesting,
- floods damaged rice seedlings that were planted for the dry season and slowly receding waters forced farmers to delay planting the 2001 dry season crop for a month or more in areas, and
- most significantly the floods destroyed wet season crops.

Damage to the Dry Season Crop

In Boeng Daol, Chrey Krahim and Chuk Chey farmers are producing two dry season crops as there are irrigation systems in place. They harvest one crop in March and the second in June or July. Since the 2001 floods came earlier than normal, there were some reports that dry season crops were flooded. The village chief of Chrey Krahim reported that a few farmers harvested the rice by boats and then tried to dry the rice before threshing it.

Damage to the 2001 dry season crop was not significant but some farmers lost rice seedlings that they were producing for the dry season crop in Preak Changkran and Chuk Chey villages. Some farmers also had to delay planting the dry season crop for up to one month because the flood waters were late receding.

Wet season crop

The 2000 floods destroyed more than 95% of the wet season rice crop in ten of the twelve villages studied. Farmers normally plant traditional varieties during the early rains in April or May and harvest in December. Farmers who had planted early lost their entire crop and the associated costs which include seed, fertilizer, pesticide and labor costs. In villages where the floods receded during August, farmers planted a second crop which was also destroyed by the September flooding.

After the floods receded in October, almost all the villagers who had lost rice replanted with the short duration varieties. In some cases families reported receiving rice seed donations from WFP, CRC, CARE and other NGOs, Government or wealthy businessmen. Despite media reports of very low germination rates for much of the seed that was distributed, there were no complaints from the villagers interviewed during the research. In addition to seed costs, farmers also had to cover the costs of fertilizer, labor and fuel with savings, borrowed money, or credit.

5.1.2 Impact of drought on rice Production

Drought during the wet season was the biggest problem affecting rice production in two of the villages, Ponley and Samroang Voat. Both villages are in the east of the province where the land rises above the Mekong flood plain so they are not affected

by flooding. Neither village has an irrigation system and rice production is entirely dependant on rainfall. Villagers described the drought which has occurred during the months of July, August and September during the last three years, 1998 to 2000, as a major disaster for their livelihoods.

In Samroang Voat the drought in 2000 damaged rice crops to varying degrees. All families interviewed reported that their crops had been damaged by drought, some by as much as a 90% decrease in expected output. Similarly, in Ponley village all of the villagers interviewed who had planted rice in 2000 reported that drought had a very serious impact on their crop. In some cases the drought killed all the seedlings and so the farmer had to buy additional seedlings to transplant. In others cases farmers had enough seedlings for their own crop but had none to sell. In addition to affecting the seedlings, the drought then reduced the overall rice yield and even prevented some of the plants from producing seed.

As a result of the serious impact of the drought on their livelihoods in Ponley and Samroang Voat none of the families were able to rely on rice production for their livelihoods in 2000.

5.1.3 Vegetable growing

Of the 12 villages studied, Preak Changkran Krom in Sithor Kandal was the only village where crops other than rice contributed significantly to the livelihoods of the villagers. The village is located on the banks of the Mekong and there is a large area of land which is filled with water in the wet season and used for growing tobacco, chilies, peanuts sesame and corn during the dry season. In normal seasons, these farmers can make a good living. However, the 2000 floods came early because of heavy rains in Laos and the upper Mekong Basin and as a result the crops in Preak Changkran Krom were completely devastated. Farmers expressed concern about replanting crops other than rice in the future because of the high investment costs that are necessary and the risk that they may loose this again.

In the other villages, family fruit trees, such as banana, papaya and jack-fruit trees, were damaged or killed by the flooding. In Boeng Daol village, the flood lasted so long that young sugar palm trees died.

5.1.4 Recommendations for Reducing the Risks to Agricultural Production from Disasters

- The province should make provisions to ensure that an adequate supply of good quality seed is available for farmers to replant crops after severe floods or droughts by appointing responsible agencies at provincial level to identify sources of good quality seed and by developing proper storage facilities in the province.
- The Extension Services of the Provincial Department of Agriculture should provide advice for farmers on drying and storage techniques and assist farmers to identify supplies of good quality storage bags.
- Many farmers apply fertilizer in Cambodia but a large proportion do not apply it at the correct times and therefore it has no benefit. There is a need for efficient extension activities to mitigate against this waste of scarce resources and how maximize the benefits from the fertilizer.
- AQIP is supporting the development of a provincial seed company which will establish shops to supply good quality agricultural inputs. Plans should be developed to use this supply system during and after disasters.
- The PCDM should cooperate with the Provincial Department of Agriculture to train staff to assess the needs of farmers during disasters.
- The Departments of Agronomy and Extension should provide advice to farmers to improve the quality of rice being produced so that there is a greater demand for Cambodian rice on the world market.
- Match varieties to conditions, for example as in Kampong Thom where villagers in flood prone areas traditionally grew deep water rice varieties and secured one good harvest perhaps every five years. The Office of Extension assisted farmers in employing an option which entailed growing an early wet season short duration crop which promised a degree of food security while giving them time to also risk the deepwater crop. Attempting to grow long duration varieties in drought prone areas can be ill-advised but a short duration early crop, if there is water, will minimize the risk associated with long season crop. The Cambodia Australia Agricultural Extension Project which is building the capacity of the extension department of the Ministry of Agriculture will begin working in Prey Veng Province in early 2001.
- Strategies recommended by CIAP for reducing the effects of ‘mini-drought’ periods in the wet season include the leveling of paddy fields to evenly distribute available water, raising bund heights to retain water during the wet periods, and the construction of small ponds beside nurseries¹².
- Crop diversification should be encouraged to limit the chances of oversupply of one particular product, to buffer farmers from price fluctuations and to increase the nutritional value of daily diets.

¹² Nesbitt, H (1996) Rice production in Cambodia. Cambodia IRRI Australia Project.

5.2 Animal Raising

The raising of animals makes up a significant proportion of rural livelihoods in Prey Veng province, as it does in most provinces in Cambodia. Families raise cows, buffaloes, pigs, chickens and ducks, and family savings are normally invested in animals which are then sold when the family needs cash. Cows and buffaloes are important in the agricultural system as draught animals for transport and plowing and for dung. The dung is used as fuel in villages where there is a shortage of firewood and as fertilizer in areas where it is not necessary to burn it for cooking.

Access to sufficient quantities of animal fodder and outbreaks of disease are on-going problems for farmers who have livestock, but these problems are greatly exacerbated by flooding and drought.

During flooding families move cows and buffaloes to high areas in their village or to nearby hills so that they do not have to stand or lie in water. At least one family member will stay with the animals to protect them from thieves. In normal circumstances families feed the cows and buffaloes with rice straw and cut-and-carried grasses and legumes, in addition to allowing them to graze freely. In times of flooding, there are few areas for the animals to graze and much of the straw is damaged by flood-water and so it becomes difficult for farmers to get enough food for the animals. Farmers reported traveling long distances by boat to collect fodder during the 2000 floods and more than 50% of the families interviewed had to move their cows and buffaloes to high ground on roads, nearby hills and pagodas.

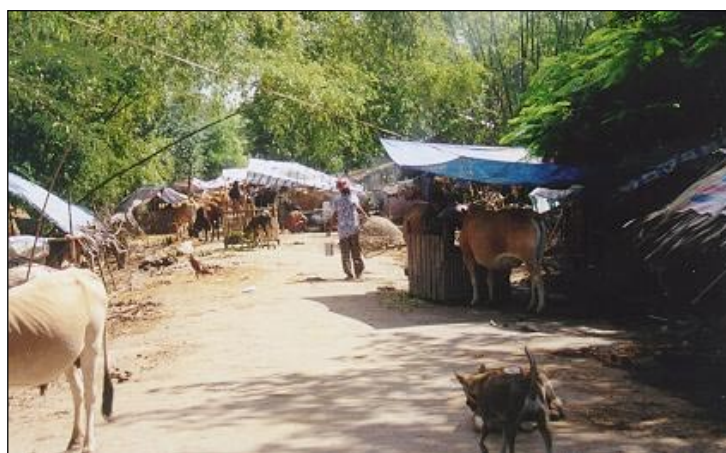


Photo 8: Cows moved to road for safety from flood

As described earlier in this report, families moved animals to safe areas in nine of the ten villages. In Sonanchay village, there are eight hills in the village and the pagoda at KrangSway which is 3km away was also used as a safe area. At the beginning of the flooding, families moved the animals to high ground near their houses but as the floods rose they had to move them to the hills. Some families had difficulty moving their animals to Krang Sway pagoda because of the deep water between it and the village.



Photo 9: Raised area prepared for animals

If families lose rice straw because of the flood, their options during the next harvest are, to buy straw at 100 - 500R/kg, to work in return for straw, or to depend on cut-and-carried grasses from common areas such as degraded forests and roadsides.

During the floods it is very difficult for families to sell any animals, even when the price is very low. Buyers may not have enough food for extra animals, however, mostly they are afraid that the animal will die. After the floods many families sell a cow, buffalo, pigs or chickens and in all 10 villages which flooded in 2000 interviewed families reported selling animals because they needed money after the floods. In most cases people sold only pigs and chickens with the exception of Pak Pri, Boeng Daol and Chrey Krahim where families reported selling cows. Table 7 shows the percentages of interviewed families who sold cows and buffaloes during and after the flooding and drought.

Village Name	% family who sold cow or buffalo during disaster	% family who sold cow or buffalo after disaster
Ponley	4%	8%
Samroang Voat	15%	0
Prey Khla	0	10%
Chouk Chey	0	8%
Chrey Krahim	0	0
Choung Krouey	4%	16%
Boeng Daol	0	4%
Pak Pri	8%	8%
Sonan Chay	0	5%
Phnom Kung	0	0
Preak Changkran Krom	0	10%
Tanal	0	0

Table 7: Families who sold cows & buffaloes during & after disasters

Diseases, such as septicemia, hemorrhagic fever and foot and mouth disease spread more rapidly during flooding because of the humid conditions, the close proximity of

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many animals in the safe areas and the weakness of animals due to food shortages. In the 10 villages studied, animals died as a result of food shortages and disease. See Table 8 for cow and buffalo deaths per village.

Village	Cows deaths	Buffalo deaths
Ponley		
Samroang Voat		
Prey Khla	36	3
Chouk Chey	18	6
Chrey Krahim	80	
Choung Krouey	0	0
Boeng Daol	32	18
Pak Pri	2	
Sonan Chay	23	2
Phnom Kung	2	5
Preak Changkran Krom	4	3
Tanal	5	3

Table 8: Cows and Buffaloes deaths during flooding

Disposal of dead animals was not reported as a problem by the villagers because they ate the meat or brought it to sell in Neak Loeung or Prey Veng despite the fact that the animal died from disease. While researching in one village one buffalo died from disease and the family brought a large piece of meat as a gift to the village chief in return for permission to transport the meat to the market.

Plowing becomes a problem for families who are forced to sell their animals or because they have died or are weak from illness and hiring draught animals adds to the cost of planting. In Pak Pri and Sonanchay villages, farmers who lost their draught animals as a result of the flooding, reported that they had no choice but to till the soil by hand as they could not afford to hire draught animals.

5.2.1 Pigs, Ducks and Chickens

Raising pigs, ducks and chickens are also important aspects of rural livelihoods which are affected by floods. Families reported that they built platforms for their chickens and pigs to protect them from the water while other families bring the animals into their house with them. When families relocate to the house of relatives, pagodas or other safe areas, the animals move with them. Selling pigs and chickens was an important coping strategy for families. Table 9 shows the percentage of interviewed families who sold pigs and chickens during and after the flood and drought.

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Village Name	% family who sold pig or chickens during disaster	% family who sold pig or chickens after disaster
Ponley	12%	37%
Samroang Voat	40%	40%
Prey Khla	0	32%
Chouk Chey	5%	10%
Chrey Kraham	40%	28%
Choung Krouey	0	4%
Boeng Daol	0	52%
Pak Pri	5%	40%
Sonan Chay	0	25%
Phnom Kung	0	25%
Preak Changkran Krom	0	4%
Tanal	15%	15%

Table 9: Interviewed families who sold pigs and chickens as a coping mechanism

5.2.2 Recommendations for Managing the Risks to Animal Production from Disasters

- Suitable safe areas for livestock should be identified by villagers and local officials at the same time as safe areas for people are being identified.
- Trees and shrubs should be planted to act as shelters for animals.
- The provincial department of agriculture should assist villagers to plant leguminous trees and grasses close to the safe areas.
- Areas where fodder can be collected should also be included in the maps of the safe areas.
- Increasing the supply of animal feed could be incorporated into all rural development and food security projects to increase animal production.
- Provision of training for village livestock agents should be incorporated into rural development and food security projects
- Encourage families to prepare some food for pigs, chickens and ducks when disasters are anticipated.
- Farmers should be encouraged to vaccinate animals. The Office of Animal Health and Production and district agricultural offices should have a vaccination plan for the province/district in cooperation with the VLA associations and VDCs. Vaccinating after flooding is too late and should be a priority regardless of disasters. PCDM should work with the relevant institutions and NGOs to develop strategies for increasing access to vaccines and medicine for animals during and post emergencies.
- Most communities collect clear statistics on animal diseases and provide the information to institutions involved in animal health regularly but the institutions do little with this information. The management of statistics relating to animal health should be improved and made available to relevant agencies during emergencies.
- Animal health services should be established in each of the villages. Projects should learn from good examples around the country such as the five VLA

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Associations in Kampot/Takeo, VSF's activities in Ba Phnom and CWS in the Northwest.

- Raise awareness of the risk to human health of eating diseased meat and develop a system of disposing of dead animals during flooding.

5.3 Selling Labor and Migration

5.3.1 Selling Labor

Selling labor as agricultural workers, construction workers and factory workers is a vital source of income for many rural families throughout Cambodia. The percentages of the interviewed families who sell labor in Prey Veng, Phnom Penh, Thailand and other provinces are summarized in Table 10.

Laboring work in Prey Veng province is predominantly related to rice production , either transplanting, weeding or harvesting and is an important source of income for both men and women. In return for one days labor, people earn between 2,500 and 4,000 riels, depending on the provision of food and accommodation. People reported traveling to nearby communes for work in rice production but also to Svay Rieng Province and to areas close to Phnom Penh city. People may travel in groups of up to ten people from one village. In many cases, people will borrow money in advance of working and then the payment per day may then be as low as 1,200 riels per day. Farmers also reported selling labor in return for straw, milled rice and rice seed. The percentage of interviewed families who sold labor in the province varied from 10% in Samroang Voat to 50% in Tanal.

Village	% family with member selling labor in Prey Veng	% family with member selling labor in Phnom Penh	% family with member selling labor in Thailand	% family with member selling labor in other provinces
Ponley	25%	37%		
Samroang Voat	10%	70%		
Prey Khla	42%	12%		5%
Chouk Chey	30%	5%		5%
Chrey Krahim	25%	8%	16%	
Choung Krouey	32%	40%	8%	
Boeng Daol	20%	20%		
Pak Pri	21%	21%		
Sonan Chay	30%	50%		
Phnom Kung	30%	35%		
Preak Changkran Krom	30%	10%		5%
Tanal	50%	15%	5%	10%

Table 10: Families who sell labor

5.3.2 Migration for work in Phnom Penh

5.3.2.1 Garment Factories

Phnom Penh now has approximately 200 garment factories which employ more than 170,000 staff. The majority of these are young women within the 15-25 year age

group who migrate from the provinces. The young women normally get a job in one of these factories through a middle person to whom they pay a commission.

In 11 of the 12 villages, families reported that female family members were working in garment factories in Phnom Penh. Young women had been going to work since 1998. They earn about \$40 per month as a basic wage but can earn more by working overtime. Girls pay \$5 per month to rent space in a small room near the factory and spend at least \$15 per month on food. The young send money back to their families regularly and visit home once or twice a year during the Water Festival, Chinese New Year and Khmer New Year.

Box 5

Pheng Lean is a farmer in Tanal village who makes a living by farming and selling labor. He lives with his daughter who also sells her labor. Lean reported that two of his grand-daughters are working in garment factories in Phnom Penh and that they earn \$30 per month and paid \$40 commission for each of the jobs. They provided the money for buying the seed to replant the rice after the flooding.

Families reported that the girls paid a commission of \$45 for the jobs in the garment factories and that most went with someone that they knew. According to the village chief of Samroang Voat, once one girl returned to the village and others saw that she had new clothes, etc. others became interested. Three girls in Choung Krouey had gone to Phnom Penh in October to find work in the garment factories but they had returned to the village because they were unable to pay a \$50 commission.

5.3.2.2 Construction Work

Migration to Phnom Penh for construction work is also very common for men and some women in the villages but the length of time which people stay in Phnom Penh varies greatly from person to person. Construction work in Phnom Penh pays from about 5,000R/day to as much as \$5 - \$7 per day for skilled carpenters and builders. The cost of travel from Prey Veng to Phnom Penh is approximately 30,000R, so people are willing to travel to the city for as little as seven days labor. Because of the frequency with which people travel to and from Phnom Penh for construction work, the study could not show conclusively that migration to Phnom Penh for construction work had increased directly as a result of the 2000 flooding. One family in Samroang Voat reported that their daughter had gone to work in the garment factory since September 2000 and families in 6 of the flooded villages, (one from Preak Changkran, 3 from Chrey Krahim, one from Boeng Daol, 2 from Phnom Kung, 7 from Choung Krouey and 2 from Sonanchay) reported that family members had also gone to Phnom Penh for work.

Box 6

Nut Eoun from Phnom Kung Village is 40 years old and is married with 3 children. The family has 2.4 ha of land on which they produce both wet and dry season rice. Eoun regularly migrates for work. In October 2000 he went to Phnom Penh to work as

a cyclo driver where he earned about 2000 – 3000 riels per day after paying for food and the cyclo rental. He returned to the village in December. During this time, Eoun's wife stayed at home and took care of the crops and the animals. Eoun regularly migrates for work each year but for different lengths of time.

In all of the villages, interviewed families reported that family members regularly travel to Phnom Penh to work: in construction; car washing businesses; as cyclo drivers; to operate small businesses selling air for car and motorbike tyres; and selling food. Money received from those family members was an important component of their income.

Box 7

Bee Aum is a 42 year old single mother from Phnum Kung. She has 1.6 ha of rice land but she rents it out to another farmer for 250kg of rice per year because she cannot cultivate it alone. She keeps some chickens and pigs. She goes to Phnom Penh to work in construction from time to time and at other times she travels around the nearby villages to sell cakes that she makes at her house.

Before and after the 2000 flooding she worked in Phnom Penh for 5,000R per day without food or accommodation. When she is in Phnom Penh her son stays with her relatives and they take care of her pig and chickens.

The migration for labor of husbands, sons and brothes has a very significant impact on the lives of the women in those families as they have to take on additional work that was previously done by the men. When women are left alone with children they are also exposed to greater insecurity even in their own homes.

Box 8

Va Savorn, 50 years old, is married with 2 children of his own and 3 orphans that he cares for. He owns 2ha of rice land in Sonanchay village and he runs a small business at Psaa Touch in Phnom Penh selling air for car and motorbike wheels. When Savorn needs to be in Sonanchay for farming, his 14 year old son goes to run the business in Phnom Penh.

During the 2000 floods, the family lost all their rice crop and the labor and fertilizer that they had invested in it. The family had to move from their house with the animals to the safe area on Paing Teth hill. As a result of the flooding, Savorn could not go to Phnom Penh so they lost the opportunity to earn money from his business. He has a good relationship with the owner of the building where he runs his business in Phnom Penh and so he borrowed 5 chi of gold (5 x \$26 - \$31) from him @ 10% interest per month. The family reduced food consumption and ate mostly rice porridge. Since the cows were weak from food shortages the family had to till the soil by hand when they replanted the rice after the flood. Ten days after the floods receded Savorn returned to his business in Phnom Penh.

The feeling of vulnerability that farmers and their families experience is more likely to be the factor that increases migration to Phnom Penh and the flooding definitely increased the sense of vulnerability.

Box 9

One morning in mid March, 2001 two of the researchers met with a group of men who were waiting for labor at Wat Lan Ka in Phnom Penh. The workers had come from three districts in Prey Veng, Kampong Trabeak, Mesang and Prey Veng.

A man from Kampong Trabeak reported that he first started coming to look for work in Phnom Penh in 1990 and that he has come every year since during the time when he does not have much work on his farm, after transplantation, and harvesting. According to the 8 workers it was easy to find work in Phnom Penh from 1990 to 1997 but it had become more difficult to find work because:

- there is less construction work underway in the city;
- most of contractors are Vietnamese, so they prefer to hire Vietnamese construction workers as it is easy to communicate and interact and there is no danger of conflict if the supervisor gives orders or criticizes the quality of work of another Vietnamese person. If the Vietnamese supervisor reprimands a Khmer worker then conflict is likely.
- many people come from the provinces to find work, e.g. workers reported the ease of finding work when they went back to their villages and as a result more came.
- flooding and drought has affected their incomes from rice production and therefore need to go to find money for fertilizer, etc.

Ten of the workers had rented a small house in the Tonle Bassac squatter area together for 30,000R per month. They spend about 1,200R per meal so food costs an average of 3,000R/day for food. They reported that since arriving in early March 2001, they could find six days work during the ten days. On previous visits to Phnom Penh they were unable to find any work and had to borrow money to return home to their village.

One of the men said that he would return to his village as soon as he had made enough money to pay for the fertilizer.

5.3.2.3 Commercial Sex Trade

During the research no family reported that their children were working in Karaoke bars or as commercial sex workers, but in two of the villages, the research team met young women who were working in the sex trade, one in a karaoke bar in Prey Veng town and the other in a karaoke bar or brothel in Boeng Trabek in Phnom Penh.

5.3.3 Migration to Thailand

An increase in the numbers of people migrating to Thailand for work was reported by provincial officials and by district officials in Pea Reang. In Pea Reang district which has a population of 117,000 people the governor reported that 4500 people had gone to Thailand in the past year. In three of the twelve villages, Chrey Kraham, Choung Krouey and Tanal, families interviewed reported sons or husbands migrating to Thailand. The men had gone to Thailand to work as fishermen on boats, in fresh water fisheries and in construction. Commission of 450,000 riels (\$115) are paid in return for a job and travel to Thailand. Only one of the interviewed families reported that the husband had gone since the flooding. The driving factor in people migrating to Thailand was the desire to earn cash and not necessarily directly related to the flooding.

Box 10

Chan Eourn, 40 years old, is married with 5 children. They have 0.5 ha of rice land. In 1999, Eourn's son went to Thailand to work as a fisherman. He paid 450,000R to a middleman who guaranteed the job and provided transport. The family borrowed the money to pay the commission. During the 2000 floods the family had to move to live with other family members and they had to borrow money because they did not have enough food stored. Eourn persuaded her husband to go to Thailand to find work there also in November. They borrowed the 450,000 R for the middleman at 50% interest per year from another villager. Eourn reported that the main reason for going was the lack of work opportunities in their area.

5.3.4 Recommendations for Mitigating the Impact of Migration on Local Communities

- Development projects cannot discourage people from migrating for work. However, they should develop programmes to mitigate the negative social impacts of migration on rural communities such as raising awareness on the dangers of sexually transmitted diseases, drug abuse and gambling.
- Increasing employment opportunities in rural areas and increasing farming incomes are necessary to reduce the numbers of people leaving the rural areas for work.
- Training programs should be established to develop agricultural and professional skills.

6 Borrowing and Credit

Borrowing is an extremely important coping strategy for rural families. Families borrow from other family members, neighbors, money lenders or middle-persons, land owners or rich farmers and NGO/IO credit programs. The percentage of the interviewed families who reported borrowing during and after disaster in each of the 12 villages is summarized in Table 11.

Village	No. of Families Borrowed Money
Ponley	58%
Samroang Voat	70%
Prey Khla	66%
Chouk Chey	20%
Chrey Krahem	92%
Chong Krouey	68%
Boeng Daol	36%
Pak Pri	73%
Sonanchay	35%
Phnom Kung	10%
Preak Changkran	45%
Tanal	15%

Table 11: Percentage families who reported borrowing money

Interest rates on borrowed money vary from a low of 4 – 10% in credit organizations and from 10 – 30% per month from private lenders. Borrowed rice is normally paid back with interest of 100% per rice season.

According to the interviews there are a number of circumstances in which families described themselves in relation to borrowing:

- Very poor families who will not borrow because they have no way to pay back money, they own no property and they survive by selling labor;
- Families who borrow rice seed and pay it back with 100% interest at the end of the season. These families may also buy fertilizer on credit and therefore may pay an extra 15,000R per bag;
- Families who borrow money for an emergency or for travel and pay back the loan after harvesting; if they cannot afford to pay back the capital sum, they will try to pay back the monthly interest;
- Families who borrow in advance of selling labor and then receive a much reduced daily rate of pay;
- Families who borrow money and pay it back only when they receive money from another family member working in Phnom Penh, other provinces or Thailand;
- Families who borrow money and have to sell assets to repay the loan.

Families normally sell small animals such as chickens and pigs first when they need money but during the flooding prices were low so many families chose to borrow money rather than sell. Families who have several cows will sell a cow when money

is needed but if the family has one or two cows they are reluctant to sell because they need them for transport and plowing.

Once families have borrowed money they will try to repay the loan by selling labor or with the profits from a good harvest. If they are unable to make money to repay then they will start to sell assets. Once all luxury items have been sold they will sell any remaining livestock. If the loan is still not covered, then the family may rent their rice land to another farmer for a season and use the money to repay the loan.

Box 11

Tes Horn is a 70 year old woman living with her widowed 29 year old daughter in Prey Khla Village. Horn sold her rice land to pay for medical treatment for her daughter when she fell from a tree. Now they survive by collecting fruit or selling labor to nearby farmers in return for money or rice. Their small house was not flooded but their livelihood suffered as a result of the floods. They borrowed rice in advance for 3 months/ 80 days work. Now they work in return for 1200 riels per day with food. In February 2000 both women were very stressed as they had not yet repaid the debt, they had no money and the farmer had had no work for them for all of the previous week.

When a large debt is incurred through a family illness or death then the family may sell their land to pay it off. Lastly, the family will sell their house and house land to payoff the debt. The 2000 Oxfam Land Study Project found that 13% of all rural families had no land and that 44% of these had sold land to repay debts incurred through illnesses.

Despite the heavy impact of borrowing on families, many reported that they had a very good relationship with the money lender from whom they borrow and that they preferred the flexibility of the timing of money lender to a credit organization despite the high interest rates charged.

6.1 Recommendations for Credit and Savings Programs

- Access for credit after disasters is extremely important for people to buy agricultural equipment such as rice seed, fertilizer, petrol, to repair homes damaged by floods, to clean wells, etc.
- The interest rate on post disaster credit should be as low as 5% per year and government policy should develop and regulate policy for post disaster credit. Repayments for loans provided for post disaster assistance should be not be required within the first year of receiving the loan. Repayments of loans for agricultural inputs should only be required at the end of the growing season.
- Saving programs should be set up to encourage families to save for emergencies

7 Conclusion

The annual flooding of the Mekong and Tonle Sap River systems play an integral role in the agricultural systems of rural Cambodians living in the flood plains. However extreme flooding also has the potential to cause serious problems some years. Rural communities have developed strategies for coping with floods such as:

- building raised houses
- moving people and animals to high areas,
- storing food for flood months and
- preparing safe areas for animals.

During the 2000 floods, most families were able to cope to some extent, but the long duration of the floods and the extreme poverty of the majority of the villagers mean that a significant number of families are being pushed further into the cycle of debt and poverty. This is being exacerbated by the low price of rice. Such high levels of vulnerability in Prey Veng will be disastrous for tens of thousands of villagers should floods strike again this year.

The recommendations outlined in this report are aimed at assisting communities reduce their vulnerability and mitigate the risks caused by flooding and other natural disasters. These recommendations can contribute to reducing the impact of disasters particularly at the household level, reducing the time needed for families to recover from disasters and ultimately, reducing the cost of emergencies for Cambodia.

Incorporating some of these recommendations into longer term development projects is critical in order to improve communities' preparedness and mitigation capacity. As Kofi Annan pointed out, activities that contribute to disaster prevention are no less a moral imperative than reducing the risk of war.

Annex 1

CARE DIPECHO Project

PRA Research Methodology for Risk Mitigation and Disaster Management Project

Research Activities for each of 12 Villages

Group Discussion
Geographic Map of Village
Safe Area Map of Village
Household Map of Village and Wealth Ranking
Transect Diagram
Historical profile and disaster profile
Seasonal Calendar
Selection of families to be interviewed
Semi-structured interviews
Group discussion II to identify future development plans to mitigate risk and disasters in the village
Reporting on Research

Results from field work for each team

1. Detailed notes from the discussions with the Groups on each of the topics given
Typed in English and Khmer
2. Geographic map of village on Flip chart, and A4 paper Scanned into computer (Khmer and English version)
3. Safe Area Map of village on Flip chart, and A4 paper Scanned into computer (Khmer and English version)
4. Household map of village on Flip Chart and A4 Scanned into computer and List of all houses in village with house and wealth rank symbol
5. Transect diagram of Village A4 Scanned into computer (Khmer and English version)
6. Historical profile of Village
7. Disaster profile for village
8. Seasonal calendar table (English and Khmer) and graphs for rainfall and disasters
9. Detailed notes from the semi-structured interviews
10. Detailed notes from Group Discussion II which describe future development plans that can help mitigate against disasters

Guidelines for Group Discussion

Number of Participants: 15 - 20 Villagers

Objective of Interview: to elicit and document the general situation in the village

- number of families and people in the village
- number of villages in commune etc.
- total land area (wet season rice land, dry season rice, chamcar, house land, etc.)
- average land holdings
- number of landless families and reasons for landlessness
- livelihoods including major cash and non-cash income sources,
- rice season and varieties,
- natural resource availability, - forests, fisheries, etc.
- access and communications in the village,
- education and health services
- wat
- number of people from the village who have migrated for labor
- development organizations working in the village
- sources of credit in the village (money lenders etc.)
- disasters affecting the village and major problems caused by disasters
- number of households in the village affected by the flood
- flood patterns in the village and commune - source of flood water etc
- major coping strategies of families
- identification of the social relationships in the village which function during disasters

Selection of Key Informants required for maps, historical profile and seasonal calendars

Ask participants to meet again on a set time two - three days later (Friday December 29th, 2000). Ask them to think about what future developments that would help mitigate flood damage and reduce disasters in the village. Tell them that the map will be displayed at wat or meeting venue and ask them to look carefully at it in order to map future developments to mitigate against disasters, etc.

Geographic Map of Village

- Review 1:50,000 map of the commune and village prior to travelling to village and sketch general features in your team notebook.
- Select a number of informants (5) that have some knowledge of maps and who are willing to share their knowledge.
- Choose a suitable place and ask the informants to draw a map of the main features of village on the ground.
- Main features should include village boundaries, roads and paths; bridges; housing land; rice land; forest land; school; health center; pagoda; government and NGO offices, lakes, rivers, streams and ponds (try to identify wet season and dry season water ways, low areas that flood and high areas) dangerous/hazardous areas.
- Help them get started but let them draw the map themselves.
- Copy map on to flip chart paper with markers (include key for all features)

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- Work with informants to add local names to important features.
- Team should verify the map by walking through the village.
- Make a copy of the and display it in a strategic position in the village for 1-2 days
- Make A4 copy of map English and Khmer

Safe Area Map

If villagers relocate to high areas outside their village during flooding, then prepare a safe area map which includes all areas where villagers move to.

- Ask key informants to identify all areas to which villagers move.
- Draw Map on Flipchart paper with village at centre and lines to all safe areas
- Try to identify safe areas on 1:50,000 Map
- Try to identify the services available in the safe areas and the safe routes to those areas.
- Record approximate distances to safe areas and safe routes.
- Make an A4 copy in English and Khmer

Household Maps

Ask three key informants (Village chief or lay person in pagoda) to help produce a map of the households.

Use the geographic map to draw roads and rivers on a flipchart paper.

Describe the four categories of houses with the informants.

Describe the three categories of wealth to the informants: medium(M), poor(P) and very poor (VP)

Medium: Own >1ha land, tiled or galvanized roof on house, motorbike, TV,

.....

Poor: Own < 1ha of land, thatched roof house, bicycle, B&W TV,

Very Poor: Own no land, sell labor, small house or thatched house,

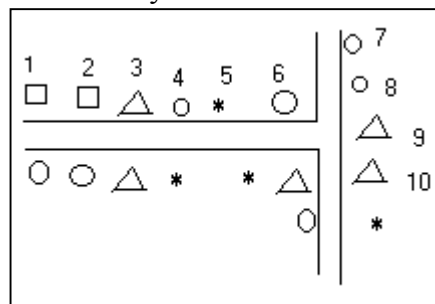
Draw the houses on the map using one of the 4 symbols :

! Tiled roof

-Galvanized zinc roof

△ Thatch roof

* Small house on the ground



Make a list of all the houses in the village on the paper provided.

Write the name beside the number you have assigned to the house on the map,

Add the symbol for the house type to the list

Describe the wealth of the family using one of the three categories M, P or VP

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Number	Family Name	House type	Wealth Category	Interviewed by
1		△	P	
2		–	P	
3		*	VP	
4		△	P	
5		!	M	
6		!	M	
7		–	P	
8		△	P	
9		*	VP	
10		–	P	

Transect Diagram

- Once the geographic map is complete ask the key informants to continue to work with the team to produce a transect map of the village
- Explain the objective of the transect diagram to the informants:
- Objective of Transect diagram is to show main landuse zones and relative elevation of land zones in village.
- Select the route to take in the transect walk
- Walk the transect
- Observe, ask and listen
- Outline the topography of the land along the walk
- Identify the main natural and agricultural zones and sketch distinguishing features.
- Draw the transect on A4 graph paper
- Generalize - do not go into detail
- Include a rough measurement of the scale of the transect

Historical Profile of the Village and the disaster profile

The historical profile should provide a summary overview of the key historical events in the village and commune and their importance to the present situation. Work with key informants that include village elders.

Record history according to the following periods on answer page provided:

Sihanouk

Lon Nol 1970-75

1975 -1979

1980 - 1993

1993 - present

Record a historical profile of disasters in the village for at least the previous ten years on the Disaster recording Sheet provided. If the disasters are floods the ask the village chief and or commune chief if there is data on the flood levels in the village, if not work with key informants to draw flood trends in the village.

Seasonal Calendar

A seasonal calendar is a calendar showing the main activities, problems and opportunities throughout the annual cycle in diagrammatic form and/or a table. It helps identify the months of greatest difficulty and vulnerability, and monthly variations which have an impact on people's lives. It can be used to summarize:

- rainfall
- rice
- other crop cycles (from planting to harvesting)
- livestock (births, weaning, sales, fodder)
- animal diseases
- rats
- insect problems
- crop diseases
- flooding
- drought
- local income generating activities
- labor demand in the area
- migration for labor
- high price/cost of rice
- low price/cost of rice
- high price/cost of other goods
- low price/cost of other goods
- human illness
- debt
- sources of drinking water

Ask informants to identify the months during which each of the above list occurs and mark on table on Seasonal Calendar Answer Sheet.

For rainfall and flood mark data on graph paper

	4	5	6	7	8	9	10	11	12	1	2	3
Rainfall												
Rice												
Insects												
Rats												

Selection of Families for Semi Structured Interviews

- Take list of families prepared during household mapping and wealth ranking exercise
- Calculate number of families to be interviewed - approximately 15-20% of families

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- Take set of numbered cards
- Divide cards into piles for each of the three wealth categories
- Put cards in a hat or bag
- Draw appropriate number of cards for each category
- Assign families to interview team

Semi Structured Interview

Visit family and explain the research that the team is undertaking.

Ask them are they willing to discuss some questions with your team

Ask if the time is convenient- if yes continue with interview: If no ask when you can return for interview

Questions for Semi -Structured Interview

1. Name of Interviewer
2. Family Name
3. Name of Household
4. Number of family members Male Female
5. Number of family members working
6. Number of dependents Children Old Sick
7. House Type
8. How long has the family been living in the village?
9. Number of children attending school
10. Major Livelihood
11. Land holdings Area House land Wet Season rice land Dry season rice
land Chamcar Land
12. Annual rice production Dry season yield Wet Season yield
13. Rice Varieties Grown
14. Do you keep animals, cows, buffalo, pigs, chickens, goats and numbers?
15. If no animals why?
16. Annual Income
17. Annual Expenditure on Food, Health, Transport, Housing, Firewood, Agricultural inputs such as fertilizer, pesticide, seed, fuel, machinery, etc.
18. What is the source of clean water for the family?
19. What disasters affect the family? *e.g. Flood, Drought, Pest, rats, Human illness, Animal diseases, security, etc.*

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20. How do each of the disasters affect family? *e.g. Loss of income, Loss of crop, Illness, temporary move, Animals ill, Animals dead*
21. Did the disasters affect all families in the village or only some families? If only some, why?
22. What does the family do to cope during the disaster? *e.g. reduce food eaten, use money saved for disaster, Move to high ground, Move to Wat, move to live on roadside, live on boat, go to other family members house, etc.*
23. Is the source of clean water affected by the disaster?
24. What does the family do to cope after the disaster? *Beg money, reduce food eaten by adults, reduce food eaten by children, eat seed rice, borrow money from neighbor, sell chickens, sell pig, Sell land, migrate full-time, sell motorbike, sell bicycle, send children to work in city*
25. Which order are assets disposed of?
26. When the disaster has been very serious was there help from an outside organization, WFP, NGO, etc. or government?
27. Which? and what kind of help?
28. What do you think about the sense of community in times of disaster
29. If the disaster occurs regularly do you have a strategy to protect your family and livelihood next year or in the future?
30. What projects do you think would help your family prepare for disasters?

Group Discussion II

Meet with 15-20 villagers and inform them about how your work has gone. Show maps, transects, etc.

Ask them to give ideas of what development projects that would help reduce disasters in the village

Record details and identify any appropriate interventions on maps

Annex 2

National Committee for Disaster Management

In 1995 the Royal Government of Cambodia (RGC) established the National Committee for Disaster Management (NCDM), a cabinet level body whose main role is to coordinate emergency response activities. The NCDM is a subcommittee of the Council of Ministers (CoM), mandated for emergency management, with membership from key Ministries, the Prime Minister and the High Command of the Armed Forces. In theory the NCDM can instruct all Ministries and institutions to “closely collaborate with NCDM according to its necessary needs”. The Cambodian Red Cross (CRC) is recognized by sub-decree as the main emergency response partner for NCDM¹³.

The NCDM has a very detailed draft national policy on emergency management¹⁴, and sees itself as having a key coordination role in emergency responses. Its roles and responsibilities are listed in its constituting sub-decree as:

Issue of necessary principles regarding disaster management.

Formulate measures of disaster prevention, preparedness, mitigation, emergency response and post disaster rehabilitation in collaboration with concerned agencies, NGOs, and international organizations.

Provide instruction to sub-national committees for the Provincial Committee for Disaster Management (PCDM) and District Committee for Disaster Management (DCDM) in disaster management activities.

Formulate proposals, utilize resources such as funds, equipment, means of working, fuel, and other material necessary for emergency response and repair of damaged infrastructure.

Coordinate with UNDP, IOs, local and international NGOs, Ministries, donors and agencies concerned with integrated disaster management.

At the provincial/ municipal level there is a Provincial/Municipal Committee for Disaster Management (PCDM) which is made up of the Provincial or Municipal Governor, Vice-Governor and Chiefs. The role and responsibilities of the PCDM are to:

implement national policy and guidelines set by NCDM;

instruct and support all activities of DCDMs;

advise NCDM on activities conducted by concerned institutions, agencies, CRC, local and international NGOs;

submit damage reports and needs for funds, materials and equipment to NCDM and to implement training curriculum and public education.

At the district level there is a District Committee for Disaster Management (DCDM) comprised of the District Governor, Vice Governor and Chiefs of Offices in the district. Its roles and responsibilities are to implement national policy and guidelines

¹³ Article 4.9, Sub-decree on Modification of the Organization and Functioning of NCDM

¹⁴ Article 2 sub-decree on Modification of the Organization and Functioning of NCDM

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set by NCDM, advise PCDM and NCDM on the status of a disaster, attend provincial/national training, make public announcements on possible disasters, access initial damage, conduct emergency response operations and to report on relief operations.

Village chiefs reported that during the 2000 floods they provided information to the commune chief who then passed this information to the district and provincial authorities. Village and commune chiefs took responsibility for coordinating the relocation of families and animals to safe areas.

Cambodia Red Cross

The Cambodian Red Cross (CRC) and its provincial branches formally shares coordination and -responsibility with the PCDM. CRC has a well-developed disaster relief and preparedness policy/plan. CRC chairs the Emergency Response Group, (a forum of international NGOs, UN agencies and Red Cross Societies), which is convened on an ad-hoc basis. CRC does the initial assessment and triggers the response. The response, once triggered, can be effective due, in part, to access to large-scale supplies, transport and distribution facilities through WFP and CRC. Many NGOs work with emergencies under the CRC umbrella through the CRC.

The CRC operates on three levels; national, provincial and within local communities. Each level has a particular role and responsibility within the disaster cycle. CRC has representatives in all the provinces so information collection and dissemination is efficient. CRC/WFP has distribution warehouses around the country that are maintained by the Provincial branches of the CRC. Within these stores there are emergency supplies assembled by Action Contre la Faim, CARE, Church World Services (CWS) and Oxfam Great Britain. Distribution is carried out in cooperation with WFP, which also has food warehouses, where CARE stores emergency high nutrition compact food (BP-5).

Emergency Response Group

ERG is a response co-ordinating forum of INGOs, UN agencies and Red Cross Societies of which CARE is a member. The ERG originated in the refugee and Internally Displaced People (IDP) resettlement in 1993 when donors used it as a means of raising issues. The ERG has functioned on occasions such as the 1996 floods, the aftermath of the political events of July 1997 in the same month, the inundation of parts of the northeastern provinces by Typhoon Victor in 1997, and the repatriation and floods of 1999 and the floods of 2000.