The Impact of Flooding and Drought in Cambodia

CDRI interviewed His Excellency General Nhim Vanda, Senior Minister and First-Vice President of the National Committee for Disaster Management. Based on the interview, this article offers a preliminary assessment of the damages caused by flooding and drought for three consecutive years, and the responses of the Royal Government of Cambodia and the International Community to this year's disaster.

The floods in 2000, were reported by the National Committee for Disaster Management (NCDM), to be the worst in 70 years. Three hundred and forty seven lives were lost and the Council of Ministers estimated US$ 150 million worth of physical damage. The following year Cambodia was once again subject to floods, but this time other parts of the country also experienced drought. This caused the deaths of a further 61 people and an additional cost of US$ 36 million.

In May 2001, the NCDM stated that; '*The floods* [of 2000] *may have been exceptional compared to the past, but they will not be exceptional in terms of the future. Climate change and consequent rises in sea level and increase in river flow is likely to render the floods of 2000 the norm not the exception'.*[1] In 2002, Cambodia experienced the third successive year of natural disaster.

This article is an initial assessment of the damage caused by the combined flood and drought of 2002, and the response of the government and the international community. As 2002 is the third successive year that Cambodia has faced natural disaster, this article is placed in the context of the impact on development. The article concludes with some general recommendations for integrating risk reduction strategies into development policies.

The Extent of the Drought and Flood in 2002

In August this year, the NCDM reported that throughout Cambodia 55 Districts consisting of 551 communes had been affected by drought, which was the worst in two decades.[2] The worst affected provinces were Prey Veng, Battambang, Kandal, Kompong Cham, Kompong Speu, Pursat and Takeo. The United Nations Office for the Coordination of Humanitarian Affairs (OCHA) reported that by mid-September, rice had been planted in only 1,237,604 ha out of a normal 1,929,000 ha (64%).[3] Some of the area planted was later affected by flooding.

While eight provinces in Cambodia were facing drought, provinces located along the Mekong River experienced floods due to heavy rains throughout Southeast Asia; on August 19, 2002 the Mekong River reached a 30-year high in Thailand.[4] The NCDM reports that the worst affected provinces were Stung Treng, Pursat, Kratie, Kompong Cham, Kandal, Prey Veng and Takeo. Estimates given by the International Federation of the Red Cross (IFRC) stated that 16,341 families had moved to higher ground as a result of the flooding.[5] As of the 25th September, OCHA reported that two districts in Takeo, three in Prey Veng and two in Kandal were still flooded. Table 1 shows the number of people and hectares affected by the flood and drought of 2002. The table also indicates how people in some provinces faced the combined impact of both drought and flood, and that some areas of land were affected by both disasters.

The Government Response

The National Committee for Disaster Management

The NCDM was established in 1994 as a result of Cambodia's experience of a series of natural disasters. The NCDMs structure is established by a 1999 Sub-Decree and includes representatives from the government ministries. At the Provincial level the NCDM includes Provincial Governors and provincial level departments as members of the Provincial Committee for Disaster Management (PCDM). At the District level, District Chiefs and relevant district level officers are designated members of the District Committee for Disaster Management (DCDM). Importantly the Sub-Decree also defines the role and membership of the Cambodian Red Cross (CRC) and its representation in the Committees.

Aid agencies reported that the government responded quickly to the flood and drought, by providing food assistance (IFRC). On the 22nd August, the NCDM together with members of the international community conducted a joint damage and needs assessment on the flood situation in Stung Treng and Kratie provinces. Following this assessment the Prime Minister formally

Table 1. The Number of People and Hectares Affected by the Drought and Flood of 2002

Province	Number of People		Number of Hectares	
	Flood	Drought	Flood	Drought
Prey Veng	439,541	198,396	27,292	19,995
Battambang		341,573		43,548
Kandal	335,062	146,540	4,012	9,032
Kompong Cham	300,728	183,667	2,204	10,214
Kompong Speu		483,181		3,027
Pursat	44,163	244,398	2,515	11,252
Svay Rieng		20,931		5,790
Takeo	198,690	398,654	14,414	8,346
Stung Treng	25,247		2,383	
Kratie	96,533		5,725	
TOTAL	***1,439,964***	***2,017,340***	***58,545***	***111,204***

Source: The National Committee for Disaster Management (October 2002)

issued a declaration on the 'Disaster Situation' on 23rd August. The government mobilised the Cambodian Royal Armed Forces (RCAF) and supplied rice, fuel, sandbags, mobile houses and other supplies as part of its emergency response.

As of 23rd August [6] the NCDM reported that the government had provided 1,900 mt of rice (20% destined for free distribution) 1 million litres of gasoline, 50–60,000 sandbags, and 3,000 mt of rice seed provided by the Ministry of Agriculture, Fisheries and Forestry (MAFF). The CRC identified 3,499 families for distribution of initial humanitarian assistance. The IFRC reports that disaster preparedness measures did make a difference and that in Kratie for example, the PCDM was proactively working with the DCDM in relocating people to safe areas. In addition, line ministries and the NCDM promptly initiated public education on food and water safety, and were responding to outbreaks of animal and human disease as necessary.

The Response of the International Community

The response of the International Community has been broad based in nature, ranging from emergency coordination and food distribution, to disaster management and coordination. Among many agencies, UNDP (through the UN Disaster Management Team, UNDMT), ECHO and OXFAM assisted in the required coordination effort, while CARE, UNICEF and CONCERN provided basic water and sanitation facilities for 16,341 families (the majority of whom have now returned home according to the NCDM). NGOs such as CONCERN, ZOA, World Vision and CARE among others, procured rice seed, and FAO provided 3,000 mt of rice seed to the MAFF. Food for Work (FFW) has been an important initiative whereby people receive daily rations of food in return for labour-intensive agricultural construction projects. In early July, WFP invited 10 NGOs to submit project proposals to support vulnerable individuals in disaster-prone and food insecure communities with effective FFW interventions. The 2–3 month projects — which will rehabilitate ponds, wells, roads, dams canals and dikes — will be implemented between September 2002 and January 2003.

Coordination efforts have not simply been aimed at providing short-term emergency relief but also to build capacity for mid and long-term, national disaster mitigation strategies. Among many agencies, the IFRC, UNDP, WFP, UNOCHA and ECHO have been assisting the government to develop the institutions and strategic plans necessary to mitigate the impact of natural disasters, to enhance emergency response in the case of disaster, and to manage rehabilitation needs.

Economic Impact in 2002

While the government and international community has responded to the twin disaster of 2002, the economic impact will still be significant particularly as regards damage to agricultural production. The NCDM estimates that the combined flood and drought have affected over 3.4 million people in 2002 and that up to 1 million could face a food shortage. Provisional estimates from the MAFF made in late August, place the economic cost of the drought alone at more than $38 million dollars. In addition, $1.5 million dollars worth of seedlings and rice paddy are estimated to have been destroyed mostly by the drought. This estimate was prepared before the worst of the flooding.

Rice

The NCDM estimates that 134,926 ha of rice were damaged by the drought, with an additional 40,027 ha damaged by flooding (this is even greater than the estimates provided by the NCDM for damage to areas of land, outlined in Table 1). 41,490 ha of rice-crop were totally destroyed and 93,436 ha of rice were particularly damaged. Additionally 16,246 hectares of seedlings were damaged, as were 3,186 hectares of subsidiary crops. Even when the rice crop is only partially damaged however, the impact of the drought on wet-season rice will be in lower productivity. The impact on rice production is likely to lead to food insecurity after 2–6 months dependent on whether the rice is early, mid or late maturing varieties. There will be an additional impact when the area is mono-cropped and when the family is already poor or suffering financially from the impact of the floods and droughts in 2000 and 2001. Flooding has had a mixed impact on wet-season rice crops dependent on the severity and length of the flooding.

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Livestock

The NCDM reports that 1,222 animals died as a result of the drought and an additional 889 died as a result of the floods. The major impact on livestock will be a lack of feed, as rice straw is the staple feed for cattle and buffalo in Cambodia. In fact when grazing is restricted during the early wet season, it is the only form of fodder. The result of the drought, especially when followed by flooding is likely to be the loss of grazing land, resulting in animal starvation and the low value of these animals when sold

Damage to Infrastructure

Initial reports from the NCDM indicate that the flood damaged 767 km of secondary road and just less than 9 km of national road. More than 14,000 homes were also damaged, and this will have a major impact on peoples savings. Additionally, 165 bridges were damaged, as were 391 culverts and just under a thousand irrigation schemes. Finally 129 schools and 7 health centres were damaged. Damage to irrigation schemes will have an additional, direct impact on food production. Damage to infrastructure will generally result in increased transportation costs and this will have an impact on the price of

products. There are no estimates yet for the damage to infrastructure but the costs are likely to be very considerable. Ministries are collating figures, but there remains a lot of work to be done to finalise the total cost.[7]

Long Term Consequences

Impact on Food Security and Livelihoods

Approximately 77 percent of Cambodia's cultivated rice areas are entirely dependent on rainfall as a source of water and an additional 11 percent depend on rainfall and supplemental irrigation. Rural livelihoods are already facing pressure from a number of sources. There is a decline in fisheries and forest resources as a result of overexploitation. The rural population is growing, land plots are being subdivided sometimes uneconomically, and concession systems have restricted access to some fertile land. The incidence of three years of successive flood and drought will certainly compound the problems that rural communities are facing.

Early indications from the PCDMs indicate that the cumulative effects of three years of consecutive floods and the recent drought which have destroyed crops, productive land, roads and drainage systems will have a disastrous impact on household economies and the food basket of Cambodia.[8] Although figures are not yet available for the total cost of the twin disasters in 2002, the NCDM stated that because of the combination of drought and flood, the situation may be worse than that of 2000.[9]

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Short term food insecurity is severe and this will have long term consequences: the NCDM estimates that 154,069 families are in need of food as a result of the drought and 89,852 families (living inside and outside the safe areas) need food as a result of the flood. IFRC indicates that in their effort to cope, people have gone increasingly into debt and are migrating to the major towns. In terms of earnings, CDRI surveys of vulnerable workers in August 2002 indicate that the daily earnings of rice workers have dropped by a significant 25.8% compared to May this year. Compared to the same period last year, earnings are 14.8% lower.

Long term food security will also be a problem with the IFRC indicating that rice seed for the next crop is currently being consumed as food. Although there has been no long-term needs assessment yet, the NCDM food security sub-group will be studying specific food needs and long term planning for food security.

The Impact on Rural Development

Although efforts have been made to improve farming techniques and promote new varieties of seeds and fertilisers, no perceptible progress has been made since 1999 largely because of the successive floods and droughts. In 2000, the flood destroyed 374,107 hectares. In 2001, irregular rainfall and serious floods in the Mekong River basin damaged approximately 250,000 hectares of rice crop. In 2002, estimates by the NCDM indicate that 169,749 ha have been either damaged or lost due to the flood and drought. Studies undertaken by CDRI (Sok, Sik and Chea, 2001) indicate that extension of irrigation systems, better distribution of new land brought under the plough and improvement in marketing systems would significantly increase crop production in Cambodia.

Consequences to Development

The World Meteorological Organisation (WMO) predicted in a press release of the 28th August 2002, that the current El Niño event will persist into early 2003 and that this is almost certainly linked with the current floods in Asia. The WMO calls for proactive measures to reduce vulnerability and strengthen mitigation capacities. To be sustainable, therefore, long-term development programmes need to take into account the impact of successive natural disasters. This is especially true for poverty eradication programmes in Cambodia when dealing with a vulnerable rural community whose livelihood is so dependent on weather patterns. While this article does not calculate the actual direct or indirect costs associated with the weather patterns of 2000–2002, some general impacts can be suggested.

Government reports for 2000–2001 indicate that the floods directly cost just under $200 million dollars, a significant amount of which will have been in reconstruction; estimates for 2002 are not yet finalised. There is a cost associated with an increase in reconstruction and the loss or damage to infrastructure development. Money and effort spent directly on reconstruction and rehabilitation is not necessarily synonymous with development. The indirect costs in terms of temporary loss of health facilities and schools, and the physical effort in reconstruction and rehabilitation can not be estimated. The weather patterns will certainly have impacted on food security, not just in the short term, but probably in the longer term, especially if savings have been reduced or destroyed. Food shortage is also likely to increase dependence on natural resources, encouraging the further exploitation of degrading resources. As the poor often have little choice but to exploit the natural environment, they are thereby increasing the risk of their own exposure to natural disasters especially floods and droughts. It is evident that floods and droughts also have impacted on rural-urban migration patterns with many poor farmers abandoning their former livelihood.

Strategies for Development Policies to Reduce Vulnerability to Disasters

Based on research papers produced as a result of the International Decade for Natural Disaster Reduction

(IDNDR, 1990–99) key activities for mitigating the impact of disasters can be suggested. These are:

Capacity Building and strengthening of Institutional Arrangements
Risk reduction should be factored into institutional development for a wide range of functions, principally for disaster-related legislation; land-use regulation; building codes and environmental protection. This includes development of sustainable management for forest and water resources.

Advocacy for integration of risk reduction in national development plans
Risk assessments and risk reduction should be instrumental in the planning of the environment, finance, transport, construction, agriculture, education and health sectors. For agricultural programmes it is recommended that specific regard should be given to food security and promotion of agricultural methods that reduce hazard related losses.

Public Awareness Programmes
Education on sustainable development needs to be focussed on schools, professionals, community leaders and community based organisations.

Development and implementation of comprehensive development and land use plans
This would assist in identifying the most suitable land use for vulnerable areas. In the Cambodian context this is particularly relevant to the ongoing land titling and cadastral process.

Development of Early Warning Systems
These are more than technological instruments to submit early warning alerts. EWS should include mechanisms for identification of the hazard and combine efforts by all sectors to plan ahead and build peoples capacity to respond rapidly and to identify increasing vulnerabilities in their communities.

Continued research on the relationship between climate, natural hazards and related socio-cultural and environmental vulnerability
It is evident that there is a close correlation between the trends of increased demographic pressure, escalated environmental degradation, increased human vulnerability and environmental disasters.[10] Research programmes at the national and international level should be facilitated. Existing research institutes should factor the relationship between the environment and human development into their research programmes.

Primary Sources

1. Part I–III, NCDM, Strategic Plan, Annex F. (Courtesy of European Community Humanitarian Office, Disaster Preparedness Programme, DIPECHO)
2. UNOCHA/GVA – 2002/0195, www.reliefweb.int, NCDM statement, August 2002
3. UNOCHA/GVA – 2002/0195, www.reliefweb.int
4. UN Disaster Management Team (UNDMT), 23rd August 2002, www.reliefweb.int
5. IFRC, www.reliefweb.int, 30 Aug 2002
6. Latest figures provide by the NCDM, 29th August 2002
7. Telephone conversation with Disaster Advisor, 4.10.2002.
8. IFRC, www.reliefweb.int, 30 Aug 2002
9. Discussion with H.E. Nhim Vanda
10. United Nations International Strategy for Disaster Reduction, UNISDR (2002) Background document for World Summit on Sustainable Development. '*Disaster Risk and Sustainable Development: Understanding the links between development, environment and natural hazards leading to disasters'*. www.unisdr.org