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SIMVA 2014

Social impact monitoring and vulnerability assessment 2014

Report on Baseline Survey 2014 of the
Lower Mekong Mainstream and Flood Plain Areas

Report prepared by
Mekong River Commission

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SIMVA 2014 is the largest socio-economic survey and study ever conducted along the Mekong mainstream and floodplain areas, and is the result of extensive collaboration between the peoples of the MRC Member Countries: Cambodia, Lao PDR, Thailand, and Viet Nam.

First and foremost, we would like to sincerely thank the 5,632 households in the 352 villages along the Mekong River and floodplains who agreed to be interviewed for the survey, and to the participants of the Focus Group Discussions in the 25 study villages. Without their interest and willingness to respond to questions, share their memories, knowledge and analysis of community events, the SIMVA 2014 would not have been possible. We would also like to thank the key Informants who provided information for the Village Profiles.

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The full list of SIMVA 2014 team members is provided in Annex A.

Despite our combined efforts, there may still be mistakes, insufficient data and information, and debatable issues in the SIMVA 2014 survey and this subsequent regional report. As always with large-scale surveys and studies such as SIMVA, we advise readers to bear in mind the limitations and qualifications when interpreting the results. We hope that the findings, issues, and lessons learned from this study will serve as useful sources of information for interested individuals and parties, and as groundwork for establishing a regular system for Social Impact Monitoring and Vulnerability Assessment in the Lower Mekong River Basin.

Glossary and definitions

Adaptation (in context of climate change)	Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates, harms or exploits beneficial opportunities (IPCC, 2001).
Aquaculture	Raising of fish, shrimp, and any other aquatic species.
Climate change	A statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes or external forces, or to persistent anthropogenic changes in the composition of the atmosphere or in land use (IPCC, 2001)
Climate change related livelihood activities	Include farming, fishing, collection of OAAs and aquaculture.
Climate variability	Variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all temporal and spatial scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forces (external variability) (IPCC, 2001).
Coping strategy	Coping strategies refer to the specific efforts, both behavioural and psychological, that people employ to master, tolerate, reduce, or minimize stressful events. Two general coping strategies have been distinguished: problem-solving strategies are efforts to do something active to alleviate stressful circumstances, whereas emotion-focused coping strategies involve efforts to regulate the emotional consequences of stressful or potentially stressful events (S. Taylor, 1998, www.macses.ucsf.edu/research/psychosocial). In this context problem-solving coping strategies are most relevant, they can include agricultural strategies such as changing crops, financial strategies such as selling of assets, or change of residence.
Drought	In the survey questionnaire drought simply means lack of water for various purposes. However, four main categories of drought have been defined: 1) Meteorological drought, i.e., low rainfall or snow, is specific to different regions. 2) Agricultural drought accounts for the water needs of crops during different growing stages. For instance, not enough moisture at planting may hinder germination, leading to low plant populations and a reduction in yield. 3) Hydrological drought refers to persistently low water volumes in streams, rivers, and reservoirs. Human activities, such as drawdown of reservoirs, can worsen hydrological droughts. Hydrological drought is often linked with meteorological droughts. 4) Socioeconomic drought occurs when the demand for water exceeds the supply. Examples include too much irrigation or when low river flow forces hydroelectric power plant operators to reduce energy production. (Donald A. Wilhitea & Michael H. Glantzb Water International: Understanding: The Drought Phenomenon: The Role of Definitions, 111-120, 2009).
Extreme weather events	Unusual weather events for the season with severe impacts. Extreme weather was explained to the interviewees as 'any weather events that you would call out-of-the-ordinary'.

15 km corridor of LMB	A corridor or buffer zone drawn along the mainstream of the Lower Mekong River and maximum extent of flooded areas. The corridor covers 15 km from either side of the mainstream and 15 km for buffer zones of wetland and flooded areas such as Songkram, Tonle Sap and the Mekong Delta (Guideline for Social Impact Monitoring and Vulnerability Assessment (SIMVA), MRC, 2014.)
Fishing effort	Computed based on the average catch divided by average hours fishing per day in the year.
Flooding	A rising and overflowing of a body of water especially onto normally dry land; also, a condition of overflowing, e.g., rivers in flood.
Household head	The household head is the person that the contacted household member says is the head. Normally it is the grown-up person – female or male – who is responsible for the household.
Income from non-aquatic sources	Includes sale of other crops, livestock, business (profit), employment (full-time), employment (irregular/seasonal), pensions, credit/loans, savings (in bank or not), remittances (money sent by household members) and interest.
Livestock	Includes cattle, buffalos, pigs, goats, horses, donkeys, but not poultry.
Main occupation of individuals	What people spend most of their time doing.
Most important and second most occupation of households	Many rural households in the LMB are increasingly dependent on a combination of activities. Some or all members of some farming households in rural areas work part- or full-time in non-agricultural activities. SIMVA has details on the most and second most important occupations in terms of sustaining the livelihood of a household.
OAAs	Include frogs, tadpoles, crabs, snails, clams/shells, shrimps, eels, turtles and others.
Resilience	Consumption, expenditure, and livelihood assets, with the assumption that households with (i) more consumption and spending, (ii) more food stored, (iii) more diverse livelihood assets and sources of income and (iv) better health and more social capital, will be more resilient to change. In the context of climate change. Resilience has been defined as “The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization and the capacity to adapt to stress and change” (IPCC WG2, 2007: 880).
Riverbank and island gardens and fields	Riverbank gardens include gardens and fields on areas on the steep slope to the Mekong, which is sometimes flooded in the rainy season, AND the area above this, which has a less steep slope, but is sometimes flooded from the river AND the same for rivers and streams than run into the Mekong AND islands in the river that are used for fields and gardens.
Sensitivity	The extent to which people that depend on water resources might be affected by changes in resources in the LMB.
Shock	Something that occurs suddenly and unexpectedly and has a strong impact. Can destroy assets directly in the case of floods, storms, etc. and can also force people to abandon their homes and dispose of assets such as land. Shocks that devastate the livelihoods of the poor are natural processes that destroy natural capital, e.g. floods that destroy agricultural land (DFID, 1999).
Social groups	Include religious, women’s union, youth union, elderly, saving/credit, farmers, fishers, share labour groups and veterans.

Trends	Trends refer to social, environmental or socio-economic changes that take place over a longer period of time, i.e., in contrast to shocks or seasonality, e.g. population trends (increasing population pressure), resource trends, economic trends (DFID, 1999).
Vulnerability	Livelihoods vulnerability has been seen as a balance between *sensitivity* and *resilience* of livelihood systems (Alwang et al. (2001)). Highly vulnerable systems are characterized as low resilience and high sensitivity, while less vulnerable systems have low sensitivity with high resilience. *Livelihood resilience* allows a system to absorb and utilize (or even benefit from) change. In the context of climate change, vulnerability has been defined as "the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity and its adaptive capacity" (IPCC WG2 2007:883).
Water resources dependent occupations	Includes fishing, collection of OAAs, aquaculture and farming.
River water resources dependent livelihoods	Fishing, collecting OAA/Ps, aquaculture, fish processing, navigation and river transport, sand mining from the river, river related construction work and tourism (included in Village Profiles). Farming is included in this category but excluded in some analysis as it constitutes by far the majority of livelihoods. Definition by SIMVA team.
Water related resources	Include fish, OAA/Ps, irrigated farming, and riverbank and island cultivation.

Exchange rate applied

1 US$ = Cambodia Riel (KHR) = 4,000**;** Lao KIP (LAK) = 8,000**;** Thai Baht (THB) = 32**;** Viet Nam Dong (VND) = 21,000. Source: Exchange-rates.org: the rates are average for month of October 2014, rounded down (Cambodia Riel 4,078 to 4,000; Lao KIP = 8,052 to 8,000; Thai Baht 32.46 = 32 ; Viet Namese Dong 21,246 = 21,000)

EXECUTIVE SUMMARY

Background

1. The theme of the Social Impact Monitoring and Vulnerability Assessment - SIMVA 2014 - is 'Shocks and Trends' with a focus on the occurrence and impacts from floods, droughts and extreme weather, and identification of longer-term trends at community level. SIMVA 2014 is the second major SIMVA study carried out by MRC, the first being SIMVA 2011.

2. SIMVA 2014 is a regional study of villages and households within a 15 km buffer zone on each side of the Mekong mainstream, from the Lao PDR – China border to the Mekong Delta and around major floodplains, an area defined as the Lower Mekong Basin (LMB) corridor. Within the LMB corridor, i.e., the sample area, 13 Sub-zones were delineated on the basis of their socio-ecological characteristics. The Sub-zones are the main units of the analysis, together with countries, presented in this report.

3. SIMVA 2014 comprises a quantitative village survey of 352 villages and a household survey of 5,632 households in those villages. It is the largest socio-economic survey ever done of the Mekong mainstream corridor. The sample size allows for statistically robust comparison of the data by Sub-zone and by country. The results of the statistical data analysis presented in this report are on the un-weighted data, except for the calculation of the total population in the LMB corridor in Section 3.1. The weights used for the population calculation need to be reviewed for further use. A Qualitative Study of important community events and trends over a 10-year period in 25 villages complemented the quantitative survey. Certain limitations exist in the methodology such as the level of representation in the sampling methods or interview shortcomings, or analysis of trends being mainly qualitative rather than quantitative. The survey results should be treated with these qualifications in mind. These will be reviewed in order to improve on future SIMVAs.

4. Data collection in the field was carried out from the end of May to October 2014. From the design stage to the present report, the SIMVA 2014 process took around 2 years, from September 2013 to November 2015. Due to the MRCS restructuring in 2016, the final report could only be finished and published in August 2017.

5. The SIMVA 2014 report gives a descriptive picture of the livelihood situations, with a focus on shocks and trends, in the LMB corridor. It contains detailed statistics in several areas and is not meant to be an in-depth analysis and evaluation of data, which would be the subject of other studies using SIMVA data. Also, it does not represent data for the whole LMB, but can be used for case studies of certain situations in the Basin, with a focus on the zones close to the Mekong mainstream.

Main findings

6. Flooding was found to be a persistent and widespread problem in the LMB corridor: at the village level 69% per cent of the sampled villages had experienced flooding inside the village at some point in the past: in Thailand and Cambodia more than 80%, in Lao PDR 63% and in Viet Nam 47% of the sampled villages had

been flooded at some point in time. In the last 3 years up to the survey, 54% of the flood-affected villages also experienced losses and damages; in Cambodia almost all flood-affected villages lost assets, in Thailand the figure was 79%, in Viet Nam 22% and in Lao PDR 50%.

7. At household level, 30% of the sampled households had experienced flooding in the 12 months before the survey: 59% in Cambodia, 22% in Lao PDR, 27% in Thailand and 11% in Viet Nam. Of all the households that experienced flooding in the previous 12 months, 88% had lost assets or experienced damages.

8. The source of flooding that had occurred in the previous 12 months was mainly overflowing rivers. The average number of days of flooding experienced over the previous 12 months was 26 days across the sample area, with 41 days in Viet Nam, 30 days in Cambodia, 23 days in Thailand and 10 days in Lao PDR.

9. 61% of the flooded households lost paddy land and rice production. On average, around 60% of land area was affected and 60% of production lost, with a mean value of lost rice per household of US$ 598. 10% of the flood-affected households lost some sections of riverbank or island fields and gardens. Only 2% of the sampled households lost aquaculture production. Loss of working days was reported by 46% of the flood-affected households, most in Cambodia at 77%. On average, 23 working days were lost due to flooding, most in Viet Nam at 48 days on average, fewest in Lao PDR at 6. 10% of the flood-affected households experienced between 1 and 55 days without access to clean drinking water.

10. Drought was also found to be a major problem. 37% of the sampled households experienced drought in the previous three years, the highest proportion in Cambodia at 73%, the lowest in Viet Nam at 6%. In the previous 12 months before the survey, 29% of the sampled households experienced drought, with 60% in Cambodia, 32% in Thailand and 19% in Lao PDR. Almost 80% of the drought-affected households also lost assets. Half of the households affected by drought in the previous 12 months lost paddy land and rice production. On average, 50% of the households' total agricultural land was affected. For the 22% of all sampled households that did lose assets due to drought in the last 12 months, the overall mean value of losses was US$ 432.

11. Extreme weather events: In the previous 12 months before the survey, 52% of sampled households experienced extreme weather events. Of those, 34% lost assets.

Trends

12. The available quantitative data from SIMVA 2011 and SIMVA 2014 form too few data points in time to allow for trend analysis. Therefore, a Qualitative Study with Focus Groups in 25 villages in the LMB corridor was included to provide insights into trends over the last 10 years which communities identified as significant. Combined analysis of the Focus Group Discussions identified the most important and unexpected events, i.e., shocks that affect community well-being, as follows: Firstly, events directly related to the Mekong, primarily flooding. Secondly, agricultural events, including plant and livestock diseases and events caused by external factors such as low prices for agricultural products; and thirdly, weather

related events such as drought and very hot weather. Along with collective village activities, these were also the types of events with the strongest impact on communities' overall well-being. The study indicates that LMB corridor communities, which are mainly rural and agricultural with extensive part-time fishing activities, but also urban in some survey zones, are still dependent on and sensitive to changes in natural resources. However, local collective village activities were very important, confirming that social and socio-economic conditions and actions are key factors for community well-being.

13. For fisheries, the perceived trend over the 10-year period was a decline in the quality and state and the contribution of fisheries to community well-being. This trend was reported by the Focus Groups in all four countries. Trends in irrigation and rice cultivation, navigation and aquaculture were reported from only a small number of villages. In general, the Focus Groups found the contribution of these activities to community well-being to be stable or to have increased over the 10-year period.

14. With regard to overall community well-being, analysis of the combined perceived trends showed a significant trend towards increasing community well-being over the period 2004-2014. This indicates general socio-economic development and progress with regard to availability of services and opportunities.

15. Work migration is one of the SIMVA indicators for resilience. The survey found that the LMB corridor is a source of workers for other areas within the Member Countries, and also exports workforce to other countries. Almost all sampled villages had people working outside their home village. With regard to alternative livelihood options, the survey found that 70% of the sampled households in the LMB corridor had not thought about alternative livelihood options; however, 30% did consider alternatives to their present livelihood. Households' coping strategies for impacts of flooding and impacts of droughts were quite similar, but varied across the LMB. The most common specific coping strategies were borrowing money and receiving assistance from government.

16. Adaptation to changing weather patterns and climate change was found to be very limited in scale.

Conclusions

17. The findings on floods and drought lead to the conclusion that flood protection and flood preventive measures have the potential to bring extensive positive effects. Similarly, drought mitigation measures such as development of irrigation potential in the LMB corridor in Cambodia, Lao PDR and also in Thailand would also bring positive effects.

18. LMB corridor villages in Cambodia particularly appear to be more vulnerable to water resource related shocks due to relatively less coverage and lower quality of public services. The combination of a high proportion of flood and drought-affected households and relatively less availability of public services indicates that the negative impacts from flooding and drought are most severe in Cambodia.

19. A trend of overall increase in community well-being in LMB corridor villages and

communities over the last 10 years was identified. At the same time, a decline in the quality and contribution of fisheries was identified. This indicates that fisheries, though a very significant part-time activity across the LMB corridor, is not seen as a determining factor in overall community well-being.

20. 30% had given thought to alternative livelihood options indicating that existing livelihoods are increasingly under pressure and that new opportunities are emerging. Relatively high levels of migration for work indicate that rural communities are increasingly becoming integrated into national economies.

21. The relevance for both research and planning purposes of the socio-ecologically defined Sub-zones was confirmed by many cases of statistically significant differences between the Sub-zones on indicator variables.

22. The SIMVA 2014 data are meant to provide the basis for a broad range of more detailed analysis beyond the scope of the present report. Examples of relevant further use of the data include: economic analysis of the costs of floods and droughts; identification of weak areas in flood warning systems; analysis of the structure of occupations/livelihoods and water related resource consumption; inland fisheries assessments, including utilization of habitats and fishing effort; analysis of water resource use for agriculture; monitoring of levels and quality of public services; and, analysis of adaptation to climate change.

Main recommendations

- MRC to consider increasing its activities on flood and drought preventive and protective measures that respect the importance of the natural aquatic eco-systems.
- MRC to consider undertaking an economic assessment of the impacts of floods and droughts based on the SIMVA 2014 data and any further data that will be available in future surveys.
- MRC to consider strengthening its support to the Member Countries' own investigations for the development of irrigation potential with a focus on Cambodia, where the most gains can be had due to the current low level of irrigation use from the Mekong, and the large population that can benefit from these expansions.
- MRC to consider instigating further data collection of riverbanks and islands to assess the economic value of these vulnerable agricultural areas.
- MRC to consider continuing to apply the Sub-zones defined in SIMVA 2014, perhaps slightly revised, across MRC's various activity areas.

Recommendations for future SIMVA surveys:

- Review sampling methodology and possibly adjust weights using the population data from the LMB Socio-economic Database and other auxiliary variables, such as socio-economic data on farming and fishing.
- Future SIMVA to build on and feed into the MRC Socio-economic Database, which contains harmonized official national statistical data.

- Consider establishing a panel of survey households drawn from the SIMVA 2014 sample for long-term monitoring.
- Consider building a network of SIMVA monitoring villages in the LMB corridor coordinated with the MRC monitoring stations.
- Provide capacity building and gradually phase out financial support from MRCS for SIMVA field data collection to decentralize this part of the survey to Member Countries in line with the MRC Decentralization Plan.

SUMMARY OF FINDINGS

This section provides more detail on the key findings in the main subjects surveyed by SIMVA 2014, namely: water resources related population and livelihoods; the main shocks facing households and villages; the trends in livelihoods, consumption and overall well-being over the last 10 years leading to the survey year of 2014; and, the level of vulnerability of households and village and resilience and coping strategies.

Population and livelihoods related to water resources

1. The sample frame for SIMVA 2014 was based on official population statistics, which were also used to estimate the total population of the LMB corridor. Based on the number of households in the sample area, multiplied by the mean household size, the population of the sample area in the LMB corridor was estimated at 20.6 million people. The difference to SIMVA 2011, which estimated 33.8 million people, was explained by the reduced extent of the survey area with more focus on the LMB corridor in 2014, and the change in the basis for the estimation, which in 2011 was synthetic Land Scan GIS data, to official statistics of village and commune populations that were used in SIMVA 2014.

2. Ethnic minorities comprised 14% of the household heads of the total sample, with 25% in Lao PDR, 21% in Thailand, and Cambodia's and Viet Nam's figures 5% and 6%, respectively. The survey data does not indicate that the ethnic minorities in the LMB corridor are more dependent on natural aquatic resources than other social groups in the particular Sub-zone where they live.

3. The report presents data on the distribution of occupations and water resources dependent livelihoods, and of the most important livelihood activities in the last 12 months. Crop farming, including gardening, was the main occupation for 59% and secondary occupation for 7% of the sample's working population. Livestock work was the secondary occupation for 29.2%. Collection of OAA/Ps was the secondary occupation for 15.5%, thereby being the third largest secondary occupation. Full-time fishing was the main occupation of only 2.4% of the working age population, but the figure was higher, at 9.1% of working population having fishing as the second most important occupation.

4. Data from village/commune level found the four main livelihoods to be crop farming, livestock work, fishing, and casual work. The significance of fishing as a part-time livelihood activity was evident. Plantation work (in Thailand) and trading and markets were also found to be important livelihoods.

5. Based on the household survey, an index of importance of water resources dependent livelihoods (defined as fishing, collecting OAA/Ps, aquaculture, fish processing, navigation and river transport, sand mining from river, but excluding crop farming) was developed. Measured by the index, water resources dependent livelihoods are among the top three most important livelihoods in most Sub-zones.

6. The livelihood activities of household members in the last 12 months also showed the importance of water resources dependent activities across all Sub-zones of the LMB corridor. Notable findings were that in the last 12 months half of the sampled households had a member who had been fishing and 61% of the sampled

households a member who had collected OAA/Ps. This clearly demonstrates that fishing is mainly a part-time activity (i.e. not considered a full-time occupation) for a large proportion of the population.

7. The report presents details of the frequency of use of different fishing habitats, and habitats for collection of OAA/Ps over the year. Overall, the data on fishing habitats used over the year show the utilization of several habitats in the various Sub-zones, but with a few habitats being the most important in each. The data are important inputs to MRC's activities related to inland fisheries.

8. Consumption of fish and OAA/Ps was analysed by the frequency and amounts consumed. In the last 24 hours before the interview, 75% of the sampled households had a meal with fish, 61% consumed fish that was bought, while 31% consumed fish from their own catch. The mean amount of fish cooked in the meals in the last 24 hours before the interview was 0.23 Kg per person. 41% of the sampled households had a meal with OAA/Ps in the last 24 hours before interview. In the latest meal that included OAA/Ps, households on average cooked 0.33 Kg OAA/Ps per person, comprising 0.18 Kg of aquatic animals and 0.15 Kg of aquatic plants.

9. Water resources for agriculture were mainly rainwater, used by 54% of the households, while Mekong water was the most important water source for the main crops for 22%. However, almost all irrigation with Mekong water is done in the Mekong Delta in Viet Nam.

10. 12% of the sampled households cultivated riverbank and island gardens and fields in the previous 12 months. On average, the households with riverbank gardens and fields sold 54% of the produce. The findings pointed to a need for further data collection and analysis to be able to assess the economic value of riverbank and island gardens and fields.

11. Despite improvements in drinking water sources in the LMB corridor, river water is still used for drinking water, especially in Cambodia and Lao PDR, with a mean percentage of 82% and 55%, respectively, of village households using river water as one of several drinking water sources.

Shock Events

<u>Flooding</u>

12. Of the 352 sampled villages and communes, 69% experienced flooding inside the village at some point in the past. Most villages that had been flooded were in Thailand and Cambodia at 86% and 81%, respectively, fewer in Lao PDR at 63% and in Viet Nam at 47% of the sampled villages.

13. In the last 3 years up to the survey, 54% of the villages that experienced flooding at some point in time also experienced losses and damages; in Cambodia there had been a loss of assets in as many as 99% and in Thailand 79% of these villages. Comparatively, in Viet Nam only 22% and in Lao PDR 15% of the flooded villages lost assets or experienced damages in the previous 3 years.

14. Forty per cent of the surveyed villages had households that experienced losses or damages from flooding in the previous 3 years, with an average of 39% of

the households in those villages being affected. The highest proportion of these villages were in Cambodia and Thailand, and smaller percentages in Viet Nam and Lao PDR.

15. In the last 12 months before the survey, 33% of all sampled villages experienced flooding, with 61% in Cambodia, 48% in Thailand, 14% in Viet Nam and 9% in Lao PDR.

16. The household survey found that 30% of the sampled households experienced flooding in the last 12 months before the survey. Of those, 88% lost assets or experienced damages.

17. Most affected was Cambodia with 59% of all households having experienced flooding and 90% that had lost assets. In Lao PDR and Thailand 22% and 27%, respectively, experienced flooding in the previous 12 months. Of those, 86% and 79%, respectively, lost assets. Only 11% of the households in Viet Nam experienced flooding in the previous 12 months, but all of these lost assets.

18. The source of flooding that occurred in the previous 12 months was mainly overflowing rivers, reported by 45% of all households. Rainwater that could not drain away was reported by 17% of all households as the source of flooding and overflowing canals by 12% of all households.

19. The source of the most serious flooding in the previous 12 months was normal rains or monsoon, reported by 60% of the households. Extreme weather or typhoons were reported by 14% of the total sample.

20. The average number of days of flooding experienced over the previous 12 months was 26 days across the sample area, with 41 days in Viet Nam, 30 days in Cambodia, 23 days in Thailand and 10 days in Lao PDR. The lowest total number of flooding days – 2 days – were reported from Lao PDR Sub-zone 2A along the mainstream, and the second lowest in Thailand Sub-zone 2C Lower at 4 days on average.

21. Of the households that experienced flooding in the previous 12 months, 61% , lost or experienced damages to paddy land and rice production due to flooding. Affected households lost or had damaged 1.3 ha. on average, which was 59% of their total paddy land area, and lost 58% of their usual production. The median value of lost rice per household was US$ 375 across the sample, with the mean value at US$ 598.

22. Losses of riverbank or island gardens and fields were reported by 10% of the flood-affected households in the previous 12 months, with half a hectare per household lost or damaged on average, equal to 82% of their riverbank land area. The value of the losses of riverbank and island fields' production across the sample was US$ 100 (median) and US$ 315 (mean).

23. Only 2.3% of flood-affected households in the previous 12 months had aquaculture temporarily destroyed. The mean value of the production lost per household across the sample was US$ 385. The highest was in Cambodia at US$ 741 and between US$ 149 and US$ 215 in the other three countries.

24. Very few households lost livestock due to flooding in the previous 12 months. Less than 10% of the households lost poultry.

25. Only 10% of flood-affected households also lost property, with an average value of US$ 454, highest in Thailand at US$ 838, lowest in Cambodia at US$ 175, with Lao PDR and Viet Nam at US$ 541 and US$ 394, respectively.

26. 46% of all the flood-affected households in the last 12 months reported loss of working days; most households in Cambodia at 77%, in the other three countries between 12% and 21%. On average, these households lost 23 working days, most in Viet Nam at 48 days, in Cambodia 24, Thailand 14, and in Lao PDR 6 working days.

27. 10% of the flood-affected households had between 1 and up to 55 days without access to clean drinking water. Most of these households were in Cambodia at 17% of the flood-affected households. Flooding also limited access to sanitation for 18% of the flood-affected households overall; in Cambodia 31%, and in Viet Nam 15% of the affected households.

Drought

28. 37% of the sampled households experienced drought in the previous three years, the highest proportion being in Cambodia at 73%, the lowest in Viet Nam at 6%. Of the households that experienced drought the previous three years, 75% lost assets.

29. In the last 12 months before the survey, 29% of the sampled households experienced drought; 60% in Cambodia, 32% in Thailand and 19% in Lao PDR. 79% of the drought-affected households also lost assets.

30. Half of the drought-affected households in the previous 12 months lost paddy land and rice production, with 51% of the total agricultural land affected on average, and the mean value of losses at US$ 454 per household; highest in Thailand at US$ 730, in Viet Nam US$ 644, in Lao PDR US$ 380, and in Cambodia US$ 368.

31. Only 3% to 8% of the surveyed households lost cows, buffaloes, pigs or goats as a result of drought.

32. For the 22% of households that did lose assets due to drought in the last 12 months, the overall mean value of losses was US$ 432, with a mean of US$ 454 for rice losses, US$ 350 for livestock and poultry, and US$ 695 for property losses.

Salinity intrusion in the Mekong Delta

33. In Viet Nam's saline Sub-zone, 23% of the sampled households reported impacts from salinity intrusion in the previous 12 months. In terms of losses due to salinity intrusion, the average agricultural loss per household was US$ 276, and the average aquaculture loss was US$ 297.

Extreme weather events

34. Extreme weather was explained to the interviewees as any weather events that they would call out-of-the-ordinary. In the last 12 months before the survey, 52% of the sampled households experienced extreme weather events. Of those households, 34% lost assets; in Cambodia 59%, in Thailand and Lao PDR around

47%, and in Viet Nam only 8%.

35. The types of extreme weather reported across the LMB corridor included local strong winds, reported by 33% of the sampled households; heavy rain, reported by 23%; other types of extreme weather, reported by 19%; and lightning, reported by 16%. Typhoons affected only 2% of the households in the previous 12 months. The types of extreme weather reported varied across the Sub-zones.

Trends

36. The SIMVA process is gradually building a long-term data set that eventually can support identification of trends. At present, the SIMVA quantitative data from 2011 and 2014 constitute two data points in time, which are too few for trend analysis. However, to document the steps in the gradual construction of the long-term monitoring data, a comparison of SIMVA 2011 and SIMVA 2014 data on selected variables on flooding and droughts was done.

37. To overcome this limitation in the available data and to investigate trends, SIMVA 2014 included a Qualitative Study in 25 villages in the LMB corridor, where Focus Groups identified important community events that occurred over a 10-year period and made timelines of the events that had the strongest impacts on community well-being.

38. Combined analysis of Focus Group Discussions in the 25 study villages identified the most important and unexpected events, i.e., shocks that affected community well-being as: events directly related to the Mekong, primarily flooding. Secondly, agricultural events, including plant and livestock diseases and events caused by external factors such as low prices for agricultural products; and, thirdly, weather related events such as drought and very hot weather. Together with collective village activities, these were also the types of events with the strongest impact on communities' overall well-being.

39. Focus Groups were asked to discuss, as relevant for their village, the overall trends over the past 10 years in fisheries, irrigation, navigation and aquaculture, and community well-being. A scale from 1 to 5 was applied; where a score of 1 was the worst and 5 the best overall situation with regard to the status, quality and contribution to community well-being of the various water related activities. The Focus Groups decided the community well-being score according to their assessment of the positive or negative impacts of events on community well-being.

40. For fisheries, the perceived trend over the 10-year period was a decline in the quality and state and the contribution of fisheries to community well-being. This trend was reported by the Focus Groups in the study villages in all four countries.

41. Focus Groups in 9 study villages in three countries reported on trends in irrigation and rice cultivation. In the report from a single village in Lao PDR, the trend was a decline, whereas in the study villages in Thailand and Viet Nam, the perceived trend indicated a stable situation.

42. Only 2 villages, both in Lao PDR, reported on the trend in navigation; in one village it was a stable, in the other village the trend was an increasing contribution of navigation to community well-being.

43. Trends in aquaculture and shrimp were reported from two villages in Viet Nam, and both showed an increase in the quality of and contribution of these activities to community well-being

44. With regard to overall community well-being, analysis of the combined perceived trends showed a statistically significant trend towards increasing community well-being over the period 2004-2014.

Vulnerability, resilience and coping strategies

45. The selected indicators for social vulnerability included dependency ratio (household age structure), number of household members, marital status of household head, and highest education attainment of any household member. There were statistically significant but weak differences between the Sub-zones with regard to these social vulnerability indicators. The LMB corridor in Cambodia has the highest percentages of households with primary school as highest education, indicating a relative higher social vulnerability.

46. Data of the availability of various village infrastructure and services and their functionality were collected as indicators for resilience. The results contain a lot of information that can be further analysed. One result was that sampled villages in Cambodia had less available infrastructure services, and more often in a bad condition, than similar services in other countries.

47. Work migration is one of the SIMVA indicators for resilience. Almost all sampled villages had people working outside their home village. The mean percentage of the village population that worked outside the village was 11%, the highest in Songkhram in Thailand at 23% of the village population. In Sub-zone 5B, Tonle Sap Lake, 64% of the villages reported having people working in another country. The survey found that the LMB corridor is a source of workers for other areas within the Member Countries, and also export workforce to other countries.

48. With regard to alternative livelihood options, the survey found that 70% of the sampled households in the LMB corridor had not thought about alternative livelihood options. However, the need to consider alternatives to their present livelihood appeared to be a present concern for 30% of the population.

49. Coping strategies for impacts of flooding varied across the LMB. The respondents could choose from a number of possible coping strategies, but the most frequent response was ‘Other’, indicating the survey did not capture the actual coping strategy in these cases. Apart from ‘Other’ coping strategies, the most common coping strategies were borrowing money and receiving assistance from government. The most desperate coping strategy of selling productive assets was a coping strategy for around 10% of the sampled households, mainly in Cambodia.

50. Coping strategies for impacts of drought were very similar to the coping strategies for impacts of flooding. The category ‘Other’ was the most common response, accounting for 34% of all responses. Of the remaining coping strategies, borrowing

money was the most common strategy, followed by receiving assistance from government.

51. Adaptation to changing weather was found to be very limited in scale. Only 5% of the sampled households had changed season for growing rice; another 15% had changed to planting rice later, and 7% of the households to planting earlier. Only 2% of the households had changed crops due to drought, and 1% had changed crops due to flooding. Only 0.3% of the sample reported they had changed crops due to either falling or increasing temperatures.

Early warning systems, disaster preparedness and measures to prevent impacts

52. Flood warning systems in some form were available to 69% of the sampled households. However, 23% had no access to flood warning and 8% did not know if such information was available. In Lao PDR and Cambodia, 57% and 25% had no flood warning information, respectively. Thailand and Viet Nam were much better covered, with 98% and 82%, respectively, reporting they had access to flood warning information.

53. For 28% of the sampled households, the most important measures to prevent impacts from floods and droughts were storage of food and drink and ensuring shelter and sanitation. Improving transportation and communications as a preventive measure was mentioned by 11% of the sampled households, while 16% reported that help from outside was an important measure to prevent impacts; notably, in Thailand, this was mentioned by 29% of the households, while in Lao PDR less than 1% mentioned this option.

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1 Introduction

The Mekong River Commission (MRC) regularly conducts Social Impact Monitoring and Vulnerability Assessments (SIMVA) in the Lower Mekong Basin (LMB) corridor along the Mekong mainstream and the adjacent floodplains. SIMVA is part of the overall environmental monitoring system in the LMB, which also includes water quality and ecological health monitoring. The social and economic monitoring in the SIMVA process supports the goals of MRC's 2011-2015 Strategic Plan and beyond. SIMVA 2014 is the largest socio-economic survey ever done in the LMB corridor and therefore the present report contains a great deal of data and information that will be useful across all of MRC's activity areas. SIMVA is an important tool for socio-economic monitoring, generating valuable information for more in-depth studies and basin development planning work.

1.1 Background

SIMVA activities begun in 2004, and prior to the present study, three phases of the study had been completed. Phase 1, from 2004-2006, was an extensive literature review. Phase 2, from 2008-2009, was a pilot survey to determine the validity of indicators and research tools. Phase 3, from 2011-2012, was a baseline survey in the LMB corridor that applied the methodology developed in Phase 2.

Thus, the present SIMVA 2014 is Phase 4 of the process. It is designed as a regional study of mainly rural, but also some urban, villages and households that are located within a 15 km buffer zone on each side of the Mekong mainstream and around major floodplains in Cambodia and in the Mekong Delta.

The theme of SIMVA 2014 is 'Shocks and Trends' with a focus on the impacts that floods and droughts have on villages and households in the LMB corridor. A 'shock' is defined as "something that occurs suddenly and unexpectedly and has a strong impact", for example a flash flood. Information on shocks, especially in the form of floods and droughts, is an important input to advise and design timely water resource related interventions, and prevention and adaptation measures.

The data from SIMVA 2014 survey constitute the second data point in a time series that was initiated with the SIMVA 2011 survey. SIMVA 2014 is therefore an important building block in the construction of data that can be used to identify trends, which is the rationale for long-term monitoring.

SIMVA 2014 has two elements: 1) the quantitative survey, which includes 352 village profiles and a survey of 5,632 households; and, 2) a qualitative study in 25 villages (7 in Cambodia, 7 in Thailand, 7 in Viet Nam, and 4 in Lao PDR). SIMVA 2014 began in September 2013 with survey design and preparation and was completed with data analysis and reporting in September 2015.

1.2 Relevance and benefits to MRC, LMB countries and local communities

SIMVA provides data that are relevant for use in many of MRC's activity areas in agriculture and irrigation, drought management, fisheries, basin development

planning, sustainable hydropower, and climate change.
SIMVA is an instrument for primary data collection and its focus is on providing data that is not available in official national statistics. SIMVA has the following specific objectives:

- Provide regular information on the status and trends of the social conditions of the people in the basin, linked to changes in the basin's aquatic ecosystems.
- Provide data and information on social vulnerability (particularly food and livelihood vulnerability) linked to changes in water resources (agriculture, aquaculture, fish, other aquatic animals, and plants).
- Establish social impact indicators that reflect current socio-economic conditions and the extent of people's dependence on water resources.

SIMVA 2014 allows for comparison of conditions in different socio-ecological zones across national boundaries. Thus, SIMVA data can be used for assessing transboundary trends, issues, and development opportunities. SIMVA 2014 could potentially provide a starting point for establishing a network of long-term monitoring villages, which will strengthen stakeholder involvement at the local level. Local communities will hopefully benefit from the knowledge generated by SIMVA through its application in water resource development initiatives such as flood protection, irrigation and fisheries regulations.

1.3 Research questions and main indicators

The following research questions were formulated at the outset of the SIMVA 2014 design process:

1. What types of positive or negative changes related to the Mekong River system and water resources (water quality, water level, flow, flooding, fish and OAA/Ps, irrigated agriculture, river bank gardens, drinking water supply, navigation and other livelihoods), and impacts from these changes have villages and households experienced over the past 12 months (quantitative survey) and over the past 10 years (qualitative study).
2. Have these changes and impacts been different in the different socio-ecological zones, measured for example by the proportions of households and villages that have experienced them?
3. What has the strength or severity of those positive or negative impacts from changes been?
4. What conditions (such as location in socio-ecological zone, time of year, slow or abrupt changes, household socio-economic status), determine whether changes have positive or negative effects?
5. What have households and village communities done to cope with the negative impacts?

6. What types of impacts have occurred abruptly, without warning, at a scale so they can be considered shocks?
7. What are the socioeconomic conditions that determine more resilience to shocks?
8. What long-term trends over the last 10 years can be identified in the use and condition of river water resources, fisheries, irrigation, navigation, timber floating, tourism, and livelihoods at community level?

Answers to the research questions were addressed through a number of indicators, as explained in next Section.

1.3.1 Indicators used to answer the research questions

Twenty-three indicators were identified as relevant for answering the research questions. The relationship between the indicators and the research question, and where they are presented in the report is as follows:

Research question 1. What types of positive or negative changes related to the Mekong River system and water resources and impacts from these changes have villages and households experienced over the past 12 months (quantitative survey) and over the past 10 years (qualitative study)?	
Indicators	Results presented in
1. Village locations and socio-economic characteristics 2. Household socio-economic characteristics.	Section 3.2 Households' main and secondary occupations
3. Level of migration into or away from, and within the mainstream corridor.	Section 6.2 Indicators for resilience
4. HH level of dependency on water related livelihoods: Frequency of different types of main and secondary occupations and livelihood activities. Specifically: frequency and proportions of HHs that are engaged in agriculture, riverbank cultivation, fisheries and aquaculture, collection of OAA/Ps.	Section 3.2 Households' main and secondary occupations Section 3.3 Water resource dependent livelihoods
5. Dependency of different types of water resources for drinking water supply.	Section 3.8 Drinking water sources
6. Number, types, and conditions of village public services as indicator of general level of development.	Section 6 Indicators for resilience
7. Number and types of water related infrastructures and boats as proxy for importance of dependency on water resources.	Section 6 Indicators for resilience
8. Importance of agriculture as livelihood and agriculture's dependency on types of water resources.	Section 3.2, 3.3 as above, and 3.7 Agriculture's dependency on different types of water sources
9. Utilization of riverbanks for agricultural and horticultural production as indicator of water resource dependency.	Section 3.7.1 Riverbank cultivation

10. Status of fishing effort, fishing time of year, fishing habitat as indicator of water resource dependency.	Section 3.3.3 Involvement in fishing activities in the last 12 months; 3.2.4 Fishing in different habitats over the year
11. Disposal of fish catches, buying and selling fish as indicator for the importance of marketing of fish.	Section 3.4 Disposal of fish catches, buying and consumption of fish
12. Frequency and amount of consumption of fish as indicator for importance of fish for food security.	Section 3.4 Disposal of fish catches, buying and consumption of fish
13. Status of collection effort, as indicator of water resource dependency.	Section 3.5 Involvement in collection of Other Aquatic Animals and Plants (OAA/Ps) in the last 12 months
14. Frequency and amount of consumption of OAA/Ps as indicator for the importance for food security.	Section 3.6 Disposal of OAA/Ps collected, buying and consumption of OAA/Ps
Research question 2. Have these changes and impacts been different in the different socio-ecological zones, measured for example by the proportions of households and villages that have experienced them?	
15. Frequency of different types of water resource related impacts that have occurred either abruptly and unexpectedly (shocks) or gradually over a longer period (trends) and their distribution by zone and sub-zone.	Section 4.1 Flooding Section 4.2 Drought Section 4.3 Extreme weather in the last 12 months
Research question 3. What has the strength or severity of those positive or negative impacts from changes been?	
16. Frequency and size of HH's losses from floods and droughts. 17. Changes in perceived community well-being and the causes for such changes.	Sections 4.1.1 Flooding in the last 3 years and loss of assets; 4.1.2 Flooding in the last 12 months and loss of assets Sections 4.2.1 Drought in the last 3 years and loss of assets; 4.2.2 Flooding in the last 12 months and loss of assets Chapter 5 Trends
Research question 4. What conditions (such as location in socio-ecological zone, time of year, slow or abrupt changes, household socio-economic status), determine whether changes have positive or negative effects?	
18. Frequency of positive and negative impacts from events distributed by zone, sub-zone, time of year. 19. Frequency and size of HH losses due to floods and droughts correlated with HH socio-economic status.	Chapter 5 Trends
Research question 5. What have households and village communities done to cope with the negative impacts?	
20. Frequency of different types of coping strategies and their distribution by zone and sub-zone.	Section 6.4 Coping strategies for impacts of flooding and 6.5 Coping strategies for impacts of drought
Research question 6. What types of impacts have occurred abruptly, without warning, at a scale so they can be considered shocks?	

21. Frequency of different types of events that have occurred abruptly and unexpectedly and their distribution by zone and sub-zone.	Chapter 4 Shock Events Chapter 5 Trends
Research question 7. What are the socioeconomic conditions that determine more resilience to shocks?	
22. Frequency of different types of alternative livelihood options and coping strategies of HHs correlated with their socio-economic status and dependency on water resources.	Analysis of Sub-zone and Country distribution of alternative livelihood options included
Research question 8. What long-term trends over the last 10 years can be identified in the use and condition of river water resources, fisheries, irrigation, navigation, timber floating, tourism, and livelihoods at community level?	
23. Frequency and distribution of types of important community events, their causes and impacts, by zone, to identify which ones are water related and see them in a broader socio-economic context.	Chapter 5 Trends

1.4 Structure of the Report

Following the Executive Summary, the Summary of Findings, and the Introduction, the report is structured as follows:

Chapter 2 Methods and Approaches describes the study area, the changes that have been made to SIMVA 2014 compared to SIMVA 2011, and explains the key concepts of shocks and trends as applied.

Chapter 3 Population and livelihoods related to water resources presents the results of the SIMVA 2014 survey in terms of population, occupations with a special focus on water resources dependent livelihoods, including an index of water resources dependent livelihoods and how they are distributed in the different socio-ecological Sub-zones. The Chapter presents findings on overall fishing effort; habitats used for fishing, and disposal of catches and consumption of fish and similar information for collection of Other Aquatic Animals and Plants (OAA/Ps). Further, it contains the data on use of water resources for agriculture, riverbank cultivation and sources of drinking water.

Chapter 4 Shock Events is the first of the two key chapters of the report, in which are presented the results of the survey of flooding and droughts events and their impacts on households. The sections cover the occurrence of flooding and droughts in the previous 12 months and the previous 3 years. The impacts in the form of loss of assets, loss of paddy land and rice production, of riverbank cultivation, aquaculture production, livestock and poultry, property, loss of working days, days without access to clean drinking water and sanitation, and the value of these losses. Lastly, the chapter presents findings on extreme weather events in the 12 months before the survey.

Chapter 5 Trends is the second key chapter, presenting the findings on trends from the qualitative study in 25 villages. The methodology and approach of the study are explained. Next, an analysis of the many types of events identified by the Focus Groups in the study villages that affect community well-being are presented. The trends that

the Focus Groups identified with regard to the state, and importance for community well-being of fisheries, irrigation and rice cultivation, navigation and aquaculture are presented. Further, the overall trends in community well-being are given as identified by the Focus Groups. The chapter ends with an example of trend analysis that can be done in the future when more data points become available, by comparing SIMVA 2011 and SIMVA 2014 data on floods and droughts and loss of assets.

Chapter 6 Vulnerability, resilience and coping strategies presents the analysis of the survey data on a number of variables related to vulnerability, resilience and coping strategies, with a focus on indicators for resilience, namely the availability and status of services, and the occurrence of work migration in the 352 sampled villages. The analysis of the sampled households' alternative livelihood options and the important coping strategies for impacts of flooding and droughts follows. Climate change is addressed with a presentation of the analysis of data on adaptation to changing weather patterns, early warning and disaster preparedness, and measures undertaking to prevent impacts.

Chapter 7 Conclusions and Recommendations highlights the possibilities for further analysis and use of the SIMVA 2014 data. Recommendations for future SIMVA exercises and recommendations for continued and enhanced relevant activity areas, as well as possible policy implications, for the Mekong River Commission are discussed.

Four National Reports complement this Regional Report. The National Reports present more detail on the findings from each of the Member Countries. The National Reports include discussion of the national perspectives to SIMVA, in terms of the study findings, but also in terms of sustainability of the SIMVA as a process of integrative data collection and analysis.

2. Methods and approaches

2.1 Study area

The study area of SIMVA 2014 covers a corridor along the Mekong mainstream from the border of China to the Mekong Delta, and around flooded areas around the Songkhram River in Thailand and the Tonle Sap Lake in Cambodia.

The study area is divided into a number of 'Socio-ecological Zones' (SEZs) (Map 1). These zones were identified by the Integrated Basin Flow Management (IBFM) programme for the corridor and for the whole basin by WWF (with MRC support) in 2006. The SEZs are based on a classification framework for sub-basins and streams that focuses on ecological functionality, which in turn is based on hydro-geomorphic characteristics. The categories that were considered for the classification framework were the following:

- Water flow system type (e.g., headwater vs. pass-through watershed, small vs. large streams, floodplain type)
- Elevation (and derivatives, e.g., slope)

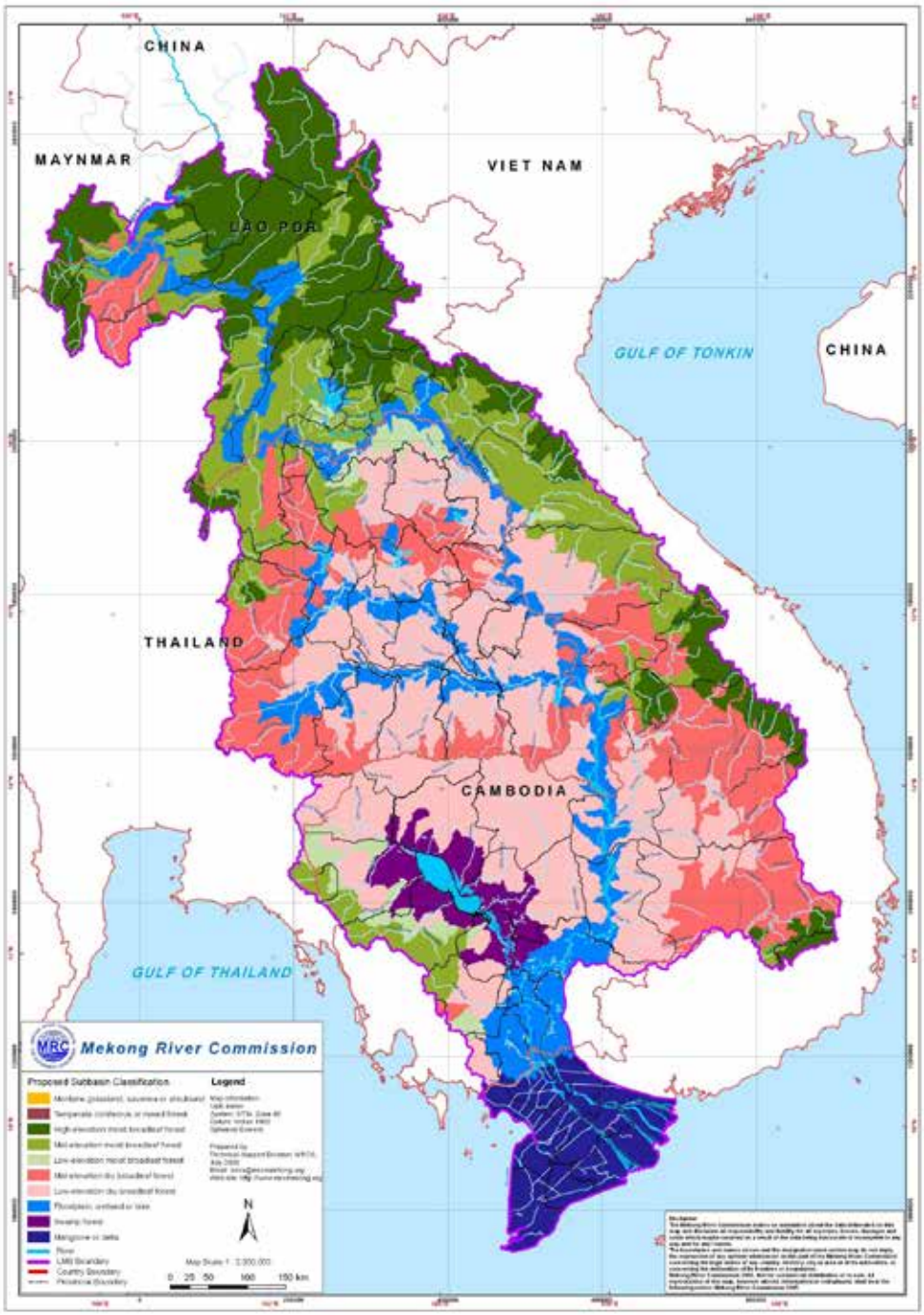
- Geology
- Vegetation
- Hydrology (e.g., surface runoff, river discharge)
- Stream network characteristics (e.g., river density, sinuosity)

Based on these categories 10 sub-basin classifications for the region were defined, 8 of which are applicable to the LMB.

The classifications are named after the natural ecosystems, although it is recognized that these have been largely transformed by agriculture and forestry. Studies show that the residents of these areas have adapted their livelihoods to the ecosystems, effectively becoming an integral part of the environment they manage and transform. As such, each SEZ corresponds to a 'social-ecological system', which is defined as 'an integrated system of ecosystems and human society with reciprocal feedback and interdependence'. The SES concept emphasizes the 'humans-in-nature' perspective[1]. Thus, it is assumed that within the SEZs, interdependence between people and the ecosystems has contributed to create generally resilient environments where both people and nature can sustain certain levels of change.

1 Assessing and managing resilience in social-ecological systems: A practitioner's workbook. Version 1.0 June 2007, Resilience Alliance.

Map 1 LMB Sub-basin classification



Source: Adapted from WWF, 2006

2.1.1 The Mekong corridor

In defining the Mekong mainstream, the following factors need to be taken into consideration:

- Mekong floods regularly extend several kilometres beyond the 'normal' course of the river. These floods play a critical role in maintaining a variety of ecosystems important to people and wildlife.
- Two major wetlands (the Songkhram and the Tonle Sap) are, in effect, part of the mainstream as they are highly dependent on the annual 'reverse flows' that occur when the Mekong rises.
- Some tributaries are impacted by reverse flow by various degrees, which have implications for the aquatic and/or riverine resources in the confluence areas. Presently, knowledge about the occurrence and extent of reverse flows is limited and not systematically compiled to allow for systematic inclusion of tributaries based on this criterion. Still, in the present survey, the '3S' system in Cambodia and the Songkhram River in Thailand have been included as Sub-zones.
- South of Kratie in Cambodia, extensive flooding occurs effectively extending the influence of the Mekong over thousands of square kilometres in Cambodia (Tonle Sap and floodplains) and Viet Nam (the Delta).

Taking these facts into consideration, in the context of SIMVA the 'mainstream' is taken to include the following:

- All those areas inundated by peak floods (using the upper flood limit of 2002)
- The major wetlands, the Tonle Sap and the Songkhram River
- The '3S' confluence in Cambodia as a tributary Sub-zone

The rationale for the 15 km corridor is that analysis of the SIMVA primary data found that the amount of resource use decreases significantly with distance from the Mekong River. The data showed that people tend to make use of ecosystems that can be reached, on average, within 15 to 20 minutes. Beyond 10 km to 15 km, distance becomes a constraint, even for those with vehicles. Beyond 15 km, it is assumed that river resource use becomes rare, except under special circumstances such as the seasonal migration of farmers to the Tonle Sap during peak fishing periods, many of who are likely come from outside the corridor. A weakness of the approach used for determining the corridors is that it does not take this seasonal use into account. Nor does it consider how the travel time to access the Mekong varies according to topography.

Delineation of Zones and Sub-zones

The major Zones in SIMVA 2014 are the same as applied in SIMVA 2011 and are based on the IBFM hydro-ecological zones. A number of Sub-zones have been defined with a view to ensure a better coverage of different socio-ecological areas in the corridor. The Sub-zones applied in SIMVA 2014 are shown in Map 2. The Zones and Sub-zones for

SIMVA in relation to the original IBFM zones are listed in Table 2.

Map 2 Sub-zones of SIMVA 2014

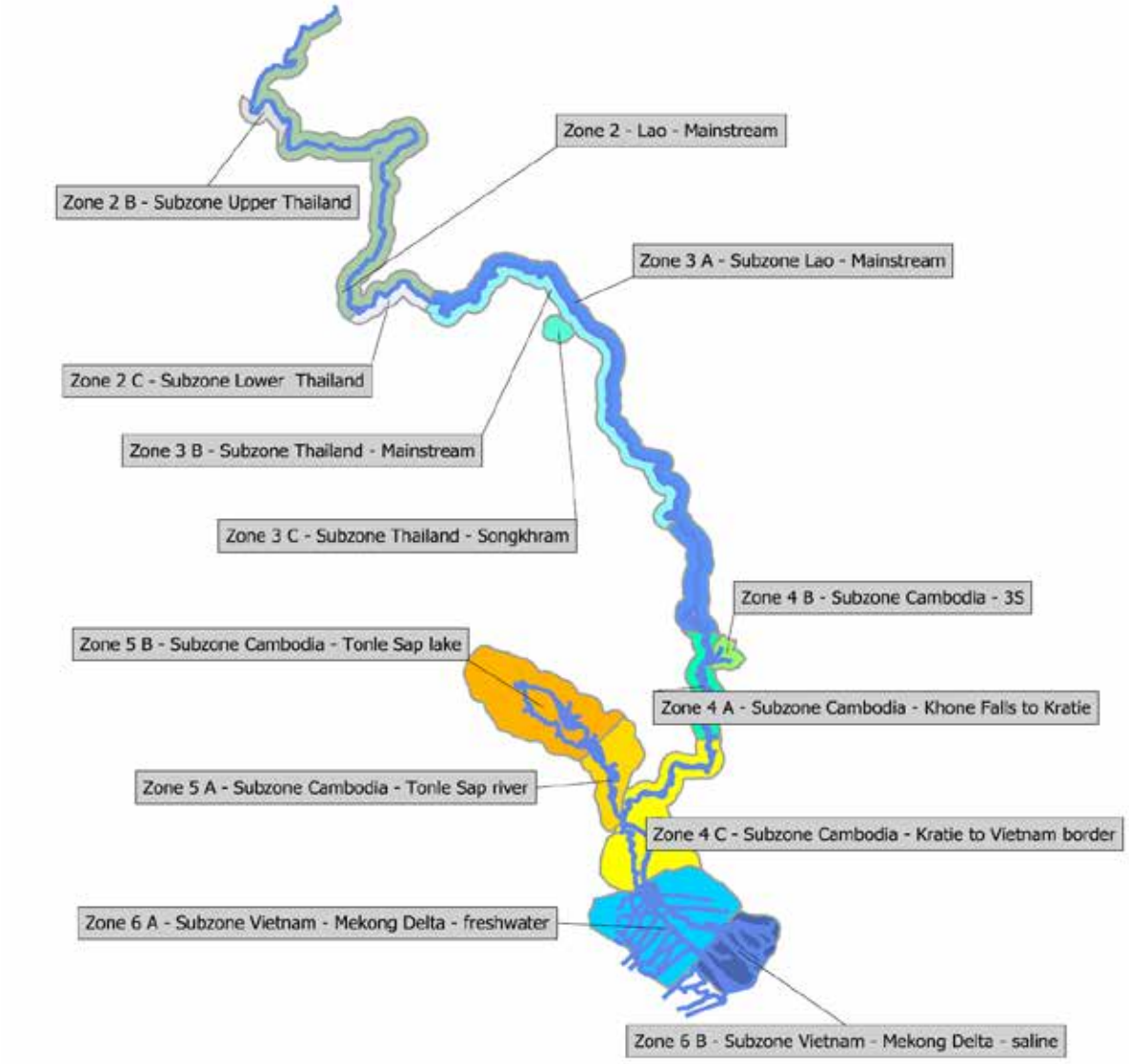


Table 1 IBFM and SIMVA Zones

Hydro-ecological zone	Description: IBFM	Description: SIMVA	Social survey Sub-zones	Description
Zone 1	*Lancang, China*	*Lancang, China*	*n.a.*	*n.a.*
Zone 2	From Chinese border to Vientiane (Upstream)	From Chinese border to Vientiane (Upstream)	Zone 2 - Lao – Mainstream	Lao PDR side of Zone 2
			Zone 2 B - Subzone Upper Thailand	Thai side of Zone 2 in 2 significantly different Sub-zones: Upper stream in Chiang Rai and Phayao Provinces and Lower stream west of Vientiane in Loei and Nong Khai provinces
			Zone 2 C - Subzone Lower Thailand	
Zone 3	From Vientiane to Pakse	From Vientiane to Lao-Cambodian border	Zone 3 A - Subzone Lao - Mainstream	Lao side of zone 3 along the Mekong mainstream (incl. Vientiane)
			Zone 3 B - Subzone Thailand – Mainstream	Thai side of zone 3 along Mekong mainstream
			Zone 3 C - Subzone Thailand - Songkhram	App. 40 km upstream from confluence of Songkhram and Mekong – wetland areas and undammed river
Zone 4	From Pakse to Kratie	From Lao-Cambodian border to Cambodian-Viet Namese border	Zone 4 B - Subzone Cambodia - 3S	App. 40 km from confluence of 3S and Mekong – undammed river, special eco-system
			Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	Along Mekong mainstream down to start of floodplain
			Zone 4 C - Subzone Cambodia - Kratie to Viet Nam border	A 15 km zone around the maximum flooded area on the floodplain along the Mekong mainstream and Bassac east and south of Phnom Penh
Zone 5	From Kratie to Phnom Penh (upstream), incl. Tonle Sap	From Phnom Penh up to and including Tonle Sap lake	Zone 5 A - Subzone Cambodia - Tonle Sap river	The socio-eco system of Tonle Sap river is considered different from the Lake so a special subzone has been drawn
			Zone 5 B - Subzone Cambodia - Tonle Sap lake	The area is defined as 15 km around the maximum flooded area (in year 2000)

Zone 6	From Phnom Penh to Mekong Delta.	From Cambodian-Viet Namese border to sea - the Mekong Delta	Zone 6 A - Subzone Viet Nam - Mekong Delta - freshwater	The subzone covers the area of the Mekong Delta which has freshwater
			Zone 6 B - Subzone Viet Nam - Mekong Delta - saline	The saline subzone has special characteristics such as problems with saline intrusion

2.2 Comparison of SIMVA 2014 and SIMVA 2011 approaches

Compared to SIMVA 2011, the main changes and additions introduced in SIMVA 2014 are as follows:

- Sample size has increased based on calculations of acceptable error and confidence level in the SIMVA 2011 data. The number of villages per country has been increased from 34 to 88, and the number of households selected in each village has been reduced from 20 to 16, which will reduce the statistical effects of clustering.
- The 40 km buffer zone around flooded areas has been reduced to 15 km, which is the same as the buffer on each side of the Mekong mainstream. Additional Sub-zones 40 km upstream from the Mekong and 10 km on each side of tributaries have been added in the Songkhram River area in Thailand and in the '3 S's in Cambodia.
- Village Profile data collection comprising community level information has been added.
- A qualitative participatory study of trends over the past 10 years has been included and will be done in survey villages located at MRC monitoring locations.
- The thematic focus on 'Shocks and Trends' means that some questions (variables) from the SIMVA 2011 are omitted.

For SIMVA 2014, the Zones and Sub-zones applied in SIMVA 2011 were split into several additional Sub-zones. These were introduced in response to the limitations of SIMVA 2011 so that areas that are clearly of different socio-ecological aspect could be represented and described by the data.

To allow for statistically valid comparison between the Sub-zones SIMVA 2014 covered a significantly larger sample than SIMVA 2011, increasing from 2,720 to 5,632 households. The larger sample size was determined from the results of an analysis of the complex sample design of the 2011 SIMVA. From the 2011 survey, the variable 'proportion of households experiencing losses from drought in the last 12 months' was selected as the yardstick for determining sample size by looking at the standard error. Sixteen variables related to shocks and trends were investigated in order to provide the options for appropriate sample sizes in order to ensure reliable estimates across and within the countries, zones, and sub-zones. It was found that the intra-class correlation coefficients from statistical analyses of 2011 SIMVA's dataset were very small. This implies that the number of households per village could be reduced while the number of villages increased. Based on this observation, the number of households per village was reduced to 16 compared to 20 for the 2011 baseline survey.

Sample proportion, standard error, and design effect have been taken into account in the sample size calculation. The margin of error was set at 2% with 95% confidence level. The 352 selected villages were selected without replacement. The selection of the 16 households per village was also without replacement.

Table 2 Comparison of SIMVA 2011 and 2014 Sub-zones and sample

IBFM zone	Zone 2			Zone 3			Zone 4			Zone 5		Zone 6		Total
SIMVA 2011 Sub-zones	Lao	Thai		Lao	Thai		Cambodia Main			Cambodia Tonle Sap		Viet Nam Fresh	Viet Nam Saline	
Nos sample HHs 2011	340	340		340	340		340			340		340	340	
SIMVA 2014 Sub-zones	Zone 2 A - Mainstream - Lao	Zone 2 B - Subzone Upper Thailand	Zone 2, Zone 2 C - Subzone Lower Thailand	Zone 3 A - Subzone Lao - Mainstream	Zone 3 B - Subzone Thailand - Mainstream	Zone 3, Zone 3 C - Subzone Thailand - Songkhram	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	Zone 4 B - Subzone Cambodia - 3S	Zone 4 C - Subzone Cambodia - Kratie to Viet Nam border	Zone 5 A - Subzone Cambodia - Tonle Sap river	Zone 5 B - Subzone Cambodia - Tonle Sap lake	Zone 6 A - Subzone Viet Nam - Mekong Delta - freshwater	Zone 6 B - Subzone Viet Nam - Mekong Delta - saline	
Nos sample Villages	44	22	22	44	22	22	22	4	18	22	22	44	44	352
Nos sample HHs 2014	704	352	352	704	352	352	352	64	288	352	352	704	704	5632

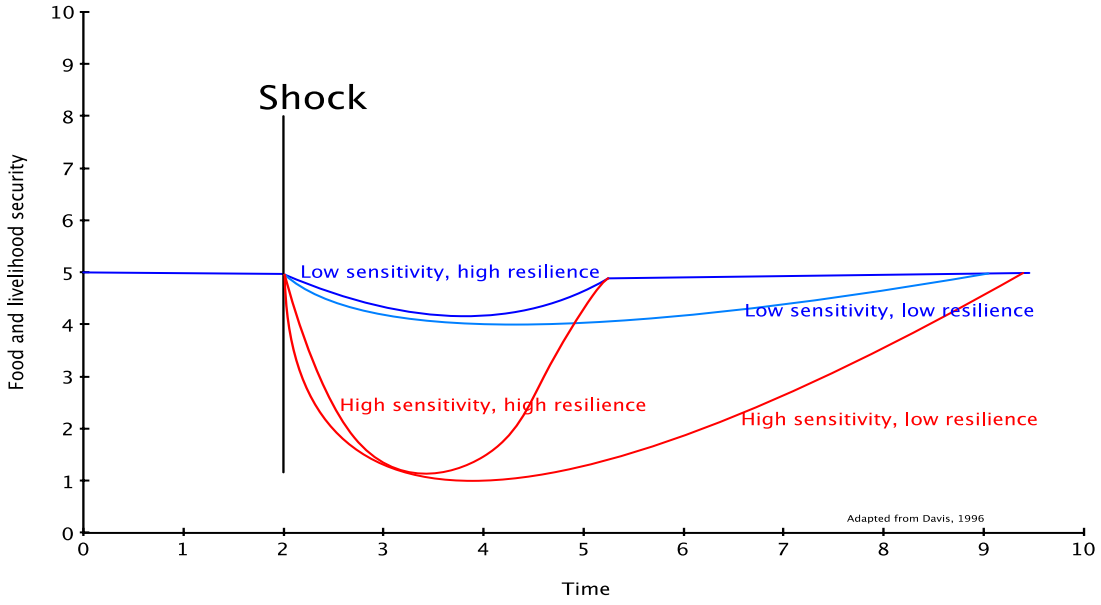
2.3 Key concepts: Shocks and Trends

The definition of 'Shock' is "a sudden upsetting or surprising event or experience." This means something that happens abruptly, suddenly, often without warning, and has a significant effect or impact.

In the SIMVA, context shocks would be floods, droughts, storms, outbreaks of water related disease, sudden loss of irrigated land, sudden loss of water related infrastructure such as bridges, roads, and loss of productive assets such as boats, fishing gear, etc. The

relationship between the concepts of 'shock', 'sensitivity' and 'resilience' is illustrated in Figure 1.

Figure 1 Shocks – sensitivity and resilience



Source: Adapted from Davis, 1996

The definition of 'Trends' is: "a general direction in which something is developing or changing." Some important aspects of the concept of 'trends' should be kept in mind[2]:

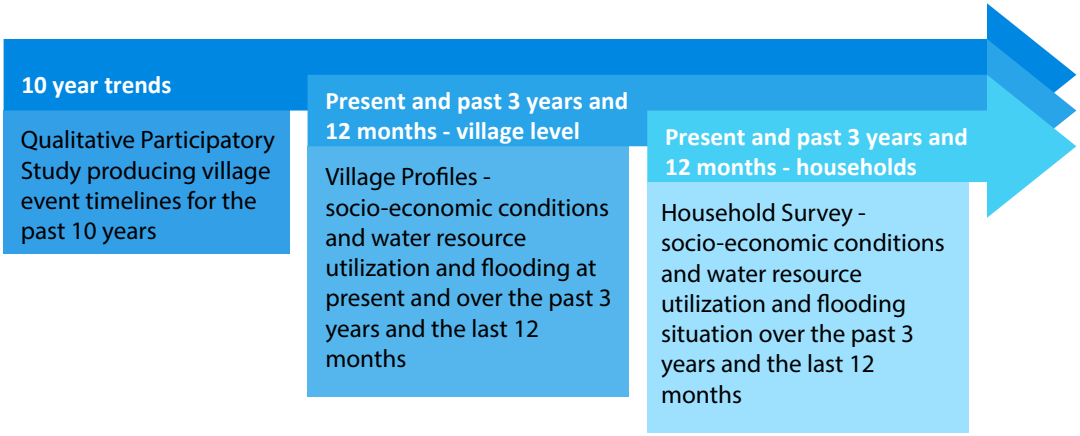
- A trend cannot be inferred from two points (or even 3 or 4).
- For socio-economic and social development and social impacts a trend should cover 5 years or more before it can be declared a trend (and is therefore different from, for example, fashion trends). If a shorter period is used there is a significant possibility that one detects only variability in the social and economic systems; for example, two years with bad harvests due to the weather does not constitute a trend but is variability.
- One cannot pick convenient spots for a trend to begin and end. For example, it is not allowed to pick years between which the rate of flooding is going up or going down.
- No change is a trend until a statistical test says it is.

For SIMVA 2014, the above points mean that the data for establishing trends are as follows:

<u>The quantitative survey at village and household level:</u> answers questions about what has happened during the last 3 years extending back to the time of the SIMVA 2011 and covers that period. Questions about events in the previous 12 months can be compared to the answers to the same questions in SIMVA 2011 (which however will not establish a trend since there are only two data points), and then compared with future SIMVA surveys.

2 Source http://www.actualanalysis.com/trend.htm

Figure 2 Time dimensions of the 3 SIMVA data collection instruments



The Qualitative Participatory Study in 25 villages: establish village timelines for water related events that have happened over the previous 10 years. By combining the timelines from around 25-30 villages it is possible to indicate trends.

2.4 The Qualitative Participatory Study of community events and trends

2.4.1 Rationale

The objective of the Qualitative Study was to obtain information on the most important events and factors over time which influence the socio-economic situation and community well-being of villages in the LMB corridor, with a focus on water related factors.

The SIMVA 2011 questionnaire included questions about trends over the past 5 years, as the interviewees perceived these. The questions relied on individuals' memory of events and trends over a 5-year period. The answers were on a scale that apart from Yes or No, was Less, the Same, A little more, Much more. However, the scientific

literature on socio-economic, psychological and health related surveys describes the limitations to individual memory of past events; even very recent events can be forgotten or mixed up with other events that occurred at another time[3]. Due to these issues related to the recall period of individual respondents in socio-economic surveys, the qualitative study was instigated. To increase reliability of information on trends, which can only be detected over a longer period of time, a participatory method for creating community calendar timelines was designed. In a long-term perspective, the Qualitative Study can form the basis for establishing a long-term collaboration with the study villages, so they eventually would be able to monitor relevant socio-economic changes themselves, i.e., self-monitoring.

2.4.2 Study design

The study applied a participatory method to create a timeline of important events that have had positive and/or negative impacts and have influenced the general community well-being and socio-economic status in the villages (refer to Chapter 5 Trends for details).

In 25 villages in the LMB corridor, Focus Groups made community timelines for important community events that happened over the previous 10 years, with a special focus on water related events. The intention was to detect trends by combining the timelines from all the 25 villages.

Due to the relatively small number of villages, the results are not statistically representative of the individual Sub-zones. However, with 25 villages covered, some statistical analysis for the whole corridor was applied. The study provides a picture of common issues affecting communities.

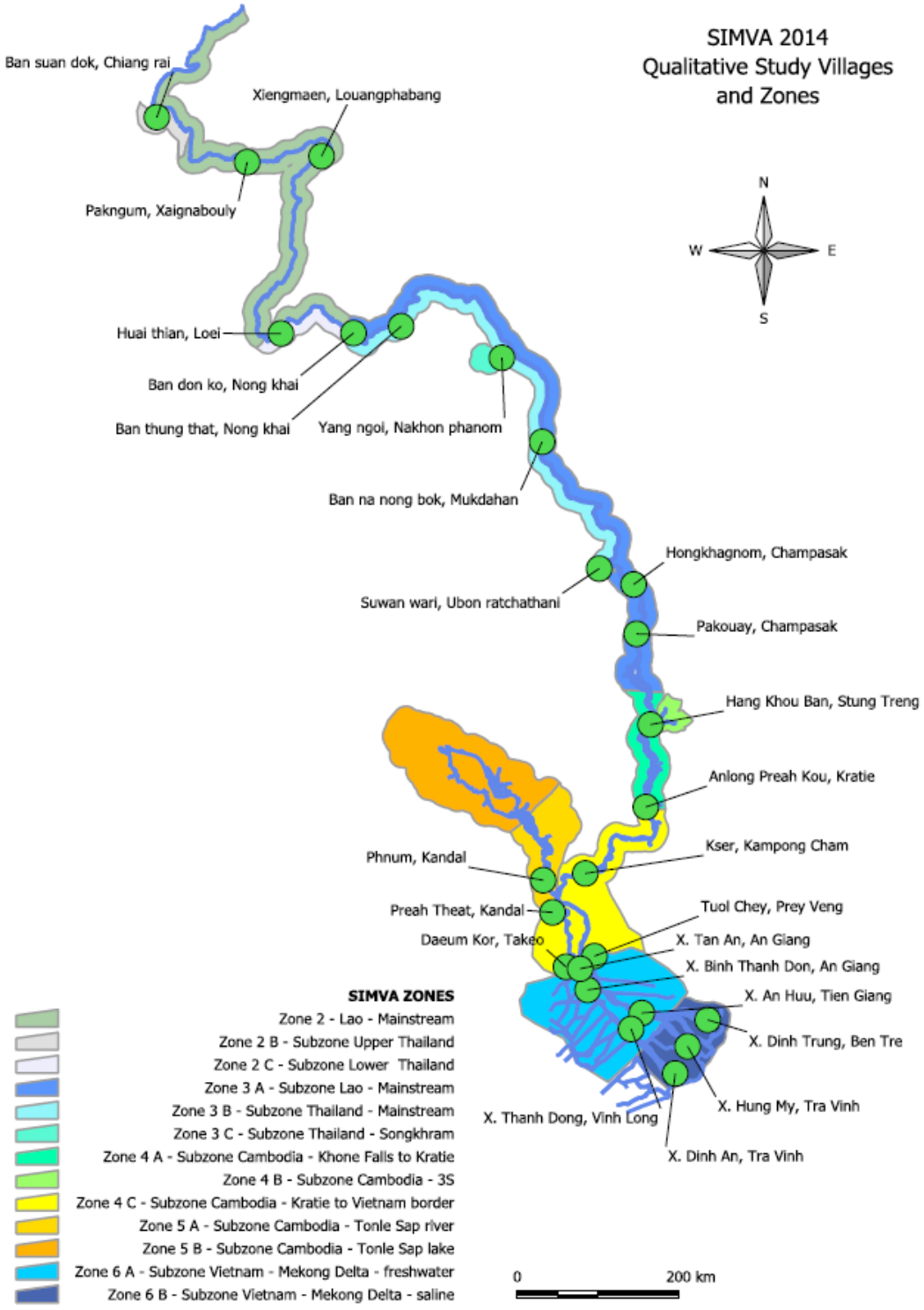
The villages selected for the qualitative study were also included in the Quantitative Survey. They are located in the Mekong corridor and cover all of the Sub-zones, except Tonle Sap Lake.

To be able to link the qualitative study to MRC's other monitoring activities of water quality (sedimentation, hydrology and fisheries) the study villages have been purposefully selected for being near MRCS monitoring stations. This selection criterion would allow for correlating the water quality, fisheries, and sediments, biological and hydrological data from the monitoring stations with the results of the Focus Group discussions. However, it was beyond the scope of the present report to include such analysis, but it is recommended as an option for further analysis.

3 "Retrospective reports in survey interviews and questionnaires are subject to many types of recall error, which may affect their completeness, consistency and dating accuracy (Schwarz and Sudman 1994; Scott and Alwin 1998; Van der Vaart 1996; Van der Vaart et al. 1995). In the social and the medical sciences, where many studies focus on the reconstruction of life histories, concerns about this problem have led to the development of so-called calendar instruments, or timeline techniques (Freedman et al. 1988; Sobell et al. 1988). These data collection procedures offer an alternative to regular survey questionnaires […]." Applications of calendar instruments in social surveys: a review. Tina Glasner and Wander van der Vaart. Qual Quant. 2009 May; 43(3): 333–349. Published online 2007 October 5. doi: 10.1007/s11135-007-9129-8

Map 3 shows the location of the 25 study villages in the Sub-zones.

Map 3 Location of Qualitative Participatory Study villages in the Sub-zones



3. Population and livelihoods related to water resources

Collection of general data on the population in terms of household sizes, occupations and livelihoods and other variables are part of the SIMVA long-term data collection process. Since SIMVA 2014 focuses on 'Shocks and Trends', a selection of general socio-economic variables is presented in this report. The full data set is available for further analysis.

3.1 Population

The results of the statistical data analysis in this report are based on un-weighted data. However, for the calculation of the population in the LMB corridor, weights based on available official population statistics of the sample frame have been used. Based on the sample frame data (number of households in the sample area multiplied by the mean household size of the sampled households), the population of the sample area in the LMB corridor is estimated at 20.6 million people (Table 3).

Table 3 Estimated population of the survey area in the LMB corridor

		Total HH in each sub-zone	Mean number of HH members (survey)	Estimated population
Country	**Zone**			
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	18,380	4.88	89,655
	Zone 4 B - Subzone Cambodia - 3S	1,404	4.98	6,998
	Zone 4 C - Subzone Cambodia - Kratie to Viet Nam border	819,839	5.02	4,113,428
	Zone 5 A - Subzone Cambodia - Tonle Sap river	285,686	4.88	1,395,154
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	187,089	5.07	948,201
	All	***1,312,398***	***4.99***	***6,553,436***

Lao PDR	Zone 2 A - Mainstream - Lao	94,235	5.38	507,316
	Zone 3 A - Subzone Lao - Mainstream	170,971	5.94	1,016,355
	All	***265,206***	***5.75***	***1,523,671***
Thailand	Zone 2 B - Subzone Upper Thailand	21,390	3.89	83,108
	Zone 2 C - Subzone Lower Thailand	19,318	4.35	84,025
	Zone 3 B - Subzone Thailand - Mainstream	155,580	4.78	743,228
	Zone 3 C - Subzone Thailand - Songkhram	18,020	4.62	83,233
	All	***214,308***	***4.18***	***993,594***
Viet Nam	Zone 6 A - Subzone Viet Nam - Mekong Delta – freshwater	1,720,324	4.81	8,279,059
	Zone 6 B - Subzone Viet Nam - Mekong Delta - saline	742,443	4.46	3,309,355
	All	***2,462,767***	***9.27***	***11,588,415***
All	**All**	**4,254,679**	**4.86**	**20,659,116**

The sources for population data for the sample frame were: Cambodia: CAMInfo 2011, Population Census 2008; Lao PDR: Agricultural Census 2010/11; Thailand: Population Census 2010; Viet Nam: Population Census, Agricultural Census 2011.

SIMVA 2011 estimated the population living within the LMB corridor (as delineated at the time) to be 33.8 million people. This was based on extrapolation from LandScan GIS information in the absence of official statistical data on the number of households in the LMB corridor. Furthermore, in SIMVA 2014 the sample area has been revised and reduced as explained above. There is a need to review and update the LMB population figures as the official statistical data becomes more readily available and consolidated. The socio-demographic profile of the surveyed households is presented in next section and in Chapter 6: Vulnerability, resilience and coping strategies.

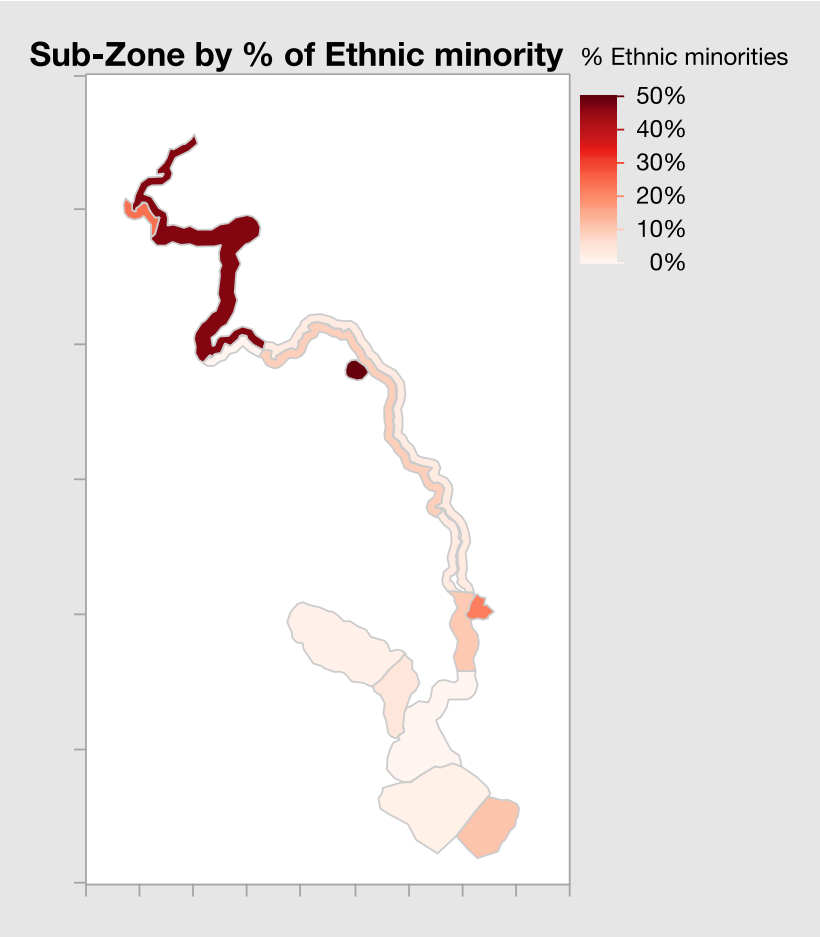
3.1.1 Ethnicity

The largest groups in the LMB corridor are Kinh in Viet Nam comprising 24% of the population, while Khmer and Lao and Thai people each comprise equally around 20-21% of the population (Table 4, Map 4, refer to Annex Table 1 for details of ethnic minorities). Ethnic minorities comprise 14% of the household heads of the total sample. The highest proportion is in Lao PDR, especially in Northern Lao, where ethnic minorities constitute 25% of the population. Thailand has 21% ethnic minorities in the LMB corridor. Cambodia and Viet Nam have relatively few ethnic minorities at 5% and 6%, respectively. The survey data does not indicate that the ethnic minorities in the LMB corridor are more dependent on natural aquatic resources than other social groups in the Sub-zone where they live.

Table 4 Main ethnic groups and ethnic minority households – percentage of sample

		Khmer	Lao	Thai	Kinh	Ethnic minority
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	67.30%	22.40%			10.20%
	Zone 4 B - Subzone Cambodia - 3S	6.30%	71.90%			21.90%
	Zone 4 C - Subzone Cambodia - Kratie to Viet Nam border	96.50%	3.50%			
	Zone 5 A - Subzone Cambodia - Tonle Sap river	95.50%				4.50%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	98.30%	0.30%			1.40%
	All	***85.30%***	***9.70%***			***5.00%***
Lao PDR	Zone 2 A - Mainstream - Lao		52.70%			47.30%
	Zone 3 A - Subzone Lao - Mainstream		96.90%			3.10%
	All		***74.80%***			***25.20%***
Thailand	Zone 2 B - Subzone Upper Thailand			75.90%		24.10%
	Zone 2 C - Subzone Lower Thailand			99.70%		0.30%
	Zone 3 B - Subzone Thailand - Mainstream			90.90%		9.10%
	Zone 3 C - Subzone Thailand - Songkhram			48.70%		51.30%
	All			***78.80%***		***21.20%***
Viet Nam	Zone 6 A - Subzone Viet Nam - Mekong Delta - freshwater				98.40%	1.60%
	Zone 6 B - Subzone Viet Nam - Mekong Delta - saline				88.90%	11.10%
	All				***93.70%***	***6.30%***
All	**All**	**21.40%**	**21.20%**	**19.60%**	**23.50%**	**14.40%**

Map 4 Ethnic minorities by Sub-zone



3.2 Households' main and secondary occupations

The household survey collected data on the single main occupation and secondary occupations (optional multiple occupations) of each household member (Figure 3 & 4, Annex Table 2).

It is important to note that 'occupation' is different from 'livelihood activity'; for example, many who are farmers by self-declared occupation consider fishing one of the most important livelihood activities (Refer to Sections 3.2.1 and 3.3.2, Figure 10). Therefore, there is a discrepancy between occupation data and livelihood activity data, especially with regard to involvement in fishing. This has been discussed at length in earlier MRC studies[4]. In official statistics such as Lao PDR Agricultural Census 2010/11, farming households were asked if they were 'engaged in fisheries', to which 51% answered yes.

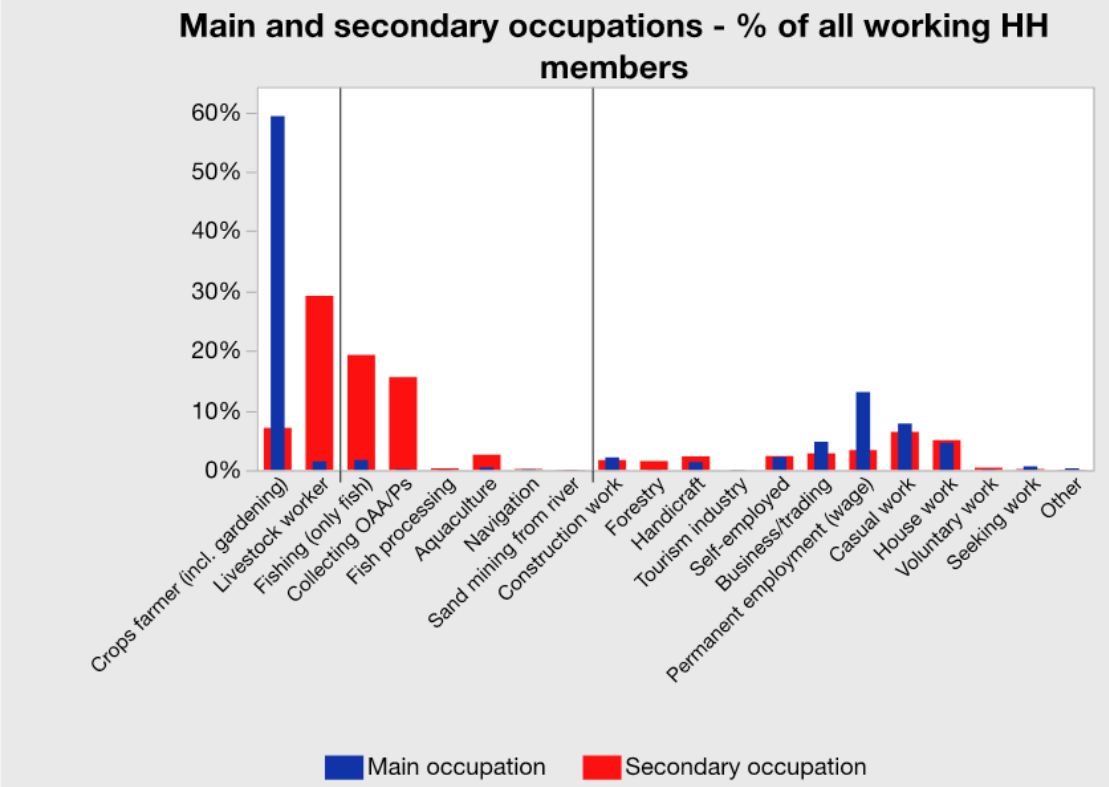
Crop farming, including gardening, was the main occupation for 59% of the working age population (i.e., not including dependents: children, elderly, disabled and students)

4 Refer e.g. to Social Assessment -Assessment of basin-wide development scenarios, Basin Development Plan Programme, Phase 2, Technical Note 12. Mekong River Commission, July 2010, Section 6.3

in the LMB corridor, i.e., the sample area. Crop farming is the secondary occupation for 7% of the working population. Livestock work was the secondary occupation for 29.2%.

Fishing as the only occupation for a household member is the main occupation for only 1.7% of the working population. With regard to fish processing, aquaculture, navigation and sand mining from the river, each of these is the main occupation for less than 1% of the working population. Collection of OAA/Ps is the main occupation for only 0.2%, but the secondary occupation for as many as 15.5% of the working population. Thus, collection of OAA/Ps is the third largest secondary occupation in the LMB corridor.

Figure 3 Main and Secondary occupations - all LMB corridor



Note: 'Dependent (children, elderly, students, disabled) not included

Figure 3 shows two vertical lines that separate the 'water resources dependent occupations' (fishing, fish processing, aquaculture, collection of OAA/Ps, navigation and river transport, and sand mining from the river) from the other occupations (refer to Section 3.3 below for details on water resources dependent occupations). Note that crop farming is not included as a water resource dependent activity in this graph. Most crop farming is rain-fed (refer to Section 3.7), and as such it is not really dependent on Mekong water resources. However, because crop farming was considered one of the water resource dependent occupations in SIMVA 2011, some of the tables and figures in the present report include farming as a water resource dependent occupation or livelihood. Where this is the case it is indicated in the text.

Figure 4 shows the main and secondary occupations by country (Annex, Table 3). Collection of OAA/Ps as a secondary occupation is most frequent in Cambodia, second in Thailand and third in Lao PDR.

Figure 4 Main and Secondary occupations--% of all working household members by Country

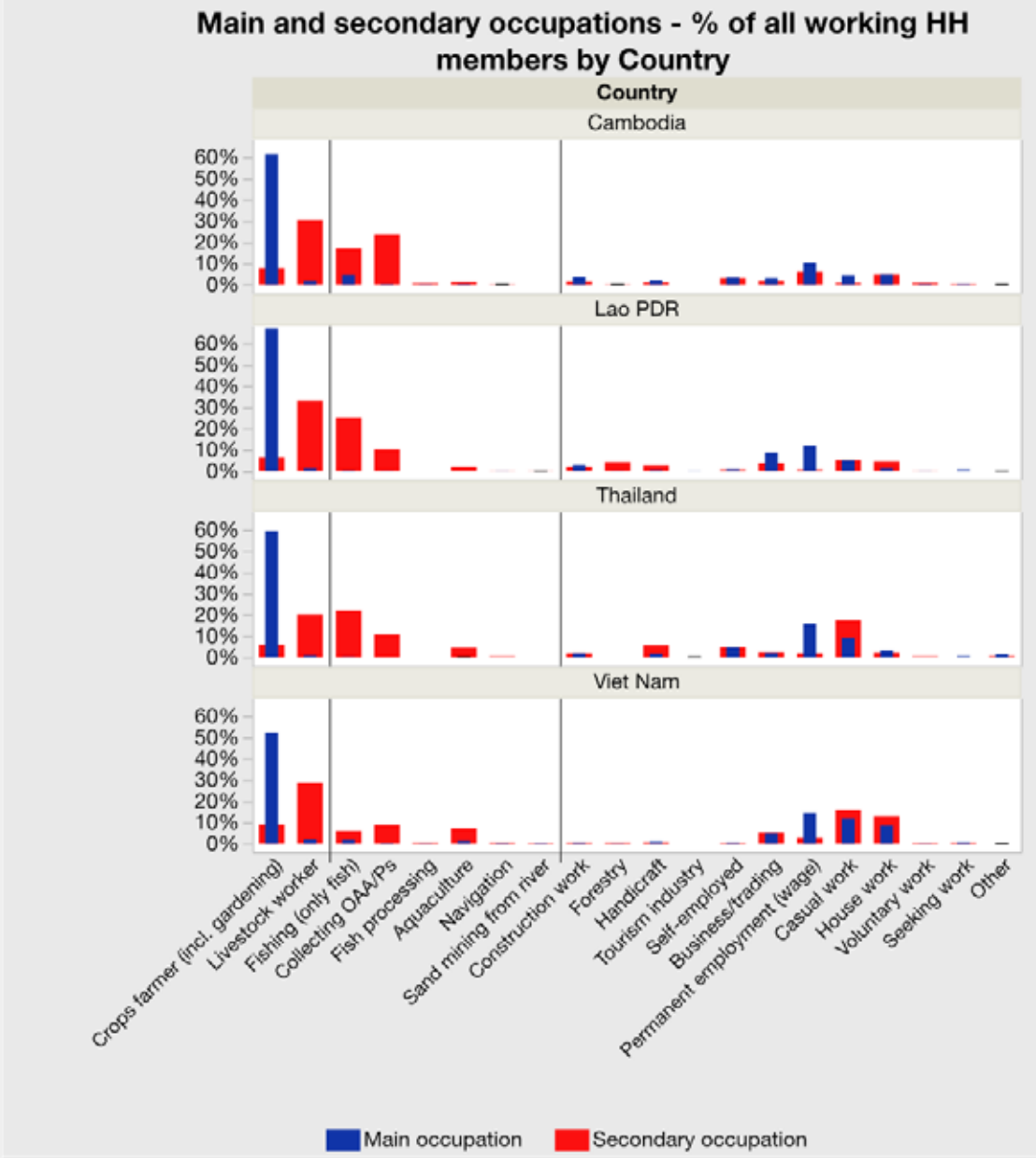


Figure 5 presents an overview by Sub-zone of the percentage-wise distribution of all household members' occupations (excluding dependents). The very prominent place of crop farming as main occupation and the secondary occupation as livestock worker is evident. In the context of the Mekong and aquatic resources, the importance of collecting OAA/Ps as a secondary occupation in Cambodia and Lao PDR stands out.

Figure 5 Household members' occupations - % of working members by Sub-zone

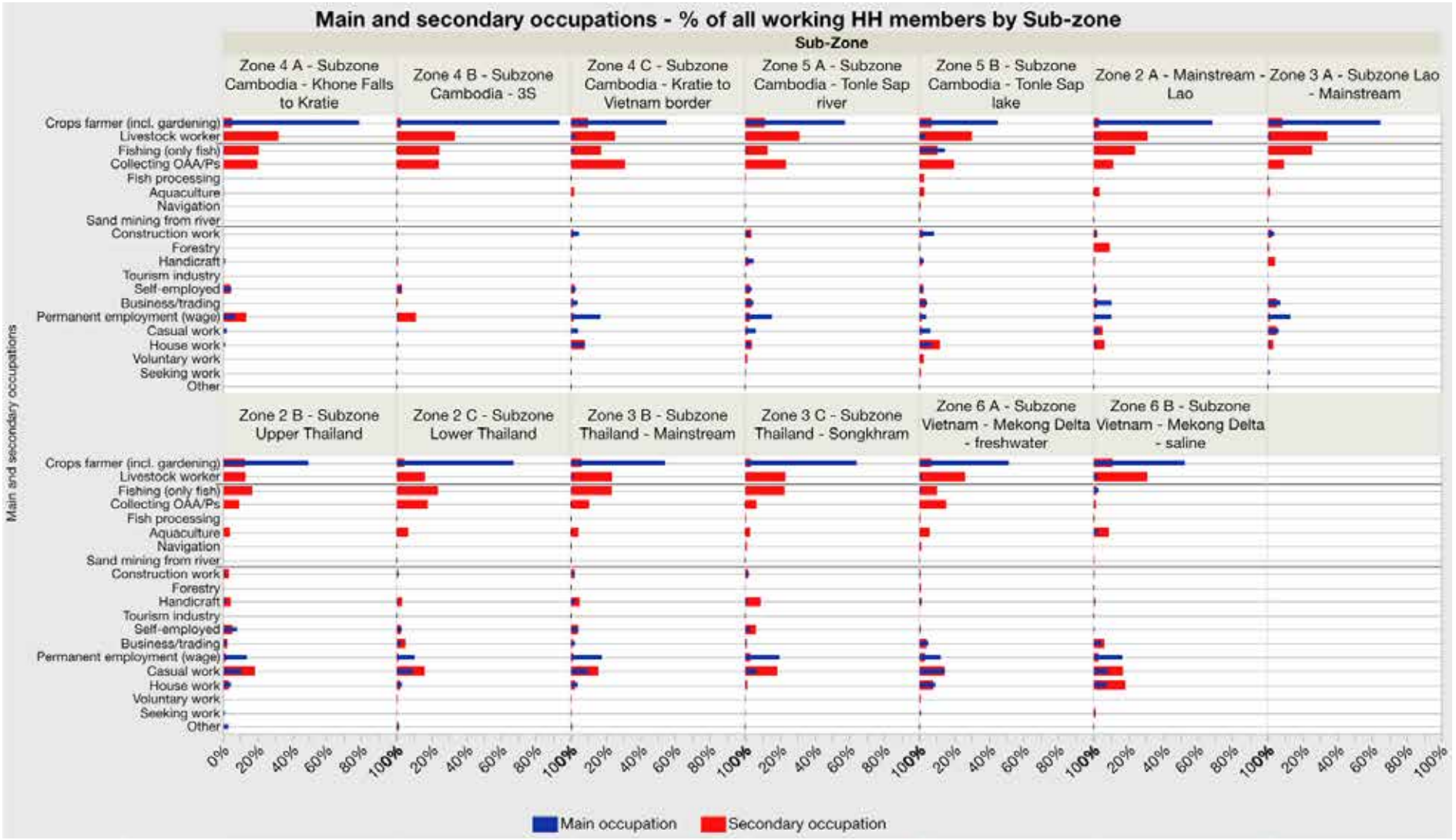
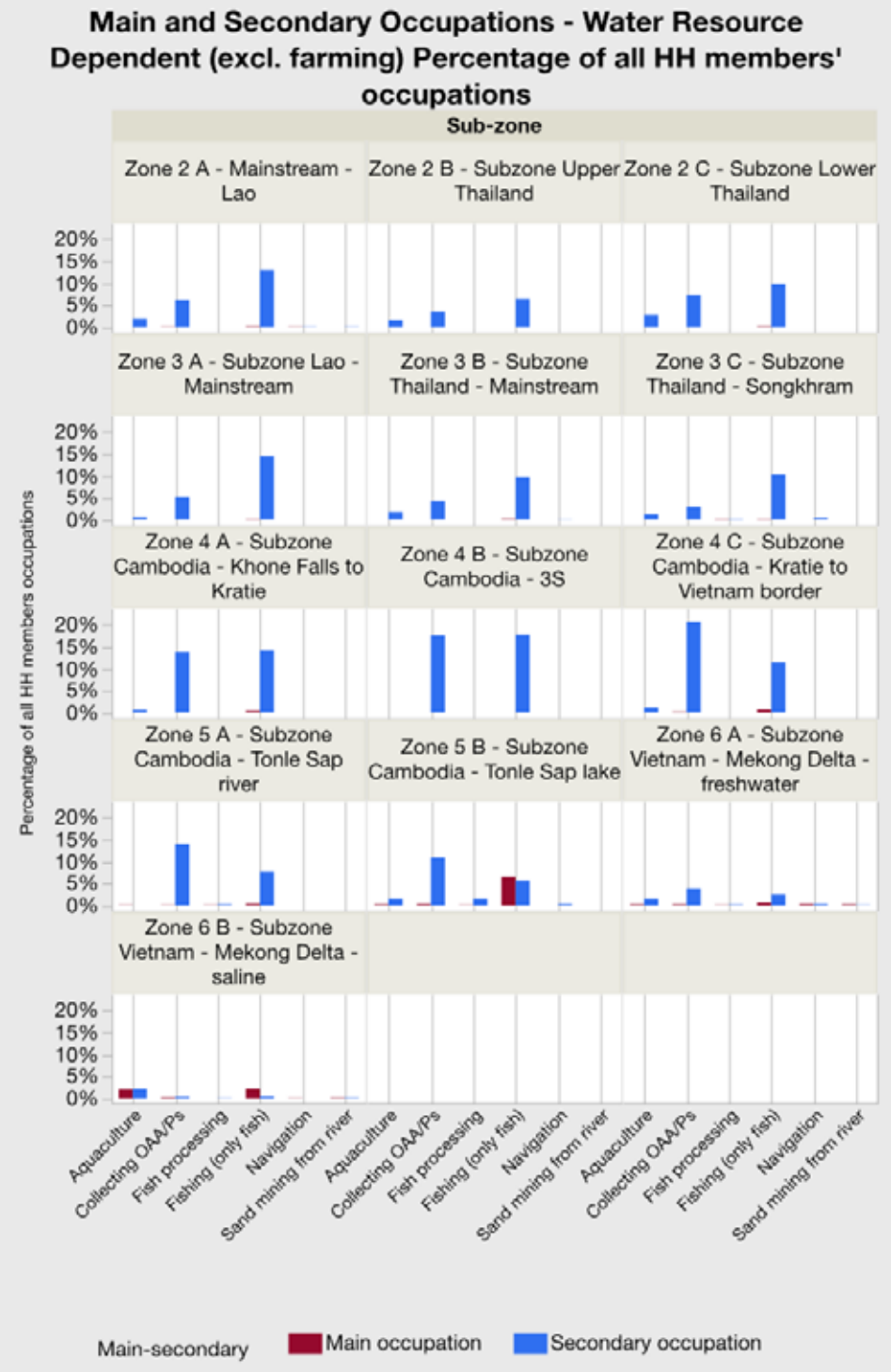


Figure 6 presents the distribution of the water resource dependent occupations (excluding crop farming), namely: fishing (household member having only fishing as an occupation), fish processing, collecting OAA/Ps, aquaculture, navigation/river transport, sand mining from the river and tourism industry. Also, in this view of the data, the importance of collecting OAA/Ps emerges clearly. However, Section 3.3 below presents the data on involvement in fishing, which shows much higher levels of fishing activities than the occupation data would indicate.

Figure 6 Main and Secondary Occupations - Water Resource Dependent (Excl. Farming) – Household Survey



3.2.1 Four main livelihoods in the sample villages

To complement the household data with community level data with regard to livelihoods, the village Key Informants were asked about the four main livelihoods of the village (Annex, Table 6). Note the remarks in Section 3.2, paragraph 2, on the difference between occupation data and livelihoods data.

Figure 7 is based on the Village Profile data of the four main livelihoods. The graph has a line that separates the 'river water resource dependent' livelihoods, which are: fishing, aquaculture, navigation and river transport, tourism (being one of MRC's priority sectors), and river related construction work (this breakdown is slightly different from the water resource dependent livelihoods at household level. Note that in this table crop farming is included as a water resources dependent activity as was done in SIMVA 2011).

The numbers inside the 'bubbles' are the percentages of responses from each Sub-zone, i.e., a number of 25% means that all the villages in the Sub-zone listed that particular livelihood as one of the four main livelihoods of the village (Please note that Sub-zone 4 B – Cambodia 3s only has 4 sample villages, which is why the percentage is 29%).

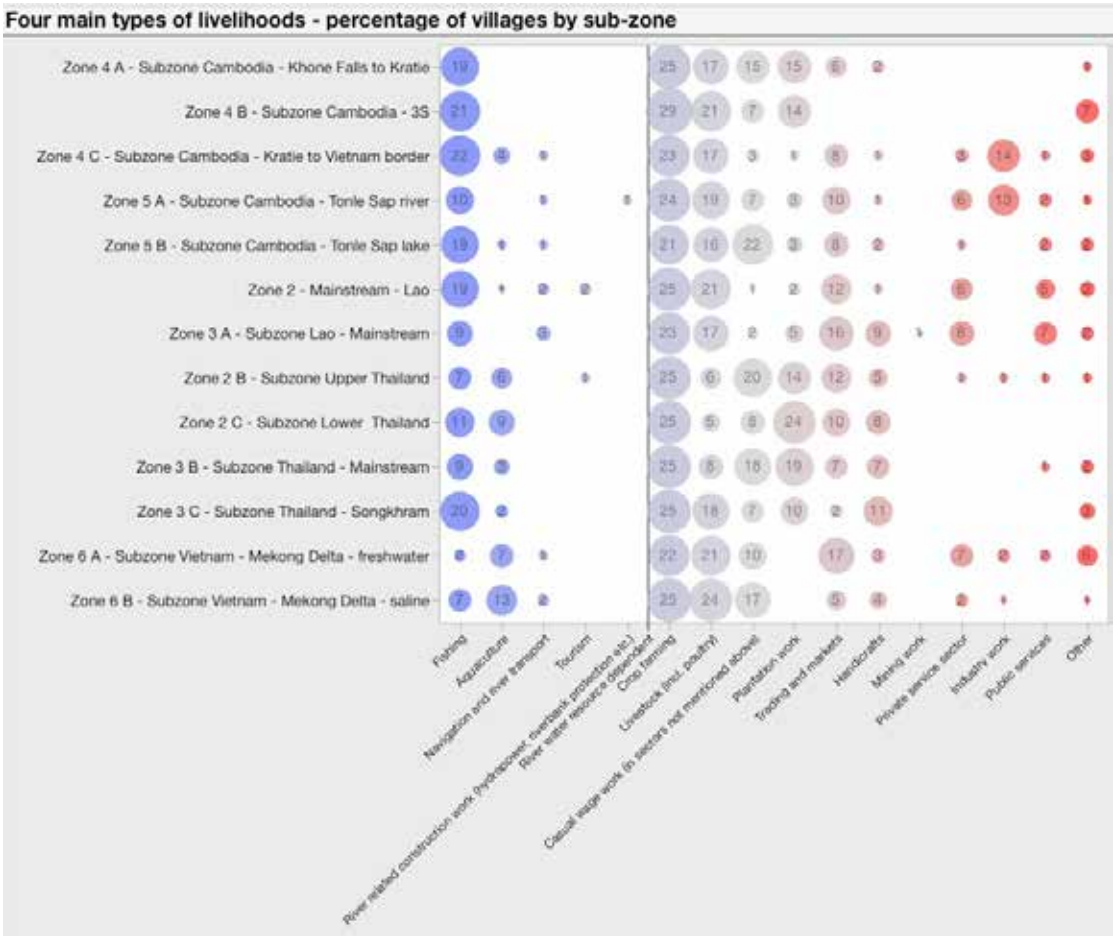
Of the river water dependent livelihoods, fishing is the most common across the LMB corridor, especially in Cambodia, in Sub-zone 3C Songkhram, and in Sub-zone 2 mainstream Lao PDR. This is an important finding since it differs so much from the household occupation data. It indicates that fishing is a very important livelihood activity, although household members do not consider it an occupation.

Aquaculture is one of the main livelihoods in many villages in Viet Nam and in Thailand. The other river water dependent livelihoods are much more specialized niches and are found in only a few villages here and there, which however does not mean they are not very important for those villages.

On the right side of the line in the graph, crop farming appears in almost all villages in the LMB as one of the main livelihoods. Livestock and poultry is also one of the most important livelihoods across the corridor, all in all reflecting the largely rural areas and the agricultural basis for livelihoods.

In Thailand, plantation work is an important livelihood in many villages, a relatively more market-oriented type of agriculture. However, there are signs that changes are happening in the Cambodian part of the corridor, with industry work being an important livelihood for people in more than half of the villages in Sub-zones 4C Kratie to the Viet Nam border and 5A along the Tonle Sap River.

Figure 7 Four main livelihoods – percentage of villages by Sub-zone – Village Profiles



3.2.2 Households' livelihood activities in the last 12 months

The sample households were asked about their livelihood activities in the last 12 months and which they considered most important, second most important and sometimes important. The livelihood activities in the last 12 months reflect closely the main and secondary occupations of the household members.

Table 5 shows the percentages of responses for most and second most important livelihood activity for the whole sample. The water resource dependent livelihood activities are marked with grey. Farming was clearly the most important activity at 68.5% of the households. For the water resource dependent livelihood activities, fishing was most important for 2.4% and second most important for 9%. Less than 2.2% of the sampled households found aquaculture, navigation, collecting OAPPs, and fish processing important livelihood activities.

Table 5 Livelihood activities in the last 12 months – whole sample

Livelihood activity last 12 months	Most important % HHs	Second most important % HHs
Farmer	68.5	8.5
Permanent employment (wage)	7.0	14.5
Business/trading/rental-lease income	5.6	8.1
Casual work	5.5	10.0
Livestock worker	4.3	30.2
Fishing	2.4	9.1
Self-employed	1.7	3.5
Construction work	1.6	3.3
Handicraft	1.1	3.6
Other	0.8	0.7
Aquaculture	0.8	2.2
House work	0.5	3.7
Navigation, river transport	0.2	0.2
Collecting OAA/Ps	0.1	1.3
Collect Non-Timber Forest Products	0.0	0.5
Tourism industry	0.0	0.3
Fish processing	0.0	0.2
Forestry	0.0	0.1
Sand mining from river	0.0	0.0

Water resource dependent livelihood activities marked grey

3.3 Water resource dependent livelihoods

This section presents an analysis of the data from the household survey, which was used to construct an index for the importance of livelihoods that are water resource dependent, specifically dependent on the river and other surface water resources.

3.3.1 Index of Importance of water resource dependent livelihoods in the previous 12 months

The survey collected information in two different dimensions: 1) proportion of households that consider the livelihood in question important, and 2) the importance each household assigns to the activity. To facilitate the analysis, the importance of each livelihood was assigned a value as follows: Most important = 5, Second most important = 3, and Sometimes important = 1. (Annex, Tables 7 and 8 show the full tables of results of analysis along these dimensions). Further, the livelihood activities were placed into 6 groups as shown in Table 6 below. The values for each livelihood

activity within each group were then summarized.

An index of livelihood importance was constructed by taking the mean importance values assigned by households in each Sub-zone, multiplied by the % of responses in each Sub-zone, then the result was multiplied by 100. The index captures both the number of households that have the particular livelihood activity and the importance the households assign to it.

Table 6 Grouping of livelihood activities used for importance index

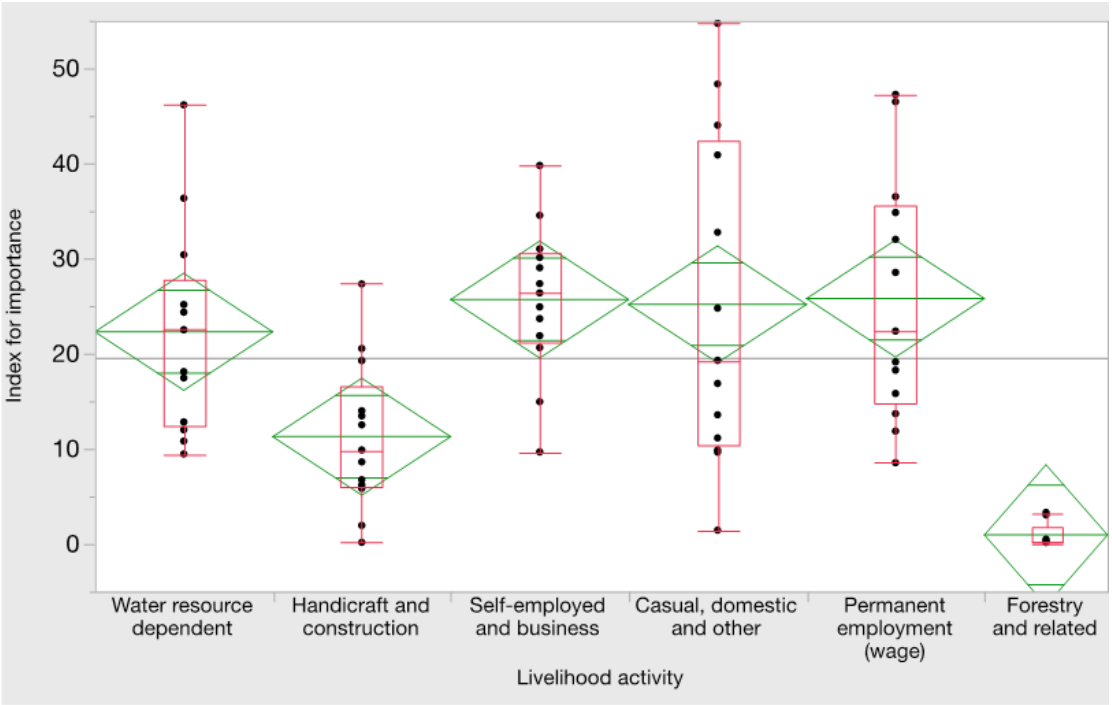
Livelihood activities grouped	Livelihood activity
Water resource dependent	Fishing
	Collecting OAA/Ps
	Aquaculture
	Fish processing
	Navigation and river transport
	Sand mining from river
Farming and livestock	Farmer
	Livestock worker
Self-employed and business	Tourism industry
	Business/trading/rental-lease income
	Self-employed
Forestry and related	Collect Non-Timber Forest Products
	Forestry
Casual, domestic work and other	Casual work
	House work
	Other
Handicraft and construction	Construction work
	Handicraft
Permanent employment (wage)	Permanent employment (wage)

The index of importance of livelihoods was analyzed by Sub-zone as shown in Table 7, Figures 8 and 9 (Annex, Table 7). The livelihood activity 'Farming and Livestock' was omitted, as it is by far the most important across all Sub-zones and would make it difficult to compare the other livelihood activities, especially to see the relative importance of water resources dependent livelihoods. For the water resource dependent livelihoods, the distribution of the index of importance values of across the LMB corridor shows a median of 22.5, which is on a par with permanent employment. Figure 8 shows the same results as in Table 7 in a graphical presentation.

Table 7 Selected percentiles of Index of Importance of livelihood activity value by livelihood activity group – whole sample

Level	Minimum	10%	25%	Median	75%	90%	Maximum
Water resource dependent	9.4	10.0	12.4	22.5	27.8	42.2	46.1
Handicraft and construction	0.1	0.9	6.0	9.9	16.6	24.6	27.3
Self-employed and business	9.7	11.8	21.2	26.4	30.5	37.7	39.8
Casual, domestic and other	1.4	4.7	10.5	19.3	42.4	52.2	54.7
Permanent employment (wage)	8.5	9.8	14.7	22.4	35.7	46.9	47.2
Forestry and related	0.0	0.0	0.2	0.3	1.8	3.3	3.3

Figure 8 One-Way analysis of Index of Importance for livelihood activities - whole sample



Please refer to Annex C for guidance on reading the One-way analysis in Figure 8.

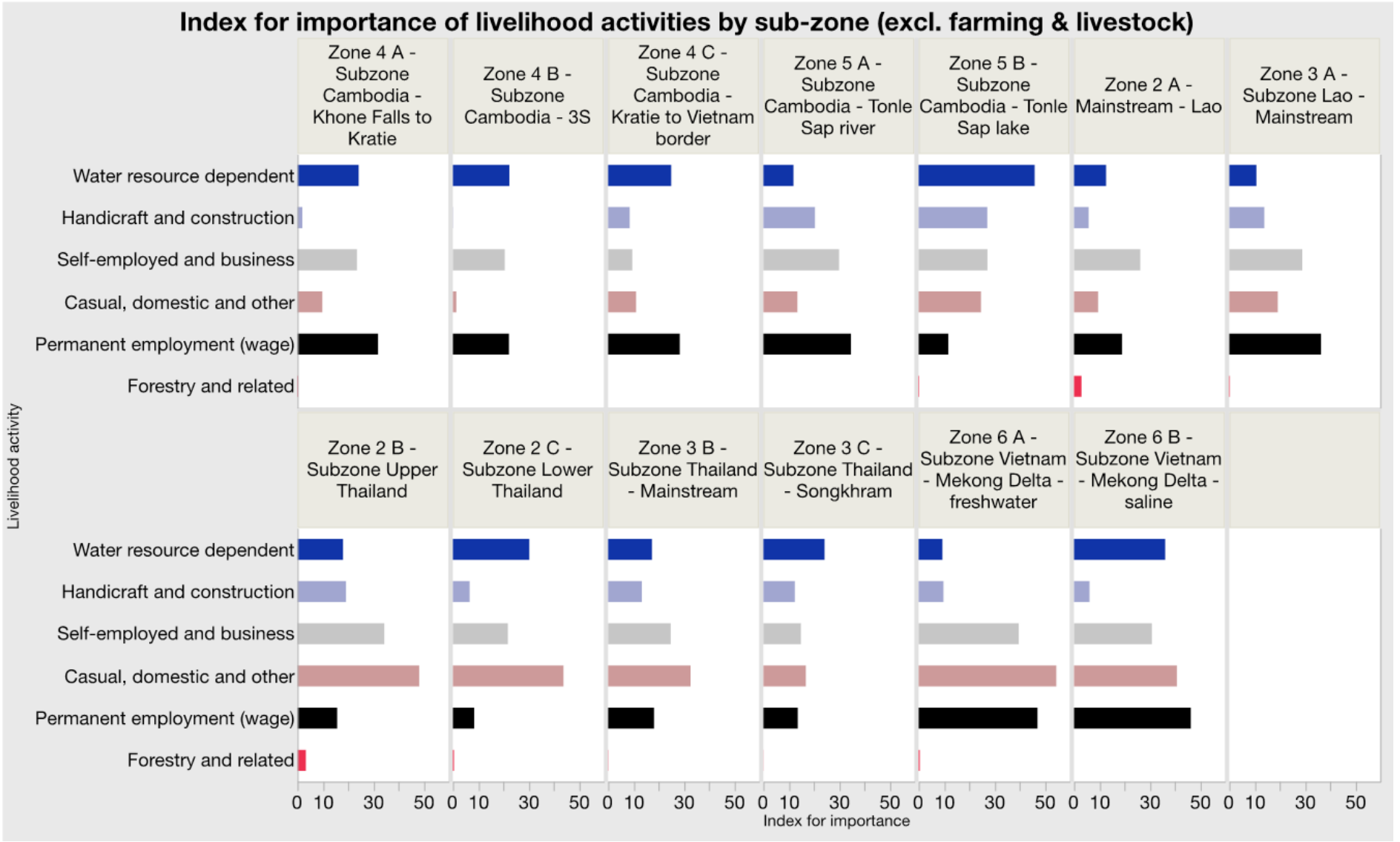
Since the index is based on grouped values, the analysis does not find a statistically significant difference between the Sub-zones in terms of the distribution of values across different livelihood activities (more detailed analysis, which can be carried out at a later stage, may find statistical significant differences).

However, water resources dependent livelihoods are very important in some Sub-zones, notably in Sub-zone 5B Cambodia Tonle Sap Lake, and in Sub-zone 3C Thailand-Songkhram, both of which are characterized by extensive floodplains and wetlands.

The index shows that in most Sub-zones, water resources dependent livelihoods is one of the three most important livelihoods in combination with various other livelihoods; for example, with permanent employment in the saline zone in Viet Nam and in most zones in Cambodia, and with casual and domestic work in Thailand.

Figure 9 shows the values for the index of importance of livelihood activities by Sub-zone.

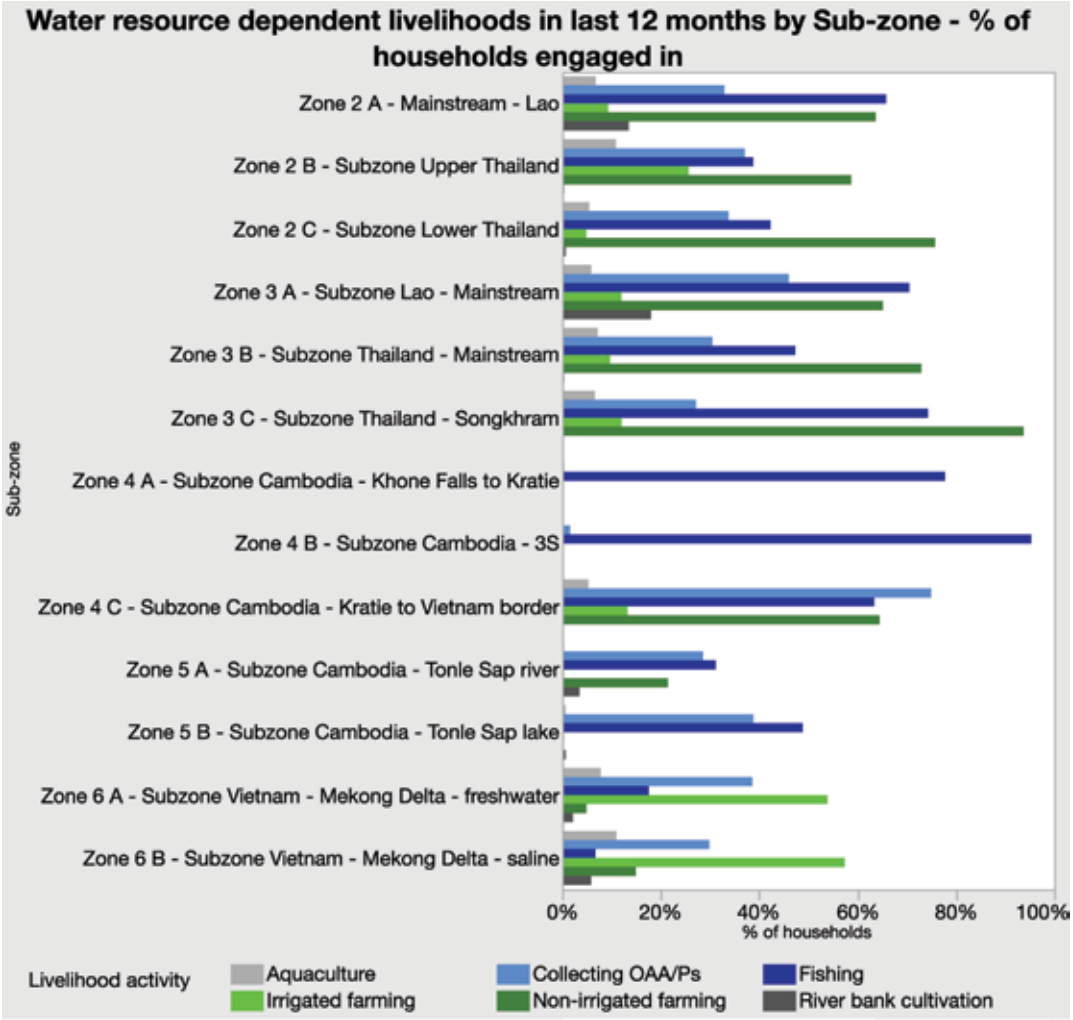
Figure 9 Index for importance of livelihood activities by Sub-zone (excl. farming & livestock) – whole sample



3.3.2 Involvement in water resource dependent activities in the last 12 months

The survey collected data on the livelihood activities of household members in the 12 months before the interview. This question distinguished between irrigated and non-irrigated farming with a view to provide more detail with regard to involvement in water resource dependent activities. The results overall confirmed the findings on the most, second most and sometimes important livelihood activities discussed in the previous section (Figure 10, Annex, Table 9, 10).

Figure 10 Water resource dependent livelihood activities previous 12 months - % households engaged in



It is notable that these data show a somewhat different picture compared to the main and secondary occupations and the index of importance of occupations. For example, the percentage of households that have been involved in fishing in the last 12 months is very high in several Sub-zones: 4B 3S, 4A Khone Falls to Kratie, 4C Kratie to Viet Nam border in Cambodia, 3C Songkhram in Thailand, and both Sub-zones in Lao PDR.

3.3.3 Involvement in fishing activities in the last 12 months

This section presents more detail on the findings with regard to fishing activities. Overall, half of the sampled households had a household member who had been fishing in the previous 12 months (Table 8). In Lao PDR, as many as 69% of the households had been engaged in fishing, a figure that compares with the latest Agricultural Census

of Lao PDR in 2010/11, which showed that 51% of all farm households in the country engaged in fishing at various levels, mostly as a part-time activity. Also, the SIMVA results from Cambodia showed that 57.6% of the households engaged in fishing, which compares with the Cambodia Agricultural Statistics, 2012, on involvement in fishing, which showed 55% of the households in the country involved in fishing activities[5].

Table 8 Fishing - HHs with a member having fished in last 12 months

		HHs with a member having fished in the last 12 months
Country	**Sub-zone**	**% of Sub-zone sample**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	78.13%
	Zone 4 B - Subzone Cambodia - 3S	96.88%
	Zone 4 C - Subzone Cambodia - Kratie to Viet Nam border	63.54%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	32.95%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	49.72%
	All	***57.60%***
Lao PDR	Zone 2 A - Mainstream – Lao	67.05%
	Zone 3 A - Subzone Lao – Mainstream	71.31%
	All	***69.18%***
Thailand	Zone 2 B - Subzone Upper Thailand	49.57%
	Zone 2 C - Subzone Lower Thailand	55.59%
	Zone 3 B - Subzone Thailand – Mainstream	55.52%
	Zone 3 C - Subzone Thailand – Songkhram	77.08%
	All	***59.44%***

5 Development Trends in the Lower Mekong Basin, Report on development trends in LMB countries for use in the formulation and assessment of long-term exploratory scenarios, Social Trends, BDP, MRC August 2014.

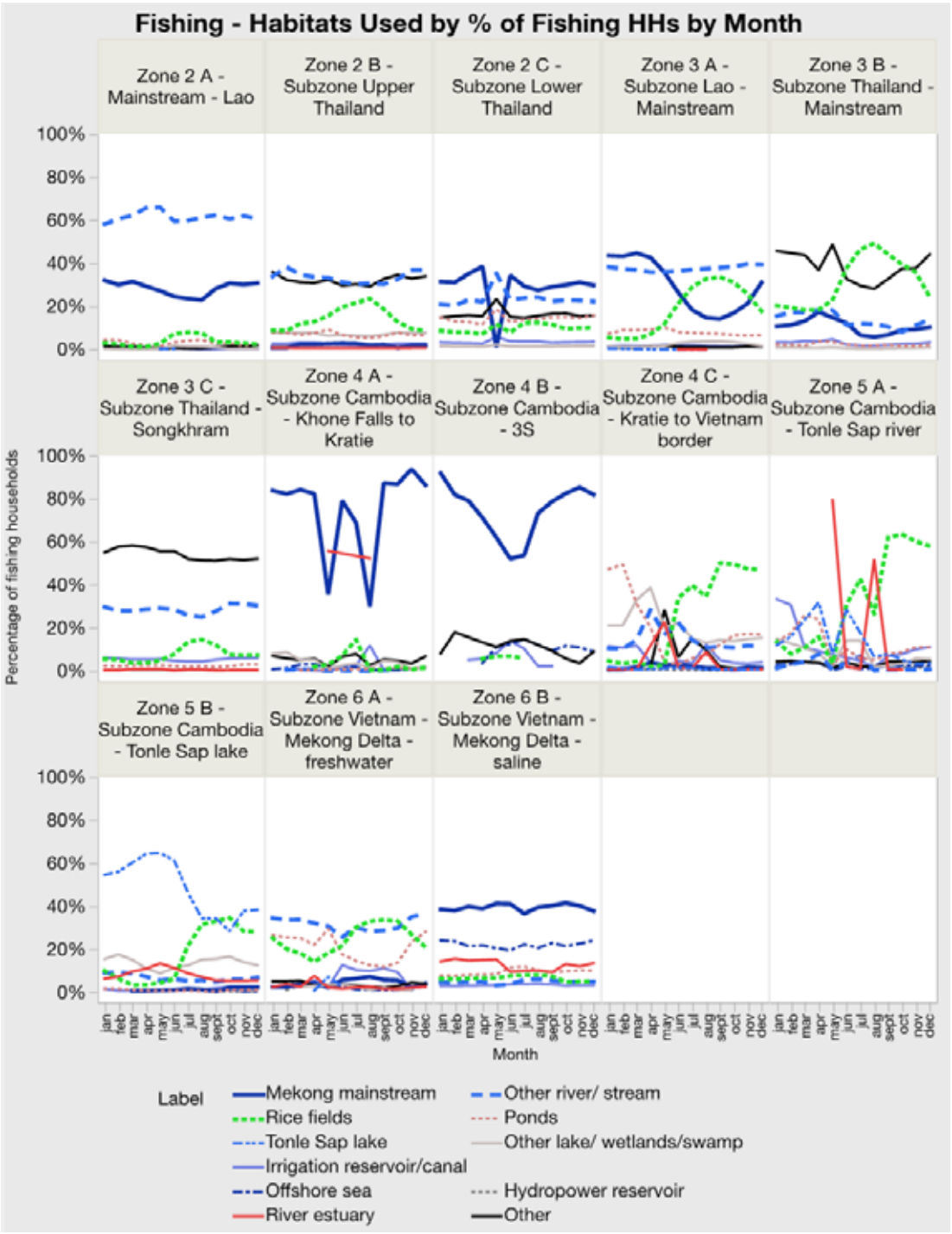
Table 8 Fishing - HHs with a member having fished in last 12 months

		HHs with a member having fished in the last 12 months
Country	**Sub-zone**	**% of Sub-zone sample**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	78.13%
	Zone 4 B - Subzone Cambodia - 3S	96.88%
	Zone 4 C - Subzone Cambodia - Kratie to Viet Nam border	63.54%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	32.95%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	49.72%
	All	***57.60%***
Lao PDR	Zone 2 A - Mainstream – Lao	67.05%
	Zone 3 A - Subzone Lao – Mainstream	71.31%
	All	***69.18%***
Thailand	Zone 2 B - Subzone Upper Thailand	49.57%
	Zone 2 C - Subzone Lower Thailand	55.59%
	Zone 3 B - Subzone Thailand – Mainstream	55.52%
	Zone 3 C - Subzone Thailand – Songkhram	77.08%
	All	***59.44%***
Viet Nam	Zone 6 A - Subzone Viet Nam - Mekong Delta - freshwater	19.18%
	Zone 6 B - Subzone Viet Nam - Mekong Delta – saline	7.81%
	All	***13.49%***
All	**All**	**49.90%**

3.3.4 Fishing in different habitats over the year

This section presents analysis of the number of fishing households that had members who fished in different habitats over the year in each of the Sub-zones. These data can be considered indications of overall fishing effort in the various habitats in each Sub-zone (the Village Profiles contain data on the amount of fishing gear in each village; however, these are not included in the present report). Figure 11 shows the percentage of households that had members who fished in the different habitats over the year. The Sub-zones are shown arranged from North to South.

Figure 11 Fishing habitats used by percentage of sampled households over the year



In Lao PDR, Sub-zone 2A, along the northern part of the Mekong mainstream, and other rivers and streams, are by far the most fished habitats, while the Mekong mainstream is the second-most important habitat. Fewer households fish in rice fields and ponds during the peak of the wet season from June to September. A similar pattern can be seen in Sub-zone 2B Upper Thailand; however, there is less fishing in other streams and rivers, but more fishing in rice fields. In Thailand, the Mekong mainstream is the most important habitat in Sub-zone 2C Lower Thailand.

In Lao PDR Sub-zone 3A, along the Mekong mainstream from Vientiane to Khone Falls, the different seasonal habitats are clearly observable, with the Mekong mainstream the most fished from January to April (and continuing but on a lower scale), while other rivers and streams are the most fished habitats from April to December. Rice fields are important fishing habitats from June to October, more so than the Mekong mainstream, but a little less than other rivers and streams, during that period. In most Sub-zones in Thailand 'other' habitats are most important throughout the year, except for rice fields, which are most important between June and November in Sub-zone 3 B along the Mekong mainstream. In Thailand Sub-zone 3C Songkhram, other rivers and streams is the second most important fishing habitat.

In Cambodia Sub-zone 4A Khone Falls to Kratie, the Mekong mainstream is almost the only fished habitat throughout the year, with the fishing season peaking from March to July. It is similar in Sub-zone 3S. In Sub-zone 4C Kratie to Viet Nam Border, covering the large floodplains, rice fields are the most common habitat fished from June to December, while ponds are fished from January to March. Along the Tonle Sap River, there is intensive fishing in river estuaries, probably using barrages, in May and again in August. Around Tonle Sap Lake, fishing is mostly in the lake itself throughout the year, with rice fields also an important habitat from July to December.

In Viet Nam, in Sub-zone 6A, the freshwater zone, other rivers and streams and rice fields are the most important fishing habitats, both with a peak season from July to November. Ponds are fished throughout the year, with a small peak in April-May. Irrigation reservoirs and canals are fished from June to October. In the saline zone, Sub-zone 6B, the Mekong mainstream is the most important fishing habitat throughout the year, with offshore marine fishing second. The river estuary is also a noteworthy fishing habitat from January to May.

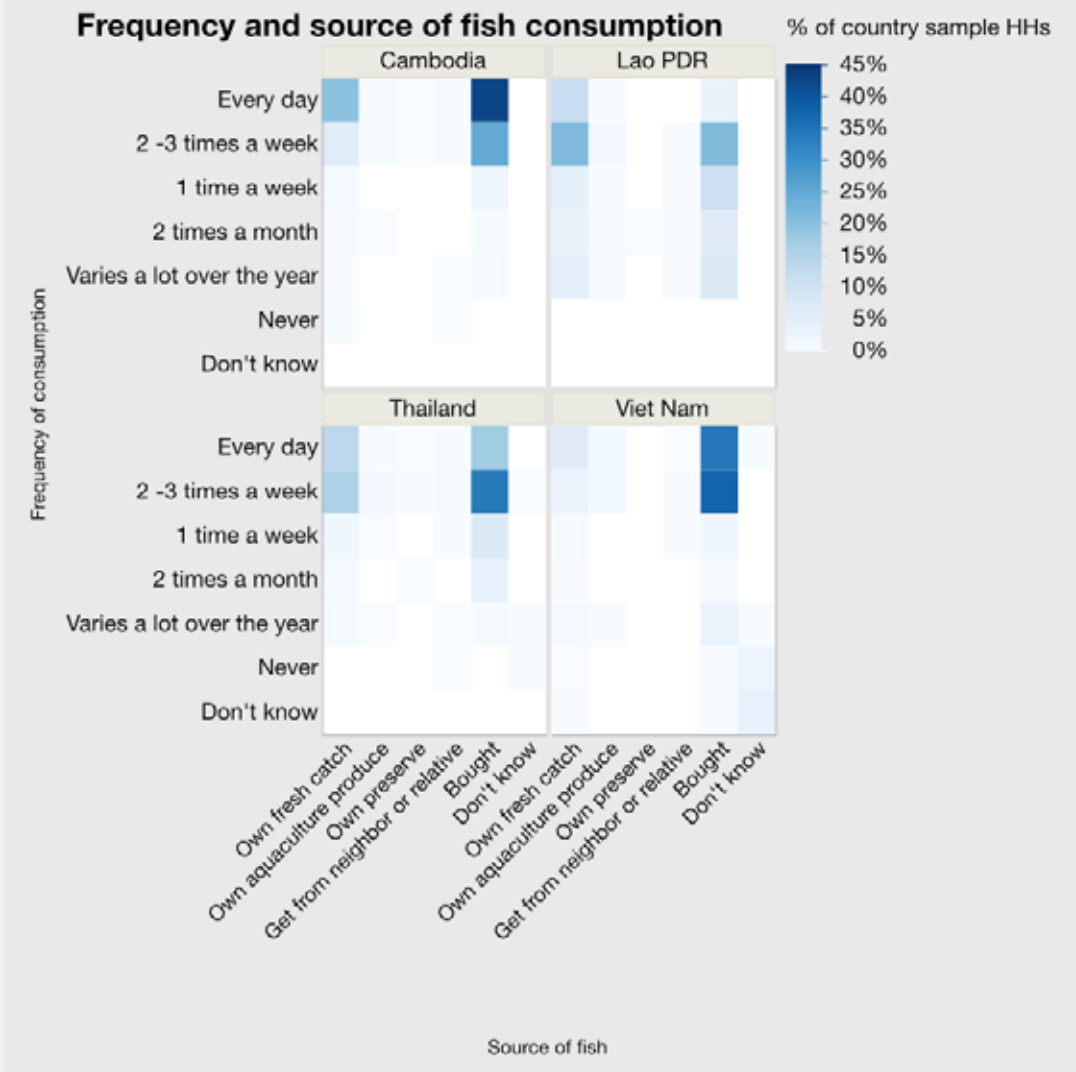
Overall, the data on fishing habitats reflect the complexity of inland fisheries in the LMB corridor and does not point to a simple overall conclusion. However, it can be observed that other rivers and streams, i.e., tributaries and rice fields, were very important habitats in addition to the Mekong mainstream. In the majority of Sub-zones, most fishing occurred in one to three habitats, with seasonal variation in intensity of fishing. Seasonal variation in the fished habitats was especially notable in the geographical stretches of the LMB corridor characterized by the river pulse floodplain eco-systems, i.e. from Sub-zone 2C Lower Thailand and down to Sub-zone 4C Kratie to Viet Nam border. Fisheries in these Sub-zones are therefore likely to be more vulnerable to changes in the hydrological regime caused by water resources developments.

The data will feed into the specialized monitoring and research on inland fisheries carried out by MRC. In terms of inputs to MRC policy, the data confirms and substantiates the widespread utilization of natural fish resources. By providing Sub-zone specific information on utilization of fishing habitats, the data are important inputs to further work on modelling the impacts on inland fisheries from water resource development activities such as hydropower dams.

3.4 Disposal of fish catches, buying and consumption of fish

The half of all the sampled households that reported being engaged in fishing also reported how they disposed of the catches (using a multiple-choice survey) (Annex, Table 11). The picture is quite similar in all the Sub-zones and countries: around 50-55% of catches were freshly cooked and eaten in the family. Overall, 19% of respondents reported processing the fish to eat later. Selling of catches occurred mostly in Cambodia, where 23% of respondents sold part of their catch, while only 14% of respondents in Thailand did so. Processing for sale and other methods of disposal was very rare. Fish is an extremely common food in the LMB corridor. The frequency of fish consumption and the source of fish is shown in Figure 12 below (Annex, Table 12).

Figure 12 Frequency of households' fish consumption and source of fish



In Cambodia, 63% of the sampled households served fish every day. In Viet Nam the figure was 42.5%, in Thailand 32%, and in Lao PDR 16%. Fish was served two to three times a week in 52% of the sampled households in Thailand, 45% in Lao PDR, 42% in Viet Nam and 32% in Cambodia.

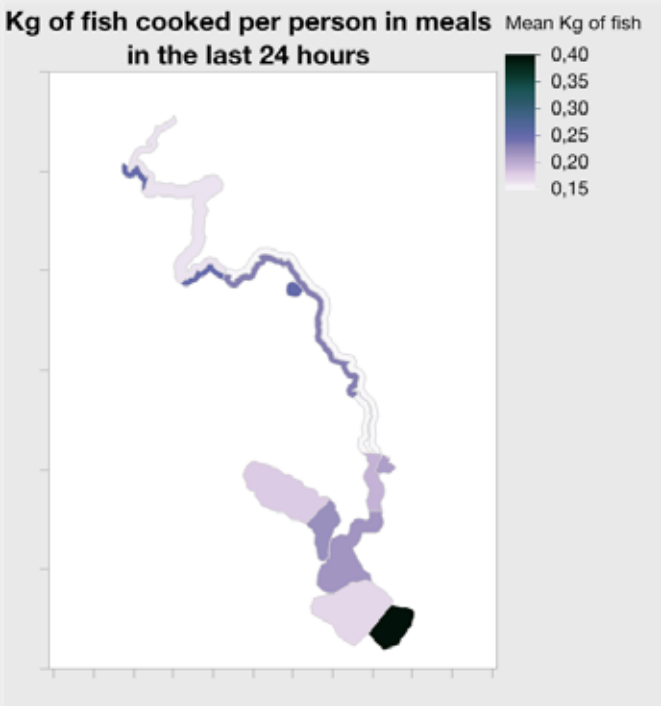
The main sources of fish were bought fish, accounting overall for 65.5% of the fish consumed, and own fresh catches accounting for 29.5% of the fish consumed by the

sampled households. Notably, in Lao PDR, 47% of the fish was from own catches, while in Thailand it was 33%, in Cambodia 28% and in Viet Nam only 11%. Fish from own aquaculture accounted for 2.2% of fish consumed overall.

The survey also covered fish consumption through a question on whether a household had a meal with fish in the previous 24 hours before the interview. Of the whole sample, as many as 75% of households had a meal with fish (Annex, Table 13). Most households, 60%, consumed fish that was bought, while in 31% of households the fish was from their own catch.

Amount of fish consumed

Map 5 Fish consumption – Kg fish cooked per person in meals in the 24 hours before the interview



In the sampled households in Cambodia, Lao PDR and Viet Nam, the mean total amount of fish cooked in the most recent meal that included fish was 0.71 Kg (in Thailand this question was for Kg of fish cooked per person). The mean amount of fish cooked in the meals in the 24 hours before the interview was 0.23 Kg per person (Annex, Table 14, Map 5) for the whole sample. The amount was lowest in Lao PDR at 0.15 Kg, in Cambodia 0.2 Kg, in Thailand 0.25 Kg, and highest in Viet Nam at 0.29 Kg per person. In Viet Nam's Sub-zone 6B saline, the amount was highest at 0.41 Kg per person.

Though it is beyond the scope of the present report to give a detailed comparison with other studies of fish consumption and analyse SIMVA findings in those contexts, one example is provided in the next paragraph.

In Cambodia, a food and nutrition study from 2012[6] found that consumption of fish and other aquatic animals on average was 0.17 Kg per person per day. Of these, inland fish were 0.11 Kg and other aquatic animals 0.01 Kg, while marine fish was 0.04 Kg. Other marine aquatic animals and fish from aquaculture accounted for 0.003 Kg each. In total, consumption of fish and other aquatic animals amounted to 63 kg per person per year. Altogether, fish and aquatic resources accounted for almost one-fifth of the

6 Food and Nutrition Security Vulnerability to Mainstream Hydropower Dam Development in Cambodia. Inland Fisheries Research And Development Institute (IFREDI), Fisheries Administration, Ministry of Agriculture, Forestry and Fisheries, December 2012

total food intake (rice, fish, vegetables, and meat combined). The study found that the highest consumption of inland fish and OAAs was in the Tonle Sap zone at 147.9 grams/person/day, while the lowest was in Mountain and Plateaus at 89.4 grams per capita per day. In the Plains zone it was 134.6 grams per capita per day.

Overall, the SIMVA and the above study data compares well if it is assumed that the SIMVA sample population in Cambodia on average consumed fish every second day. The study used 24-hour food recall interviews in 1,200 households randomly selected in five main ecological zones in the country. Though that methodology is comparable with SIMVA with respect to recall period, to compare the data directly will require more detailed analysis of the SIMVA data than is possible in the present context. SIMVA's consistently applied methodology for collecting fish consumption data across the whole LMB corridor has produced an important data set that can be used for reviewing and updating earlier studies of fish consumption in the LMB[7].

Buying of fish for consumption

How often households buy fish is a good indicator of the importance of fish as a food commodity. Overall, 23% of the sampled households bought fish every day, while 36% did so two to three times a week (Annex, Table 15).

The highest proportion of households that bought fish every day are in Cambodia at 47% of the sample, followed by Viet Nam at 31%. In Lao PDR only 2% of the sample households bought fish every day, and in Thailand only 10%. However, in Lao PDR, 48% bought fish at least once per week, and of those 26% two to three times a week. Also, in Thailand the proportion of households buying fish several times per week was high at 41%.

Overall, the SIMVA 2014 data supports the findings from SIMVA 2011 and other studies, including food security studies,[8] that fish is a very important food element for households in the LMB. Further, the amounts of fish that are bought indicate that fish is also an important food commodity.

3.5 Involvement in collection of Other Aquatic Animals and Plants (OAA/Ps) in the last 12 months

Collection of OAA/Ps is an important element in the majority of households' livelihood activities. 61% of the sampled households had a member who had collected OAA/Ps in the previous 12 month (Table 9, Annex Table 10). This is 11 percentage points more than households with members who had been fishing in the last 12 months.

In Cambodia, collection of OAA/Ps is extremely common, with 70% of the sampled households involved in this activity, and with as high a proportion as 94% of the sampled households in Sub-zone 3S, and 82% in the Sub-zone Kratie to Viet Nam border.

7 Hortle KG (2007) Consumption and the yield of fish and other aquatic animals from the lower Mekong basin. MRC Technical Paper 16: 1-88.

8 In addition to the studies referred to above, please refer to Annex References.

In Lao PDR, 67% of the sampled households were engaged in collection of OAA/Ps, while the percentages were a bit lower in Thailand and Viet Nam at 58% and 47% of the sample households, respectively.

Table 9 Collection of OAA/Ps - HHs with a member having collected in the previous 12 months

		HHs with a member having collected OAA/Ps in the previous 12 months
Country	**Sub-Zone**	**% of sample HHs**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	78.98%
	Zone 4 B - Subzone Cambodia - 3S	93.75%
	Zone 4 C - Subzone Cambodia - Kratie to Viet Nam border	81.94%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	52.56%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	64.77%
	All	***70.10%***
Lao PDR	Zone 2 A - Mainstream – Lao	62.22%
	Zone 3 A - Subzone Lao – Mainstream	71.73%
	All	***66.97%***
Thailand	Zone 2 B - Subzone Upper Thailand	53.58%
	Zone 2 C - Subzone Lower Thailand	64.47%
	Zone 3 B - Subzone Thailand – Mainstream	56.41%
	Zone 3 C - Subzone Thailand – Songkhram	58.91%
	All	***58.34%***
Viet Nam	Zone 6 A - Subzone Viet Nam - Mekong Delta – freshwater	46.59%
	Zone 6 B - Subzone Viet Nam - Mekong Delta – saline	46.88%
	All	***46.73%***
All	**All**	**60.54%**

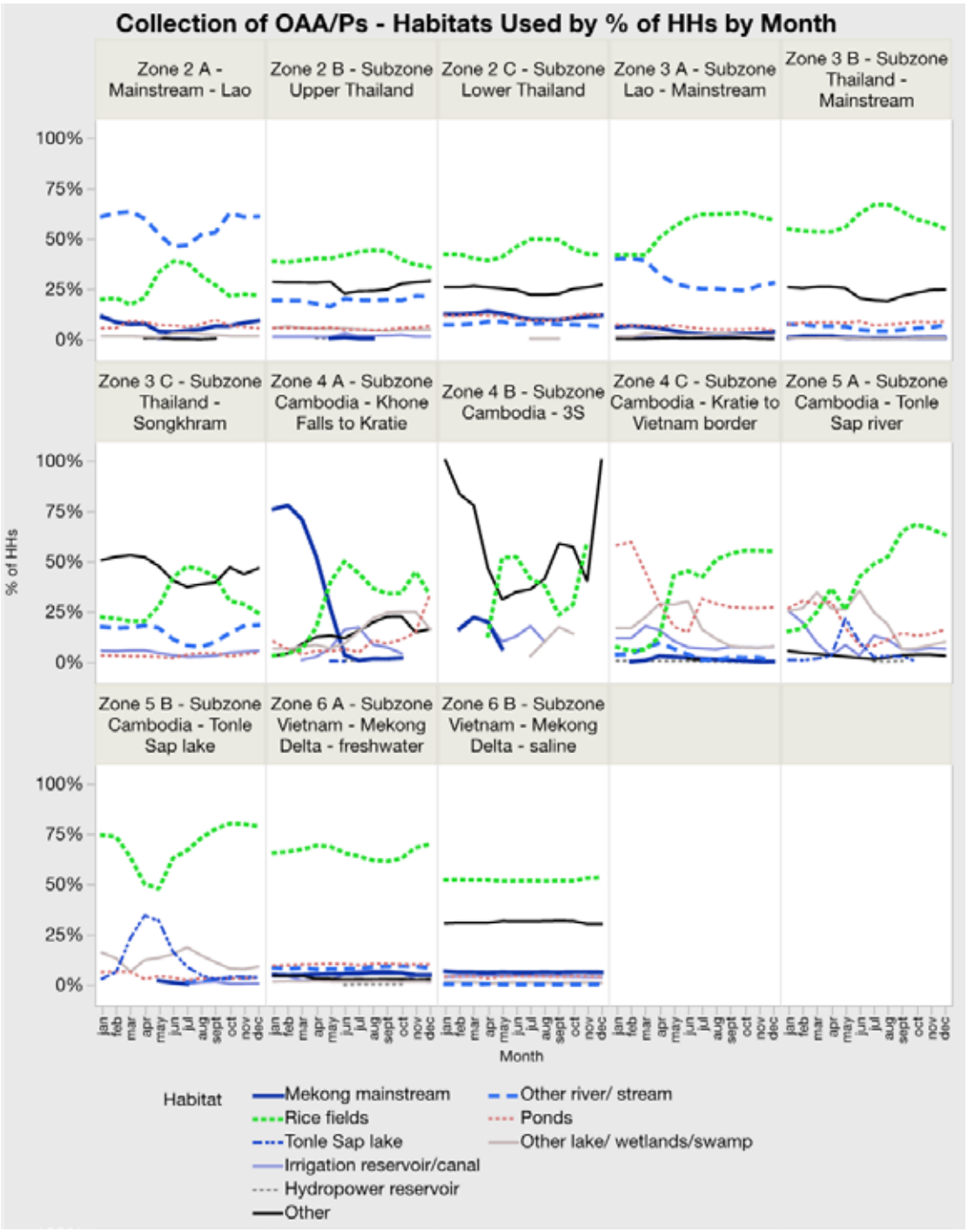
3.5.1 Collection of OAA/Ps in different habitats over the year

Across the LMB corridor, OAA/Ps are mostly collected in rice fields and takes place throughout the year in most Sub-zones. As such, rice fields are essential sources of OAA/Ps. However, there is some variation between the Sub-zones in the overall importance of different habitats and in the intensity of collection in different seasons.

For example, in Sub-zone 2A Mainstream Lao in the North of Lao PDR, other rivers and streams are the most important habitat for collection of OAA/Ps; and in Sub-zone 4A Khone Falls to Kratie in Cambodia, the Mekong mainstream is the most important habitat during the dry season. In Sub-zone 2A Mainstream Lao, and 3C Songkhram in Thailand, collection in rice fields peaks during the monsoon season and immediately after. The Sub-zones in Cambodia have the largest seasonal variation in habitats for collection, reflecting the impacts of the flooding cycle on the river plains. In Viet Nam, collection in rice fields takes place at an almost constant level all year round. Figure

13 shows the percentage of households that collect OAA/Ps in different habitats over the year.

Figure 13 Collection of OAA/Ps – habitats used over the year



3.6 Disposal of OAA/Ps collected, buying and consumption of OAA/Ps

The OAA/Ps collected are mostly cooked fresh for own consumption: 77% of the households dispose of the collection in this way (Annex, Table 16). This picture is similar across all the Sub-zones; in Cambodia, Sub-zone 4A Khone Falls to Kratie and 3S as many as 95-96% of the OAA/P collecting households cook and eat it in the family. 8% of the households reported that they process the OAA/Ps to eat later, and 7% of the households reported that they sell it. 6% of the sampled households also share what they have collected with neighbours.

Consumption of OAA/Ps last 24 hours and source of OAA/Ps

Other Aquatic Animals and Plants are important elements of the daily diet in the LMB corridor. As much as 41% of the sampled households had a meal with OAA/Ps in the 24 hours before the survey interview (Annex, Table 18). The difference between the Sub-zones is statistically significant with probability > F at 0.001 and Rsquare adjusted at 0.1472.

The highest proportion of households that had a meal with OAA/Ps in the 24 hours before the interview was in Viet Nam at 68% of the sample, and the lowest in Thailand at 27%. In Cambodia, Lao PDR and Thailand, most households – between 63% and 70% - got the OAA/Ps from their own fresh collection. However, in Viet Nam almost half of the households consumed OAA/Ps that were bought, or they did not know the source. Because of this, the total for the sample is 32% of the households consumed OAA/Ps collected by themselves, while 40% consumed OAA/Ps that had been bought.

In the latest meal that had included OAA/Ps, households on average cooked 0.33 Kg OAA/Ps per person, comprising 0.18 Kg of aquatic animals and 0.15 Kg of aquatic plants (Annex, Table 17). The difference between the Sub-zones, though not large, is statistically significant ranging from a high of 0.52 Kg total OAA/Ps in Sub-zone 4C Kratie to Viet Nam Border down to 0.24 Kg total in Sub-zone 3A Lao Mainstream.

In summary, the survey results clearly demonstrate that OAA/Ps are important elements in the rice-fish farming systems[9] in the LMB corridor and an important source of food for the households in the LMB corridor (refer to studies mentioned above in footnotes to Section 3.4, and Annex References).

3.7 Water sources for agriculture

MRC data on the sources of water for crop cultivation are of great interest, providing a basis for calculations of water extraction, and, in a water resources development context, indicating the need for irrigation. The survey included a multiple-choice question about households' most important crops and which sources they use for watering them. As discussed above, crop farming is the most common main livelihood with 79% of the sampled households having cultivated crops in the 12 months before the survey (Annex, Table 19).

Rain-fed agriculture is the most common main water source with 54% of the respondents across the survey area using this (Annex, Table 20).

Irrigation from the Mekong is the main water source for 12% of the respondents and for 10% it is pumped water from the Mekong. Thus, Mekong water is the most

9 Scoping agriculture–wetland interactions: Towards a sustainable multiple-response strategy. FAO, 2008, Chapter 8: Integrated rice and fish culture/capture in the lower Songkhram River basin, northeast Thailand.

important water source for the main crops for 22% of the respondents. However, almost all irrigation with Mekong water is done in the Mekong Delta in Viet Nam, with 64% of the households in the Sub-zone 6A freshwater and 40% in Sub-zone 6B saline. Irrigation from the Mekong is used on a very limited scale in Cambodia, Lao PDR and Thailand at around 1-2% of the sampled households.

The survey results on drought indicate that development of irrigation potential in the LMB corridor in Cambodia, Lao PDR and in Thailand is a very relevant undertaking.

3.7.1 Riverbank cultivation

Riverbank and island gardens and fields are important agricultural areas and they are very vulnerable to flooding and soil erosion.

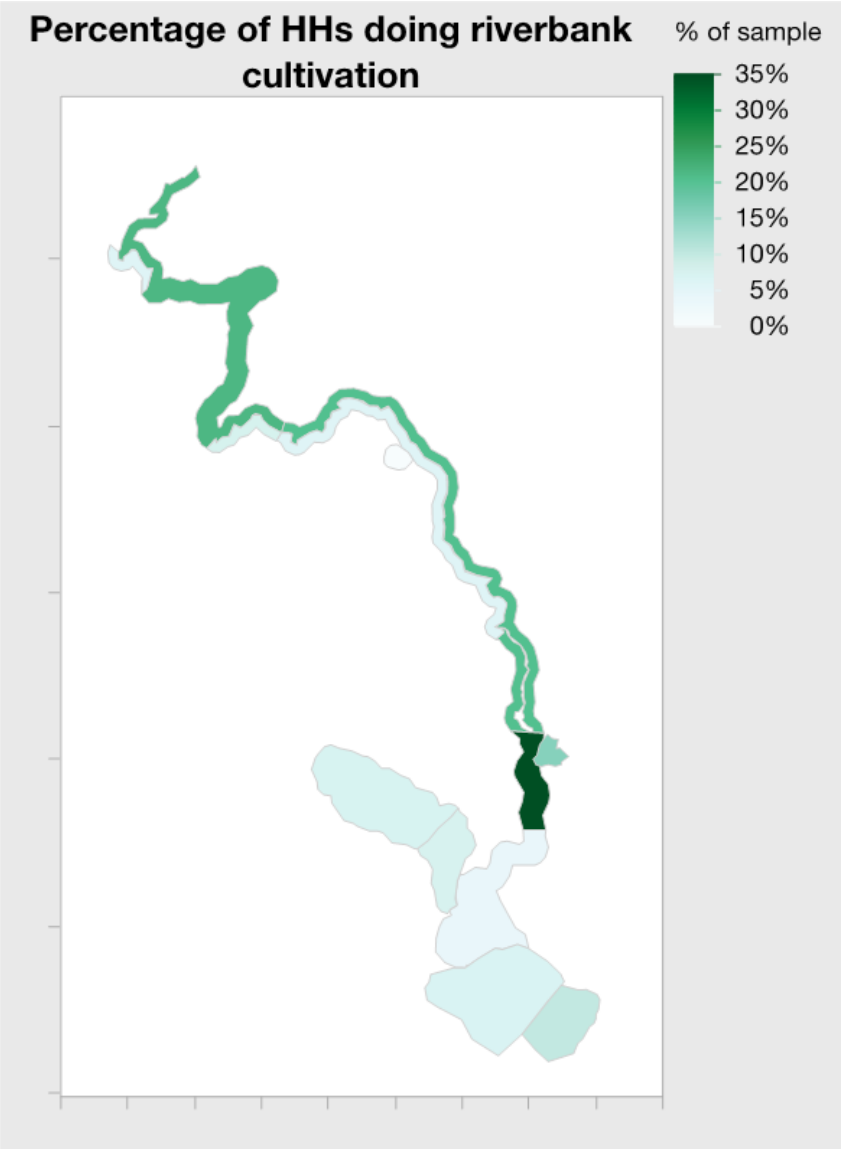
12% of the sampled households had cultivated in these areas in the previous 12 months (Map 6, Annex, Table 21). In Sub-zone 4A Khone Falls to Kratie, as many as 36% of the sampled households, and 21% in both Sub-zones in Lao PDR, had cultivated on the riverbanks.

The average area of riverbank gardens and fields was 0.38 ha. for the whole LMB corridor, and slightly higher in Viet Nam at 0.42 ha. The largest areas were in Cambodia Sub-zone 4B 3S at 1 Ha. on average, followed by Thailand Sub-zone 2B Upper at 0.56 ha. In several Sub-zones, the average area was between 0.46 and 0.49 ha.: in 4C Kratie to Viet Nam Border, 5A Tonle Sap River, 2C Lower Thailand, and 6B Saline in Viet Nam. The importance of riverbank gardens and fields for the LMB households' economies and subsistence is indicated by the percentage of riverbank produce that was sold. On average, in the LMB corridor the households with riverbank gardens and fields sold 54% of the produce. The highest percentage of produce sold was in Viet Nam at 78%, followed by Cambodia at 69%, Lao PDR at 39%, and Thailand 36%.

The data indicates that in Viet Nam and Cambodia riverbank gardens and fields mostly contribute to household income through selling of produce, while in Lao PDR and Thailand they contribute to household food to a higher degree.

In terms of inputs to MRC policy, the findings on the relative importance of the productive riverbanks and islands, point to a need for further data collection and analysis to be able to assess their economic value.

Map 6 Percentage of households doing riverbank cultivation



3.8 Drinking water sources

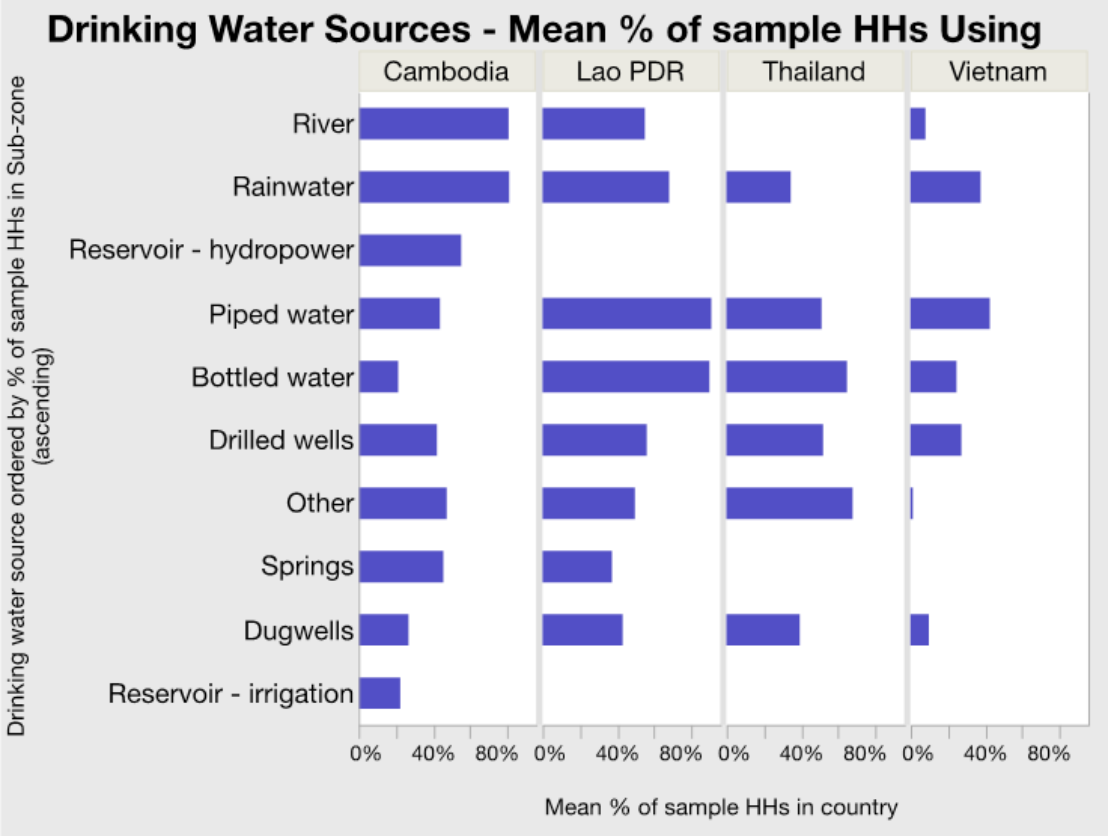
The survey captured village level data regarding the use of different drinking water sources for the households in the village. It is most often the case that several different drinking water sources are used in the same village and in the same household.

River water used for drinking water is most frequently found in Cambodia, with a mean percentage of 82% of village households using this as a source, and secondly in Lao PDR with a mean percentage of 55%. It is notable that bottled water is a very common drinking water source in Lao PDR and Thailand. Though it is known that piped water, which is common in Lao PDR, is from rivers in some cases, the survey did not obtain data on the source of piped water supply. Figure 14 below shows the mean percentage of village households in the sampled villages that use different drinking water sources.

In terms of inputs to MRC activities and policy, the finding that river water is extensively used for drinking water in Cambodia and Lao PDR points to the importance of water

quality monitoring. Further, an inventory of extraction of water from the Mekong for drinking water would be a worthwhile exercise that could more precisely identify critical spots where good water quality is most important.

Figure 14 Drinking water sources in villages



Source: Village Profile

4. Shocks

SIMVA 2014 data collection focused on the shocks to households and communities that come from floods and drought (being the main water related shock events). Floods are caused by excess water in certain places at certain times, droughts by lack of water in certain places at certain times. The aim of the survey was to provide information on the frequency and severity of such shocks to people in the LMB corridor. The survey included questions about occurrence and impacts of flooding and drought over the last three years (the same period of time applied in SIMVA 2011), and over the 12 months before the survey interview.

4.1 Flooding

Periodical flooding of low-lying areas near rivers is a common occurrence in most natural river systems. The Mekong River has some of the most extensive floodplains in the world, comprising large parts of Cambodia and the Mekong Delta in Viet Nam. The Songkhram River in Northeast Thailand has a large floodplain and on various sections of the mainstream natural flooding occurs every year.

As floodplains are increasingly appropriated as farmland, for human habitation, and for various infrastructure, the damages from flooding will increase unless measures are put in place to prevent this from happening. Further, changes in river flows due to human activity, such as deforestation, water regulation, hydropower and climate change create new situations where flooding becomes a risk to humans and assets.

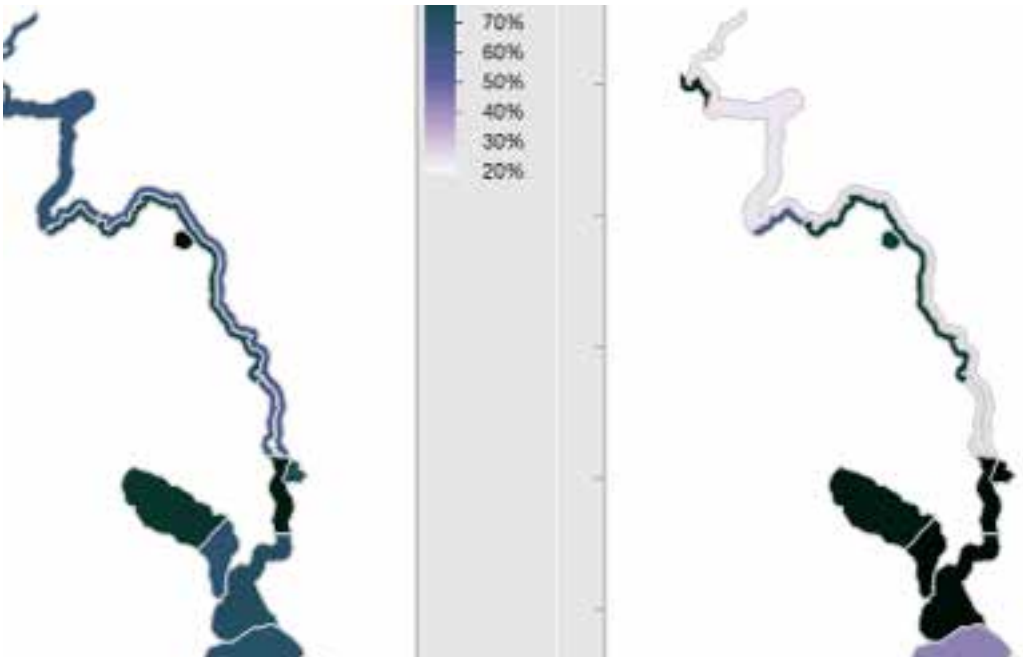
4.1.1 Flooding in the previous 3 years and loss of assets

As background information, the Annual Mekong Flood 2014 Report indicated that the rainfall amount for 2014 was at normal levels for the selected monitoring sites in the Basin. In addition, the flood season in 2014 was shorter and mostly drier.

The first data presented here are from the Village Profiles. Of the 352 sampled villages, 69% had flooding inside the village at some point of time in the past (Annex, Table 22). Country wise, Viet Nam had the lowest proportion at 47% and Thailand the highest at 86% of the sampled villages. In Cambodia, 81% and in Lao PDR 63% of the villages had experienced flooding at some point in the past. The highest percentage of these villages was in Sub-zone 3C Thailand in Songkhram with 100% of the sampled villages, and the lowest percentage was in the saline zone in the Mekong Delta where 23% had been flooded.

In the 3 years up to the survey, 54% of the villages that had experienced flooding at some point in time also experienced losses and damages; in Cambodia as many as 99% and in Thailand 79% of these villages lost assets. Comparatively, in Viet Nam 22% and in Lao PDR only 15% of these villages lost assets or experienced damages (Map 7, Annex Table 22).

Map 7 Percentage of villages that have been flooded at a point in the past, or experienced losses or damages due to flooding in the previous 3 years



The Village Profiles also reported on the percentage of village households that had experienced damages from flooding in the previous 3 years (please note this information is different from the household survey). 40% of the villages in the survey

area had households that experienced losses from flooding in the previous 3 years, with an average of 39% of the households in those villages being affected. In 77% of the villages in Cambodia, half of the households experienced damages; in Thailand 68% of villages with an average of 31% of households, and in Viet Nam 13% of the villages with an average of 32% of the households had losses or damages. In Lao PDR, only 1% of the villages reported households that had losses from flooding (Annex, Table 23).

The Household Survey found that 39% of all the sampled households experienced flooding in the previous three years, and 80% of those experienced damages or lost assets (Annex, Table 24). Not surprisingly most households that had been flooded were in Cambodia at 71% of the sampled households; the highest proportion being in Sub-zone 4A Khone Falls to Kratie at 88%. The lowest percentage of households that had been flooded in the previous 3 years was in Viet Nam at 16%, with only 5% of the sample in the saline zone in the Mekong Delta. In Lao PDR, 30% of the households had experienced flooding, with 32% in the Lower Mainstream Sub-zone. In Thailand, most flooding occurred in Sub-zone 3C Songkhram with 55% of households having experienced flooding, while in Thailand as a whole 40% of the sampled households had experienced flooding.

80% of households that had experienced flooding in the previous three years also lost assets or experienced damages: in Cambodia, Thailand and Viet Nam around 80% of households lost assets or experienced damages, in Lao PDR the figure was 71% of the sampled households.

All in all, the survey results on flooding events that occurred anytime in the past and especially in the last 3 years demonstrate clearly that flooding is a widespread, recurrent and serious problem affecting more than two-thirds, and in many areas more, of the communities, and 40% of the households in the LMB corridor. The problem is most serious in Cambodia and Thailand with two-thirds to three-quarters of sampled villages experiencing losses and damages from flooding, affecting 40% of the village households.

4.1.2 Flooding in the previous 12 months and loss of assets

At the village level, 33% of all sampled villages experienced flooding in the 12 months before the survey. 61% of the villages in Cambodia, 48% in Thailand, 14% in Viet Nam and 9% in Lao PDR experienced flooding. The area between Khone Falls and Kratie in Cambodia was severely affected with 91%, and Upper Thailand with 77% of these villages experiencing flooding in 2013-14 (Annex, Table 25).

At the household level, 30% of the whole sample experienced flooding in the previous 12 months, a result that matches well with the village level data. In Cambodia, 59% of the households experienced flooding in the previous 12 months. Flooding in Viet Nam, especially in the saline Sub-zone, was the least frequent of the four countries with only 11% of the households having experienced flooding. In Lao PDR and Thailand, the number of households that experienced flooding in the last 12 months was 22% and 27%, respectively.

Of the households that experienced flooding, 88% lost assets or experienced damages. The highest proportion was in Cambodia at 90%, and lowest in Thailand at 80%. In Viet Nam, though having the least number of households that experienced flooding, all reported that they lost assets or experienced damages. (Annex, Table 26).

The results suggest that action on flood protection measures and preventive measures are very relevant undertakings. For MRC, this would mean a continued focus and maybe enhanced activity with regard to flood protection and flood preventive measures.

4.1.3 Source of flooding in the previous 12 months and the duration of flooding

The source of flooding that occurred in the previous 12 months was mainly rivers that overflowed, reported by 45% of all sampled households (Annex, Table 27).

Thailand had the highest ratio of households that reported this source at 68%, with the highest in the Songkhram river area at 79%. In Cambodia, 46% of all households reported that rivers were the source of flooding, of these 72% of households in the 3S area, 56% in the areas Khone falls to Kratie and to the Viet Nam border reported the river as the flooding source. In Viet Nam, only 19% reported the river as the flooding source.

Rainwater that could not drain away was reported by 17% of all households; the ratio was highest in Thailand at 22% of all the sampled households, and of those, was highest in the Zone 3 B Mainstream Thailand at 31.5%.

Canals that overflowed as a source of flooding were only reported by 9% of all households, mostly in Lao PDR Zone 2A Mainstream. Overflowing lakes were reported by 12% of all households as the source of flooding, not surprisingly highest in Cambodia at 16% of the households, but maybe surprisingly only 9% of the households in the Sub-zone around Tonle Sap Lake reported that lake overflow was a source of flooding.

The average number of days of flooding experienced over the last 12 months was 26 days across the sample (Annex, Table 27, Map 8). The number of days was highest at 41 days in Viet Nam, the highest in the Zone 6A Freshwater with 45 days of flooding, and in Cambodia at 30 days of flooding, the highest in the Zone 4C Kratie to Viet Nam border. These areas are of course the core area of the Mekong floodplains. In other areas of the LMB corridor, flooding typically lasted between 10 and 20 days. The lowest total number of flooding days of 2 days was reported from Lao PDR Sub-zone 2A along the mainstream, and second lowest in Thailand Sub-zone 2C Lower at 4.4 days on average.

The survey also asked respondents about the source of the most serious flooding that had occurred in the previous 12 months (Annex, Table 28). 60% of the sampled households reported normal rains or monsoon as the source. In Thailand and Lao PDR, most of the households reported normal monsoon rains as the source, at 95% and 85% of the households, respectively. In Cambodia and Viet Nam, 41% and 30% of households respectively reported normal monsoon rains as the source of the most serious flooding events in the last 12 months. This fits well with the mainly floodplain

topography of the LMB corridor in these two countries.

Extreme weather or typhoons was reported by 14% of the whole sample, with the most reports in Cambodia at 27% of the households, and of those most in the area Khone falls to Kratie and along the Tonle Sap River at 43% of the households.

Man-made causes for flooding in the form of hydropower reservoir releases as a source of serious flooding events was reported by only 3% of all households overall; however, in Cambodia Sub-zone 4A Khone Falls to Kratie, 14% of the households reported this as a source, and in the Sub-zone 3S it was 10% of households. This indicates that hydropower releases in the 3S Rivers cause flooding, which could indicate the need for mitigating actions in which MRC could have a role to play.

Other sources for the most serious flooding were reported by 10% of the households, of which most were in Viet Nam: 56% in the Mekong Delta freshwater zone and 46% in the saline zone, probably indicating overflowing canals.

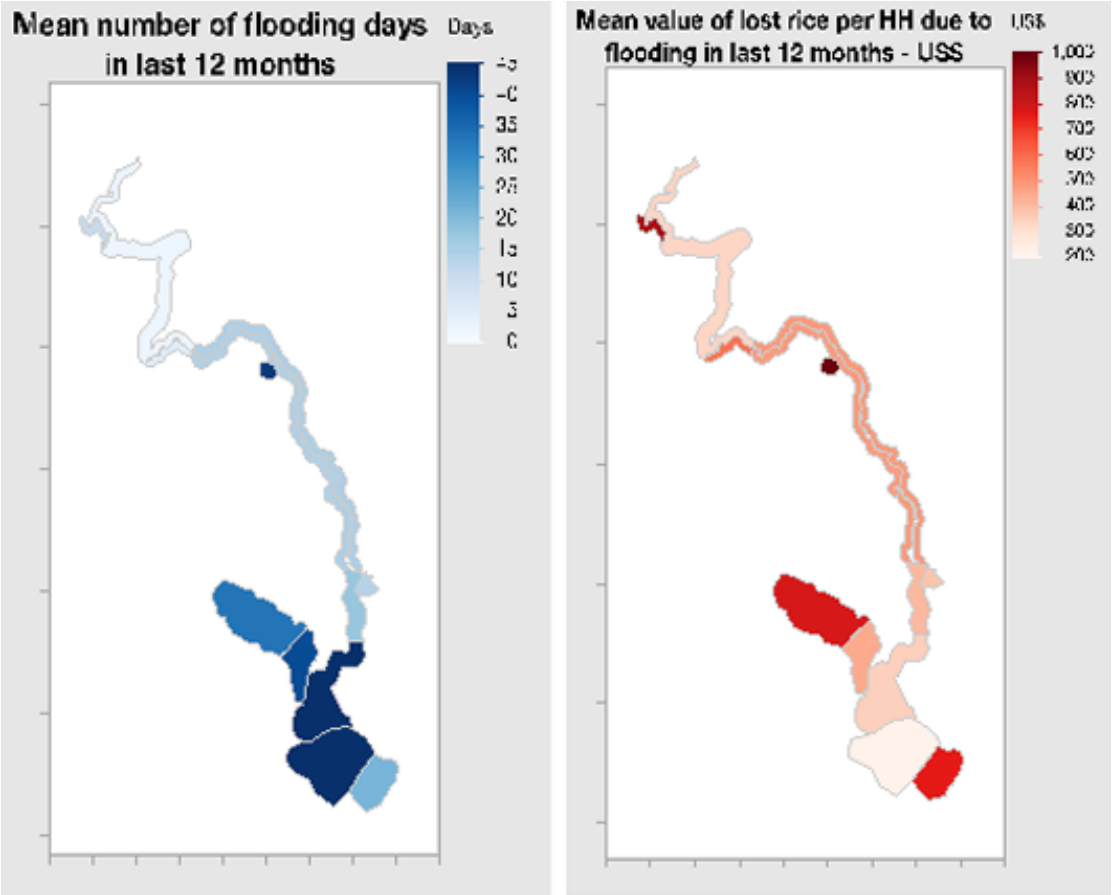
Only 9% of the sampled households answered that they didn't know the source of the most serious flooding event in the last 12 months. In Cambodia, 16% of households, and of those 31% around the Tonle Sap Lake, said they didn't really know the source of the most serious flooding event.

4.1.4 Losses of paddy land and rice production from flooding in the previous 12 months

Of the households that had experienced flooding in the previous 12 months, 61% lost or had damages to their paddy land and rice production (Annex, Table 29). In Cambodia, Lao PDR and Thailand, the percentage of households was in the same range at around 66% to 69%, whereas in Viet Nam only 5% of the households lost or had damages to their paddy land due to flooding. This indicates that the protection of paddy lands in the Mekong Delta is much better than in the rest of the LMB corridor. This refers back to the need for flood protection measures that emerges from the survey data.

The average ha. that were lost or damaged due to flooding in the last 12 months was 1.3 ha for the whole sample, the highest in Thailand at 1.9 ha, where the high average was driven by Zone 3C in the Songkhram River at 2.8 ha; in Cambodia it was 1.3 ha on average. In Lao PDR, the average number of ha. lost to damages was 0.8, and in Viet Nam 0.5 ha. The average percent of the households' total paddy land area that was lost or damaged was 59% for the whole sample. The range across all four countries was between 64% in Cambodia to the lowest in Lao PDR at 47% of the total paddy land area.

Map 8 Flooding days and mean value of lost rice per HH



In terms of the percentage of the usual total rice production that was lost due to flooding in the previous 12 months, the average was 58% for the whole sample. Reflecting the similarity between Sub-zones in the extent of the areas that were damaged, the percentage that was lost production is also in the range of 65% in Cambodia to 47% in Lao PDR.

The median value of lost rice per household was US$ 375 across the sample, whereas the average value of lost rice per household was US$ 598 (Map 8). The median value ranged from a low of US$ 119 in the freshwater zone of the Mekong Delta in Viet Nam to a high of US$ 647 in Thailand in the Songkhram River area. The value of lost rice differs significantly between the Sub-zones, with a probability larger than the F value at < 0.0001, but very weak with Rsquare adjusted at 0.039.

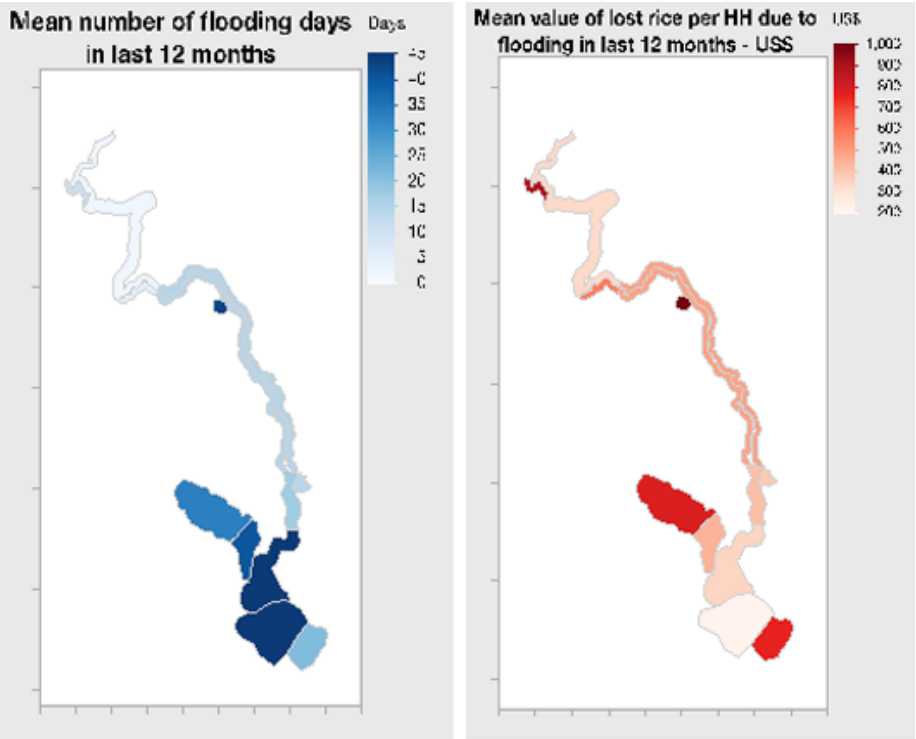
The survey data on the value of lost rice and paddy due to flooding provides an important input to economic assessment of the total cost of flooding in the LMB corridor.

4.1.5 Loss of riverbank/island gardens and fields due to flooding

Of the 30% of the total sample of households that experienced flooding in the previous 12 months, 10% experienced losses of riverbank or island fields and gardens (Annex, Table 30). In Cambodia, 16% of households that experienced flooding had also lost riverbank island fields and gardens. The highest percentage was in the Sub-zone 4A

Khone falls to Kratie at 35% of households, indicating a higher frequency of riverbanks in that area. In Lao PDR, 8% of the households that experienced flooding also lost riverbank or Island fields and gardens.

Map 9 Mean value of riverbank losses due to flooding in last 12 months – US$



The areas of riverbank gardens and fields that were affected were on average half a hectare per household. The percentage of the total cultivated riverbank or island field areas that were lost due to flooding was on average 82% per household across the sample.

The data indicate that Cambodia in the Khone Falls to Kratie area has the most vulnerable households in terms of exposure to flooding, threatening their riverbank and island production. In the other Sub-zones, households have other agricultural production land, so even losing 70% to 90% of their riverbank and island cultivated land would not affect them that much.

The percentage of the usual production from the riverbank and islands fields that was lost was 80% across the sample, highest in Cambodia at 85% and lowest in Viet Nam at 44%. In terms of the value of the losses of riverbank and island fields' production, the median across the sample was US$ 100, and the average US$ 315.

In Thailand, the median and average values of lost riverbank and island production were very much higher than in the other areas; however, in Thailand only 7 households experienced these losses. In Cambodia, the median value of losses was US$ 88 with a mean of US$ 288. In Lao PDR, the median was US$ 125 and the mean US$ 196. The difference is statistically significant between the Sub-zones with respect to the average value of riverbank losses experienced by households, at probability larger then F value less than 0.0001, and RSquare adjusted at 0.15. Map 9 shows the distribution of mean values of riverbank and island fields and garden losses.

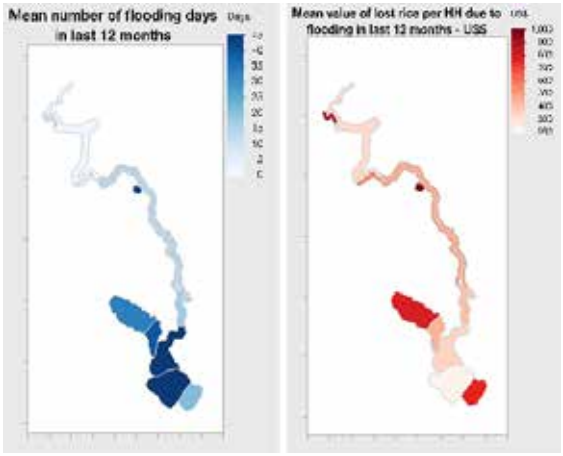
4.1.6 Losses of aquaculture production due to flooding in the last 12 months

Only 2.3% of the households that experienced flooding in the last 12 months also experienced their aquaculture temporarily destroyed due to flooding (Annex, Table 31). Altogether, 39 households of the household sample reported losses of aquaculture due to flooding.

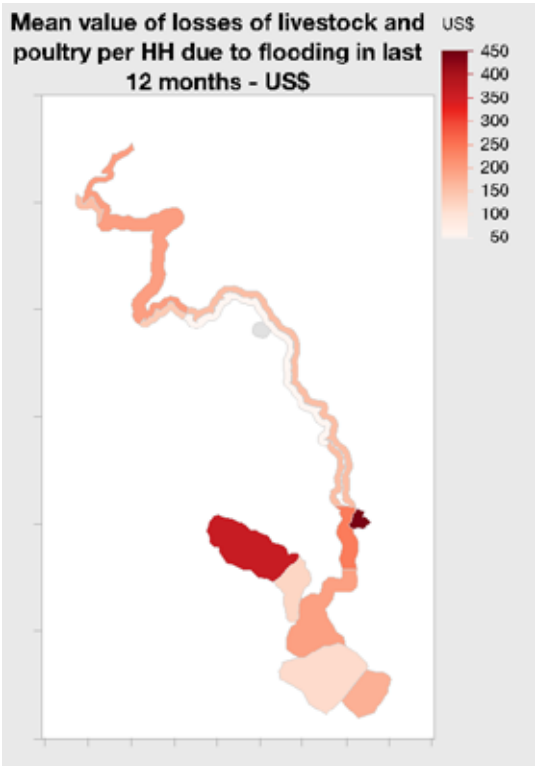
The average aquaculture production lost per household was 197 kg, which on average was 45% of annual production. The mean value of the production lost per household was US$ 382, highest in Cambodia at US$ 741 and between US$ 140 and US$ 215 in the other three countries.

The sample was not designed to obtain detailed information specifically on aquaculture and the sample reflects the overall proportion of aquaculture households in the LMB corridor. The data are statistically too few to infer any general conclusions about losses and value of losses. There is no statistically significant difference between the Sub-zones in terms of the mean value of aquaculture losses.

Map 10 Mean value of aquaculture losses per HH in previous 12 months



Map 11 Mean value of livestock and poultry losses per HH in previous 12 months



4.1.7 Losses of livestock and poultry from flooding in the last 12 months

Very few of the households lost livestock due to flooding: of the whole sample only 38 households lost cows due to flooding, of which 36 were households in Cambodia. Only 19 households lost buffalos, and 89 households lost pigs and goats with 85 of these households in Cambodia.

482 households lost poultry due to flooding. The numbers of households that lost livestock or poultry are too few to provide a basis for meaningful statistics on distributions among Sub-zones. In terms of value of losses of livestock and poultry, the average for the relatively few households that did experience these losses was US$ 245 across all Sub-zones, with the highest of US$ 444 in Zone 4B 3S in Cambodia. The difference between Sub-zones is not statistically significant. Map 8 shows the distribution of mean value of losses of livestock and poultry.

4.1.8 Losses of other property due to flooding

Of the whole sample, 10% of the households that were affected by flooding in the last 12 months also reported losing other property[10] (Annex, Table 32). Most were in Cambodia; however, it was only 9% of the households affected by floods, whereas in Thailand 15% of the flood-affected households also lost property. The average value of lost property was US$ 454, highest in Thailand with US$ 838 and lowest in Cambodia at US$ 175, with Lao PDR and Viet Nam at US$ 541 and US$ 394, respectively. The difference between Sub-zones is statistically significant at probability > F at 0.0147 but weak with Rsquare adjusted at 0.07.

4.1.9 Loss of working days due to flooding

46% of the households that were affected by flooding in the previous 12 months reported loss of working days (Annex, Table 33). Most of these households, at 77%, were in Cambodia, while 21.5%, were in Viet Nam, 12.5% in Lao PDR, and in 15% Thailand .

On average, the number of working days lost in flood-affected households in the previous 12 months was 23 across the LMB corridor, highest in Viet Nam at 48 days. The high number in Viet Nam was driven by the 23% of sampled households in the freshwater zone of the Mekong Delta that on average lost 50 working days.

The lowest number of working days lost was in Lao PDR at 6 days, while Cambodia on average reported 24 days, and Thailand 14 days. The difference between the Sub-zones in terms of working days lost due to flooding in the previous 12 months was statistically significantly different at the probability > F value at less than 0.0001, and RSquare adjusted at 0.25.

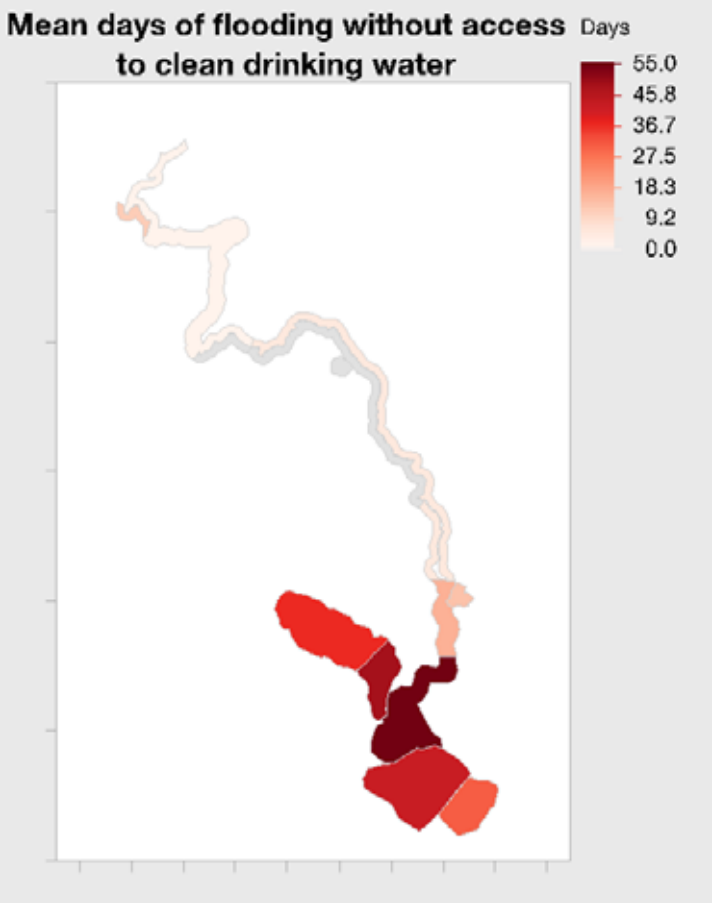
10 'Other property', i.e., property that had not been included in previous questions. Thus 'Other property' can include, for example, loss of dwelling or buildings, or loss of other crop production, which was not included in previous answers. This is also the case for similar questions on impacts from drought, in Section 4.2.5.

The survey data on number of working days lost due to flooding are important for economic assessment of the cost of flooding.

4.1.10 Days without access to clean drinking water and sanitation

10% of the households that were flood affected in the last 12 months had days without access to clean drinking water (Map 12, Annex, Table 34). Of those 10%, most households without access were found in Cambodia at 17% of the flood-affected households. Sub-zone 4A Khone Falls to Kratie was most impacted with 22% of the flood-affected households experiencing on average 17 days without access.

Map 12 Mean days of flooding without access to clean drinking water



In Sub-zone 4C Kratie to Viet Nam border, 20% of the households experienced on average 55 days without access to clean drinking water.

Also, in the Tonle Sap River and lake areas, 12-14% of the flood-affected households went 37 to 49 days without access to clean drinking water. Similarly, in Viet Nam, in the freshwater zone 6A, 10% of the households did not have access for an average of 43 days, while 17% of the flood-affected households in the saline area of the Mekong Delta - zone 6B - on average were without clean drinking water for 31 days in the previous 12 months due to flooding.

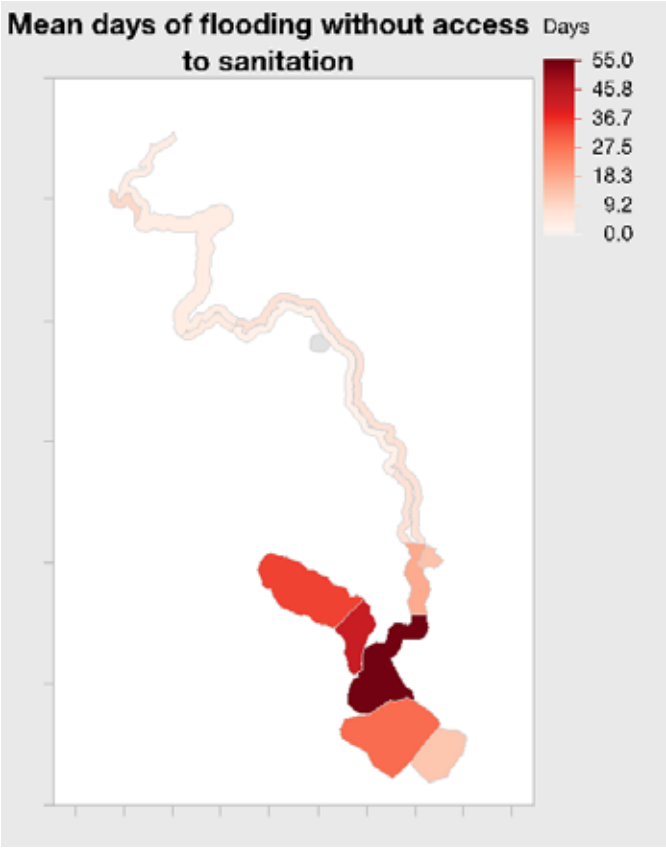
The difference between the Sub-zones in terms of days without access to clean drinking water due to flooding in the previous 12 months was statistically significantly different at the probability > F value at less than 0.0001, and RSquare adjusted at 0.33.

Flooding limited access to sanitation for 18% of the flood-affected households in the LMB corridor (Annex, Table 34, Map 12). Most were in Cambodia at 31% of the flood-affected households, and 15% of the affected households in Viet Nam.

For those households that were affected, the average number of days without access to sanitation across the LMB corridor was 36, highest in Cambodia with 39 days, and Viet Nam 24 days, while in Lao PDR and Thailand average days were much less at 4 and 7 respectively for the very few affected households in the latter two countries.

Days without access to sanitation were significantly different between the Sub-zones at probability larger than F value at 0.0001, and Rsquare adjusted at 0.27.

Map 13 Mean days without access to sanitation due to flooding



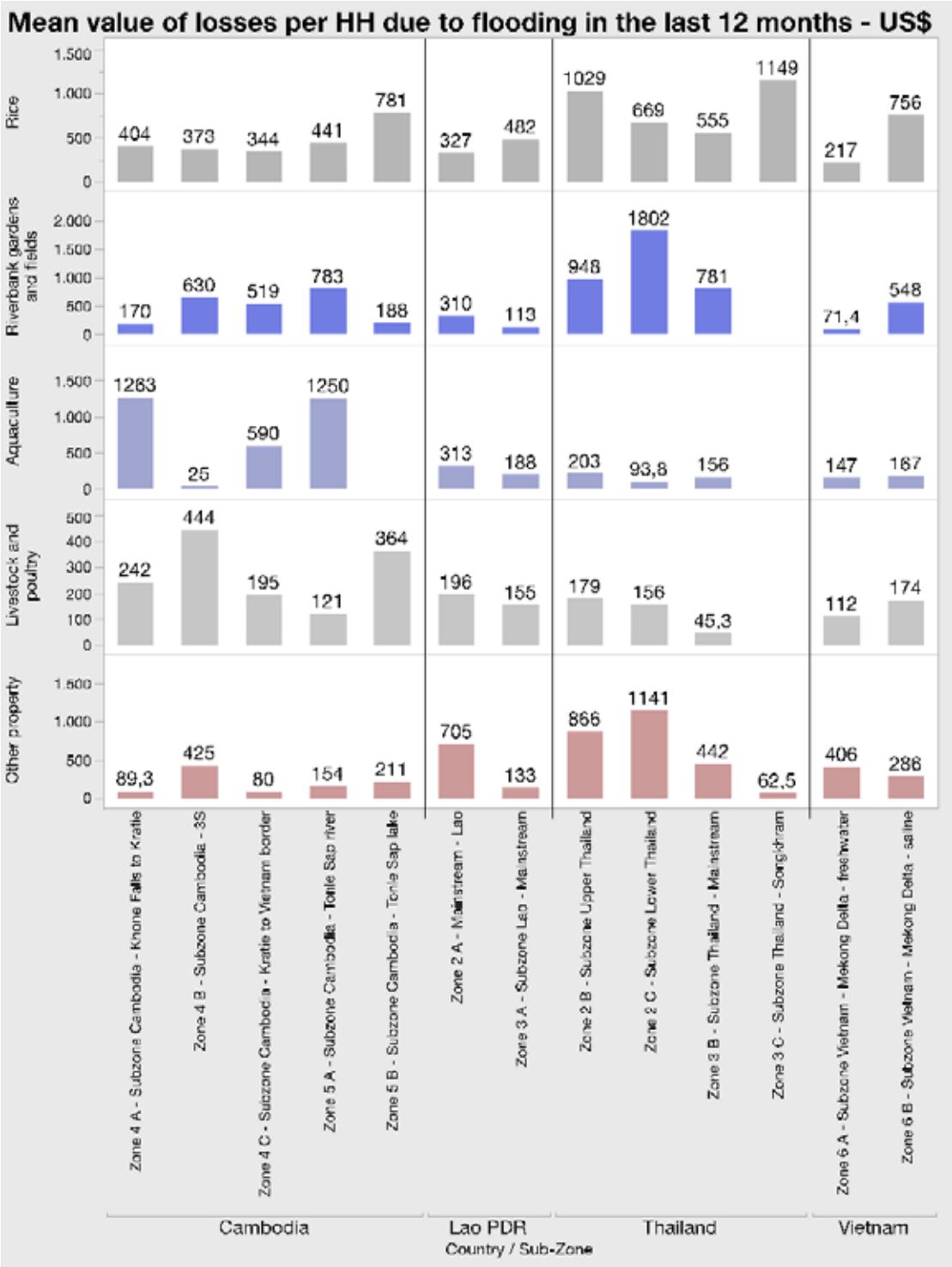
4.1.11 **Injuries and loss of life**

Four people in 4 households lost their lives due to flooding in the previous 12 months: two near Tonle Sap Lake, one near Tonle Sap River and one in the Sub-zone Kratie to Viet Nam border. Injuries were fortunately few, with 12 persons of the whole sample population injured due to flooding (Annex, Table 35).

Figure 15 shows the mean values of all losses due to flooding in the previous 12

months per household across the various Sub-zones within each country, providing an overview of the data and analysis in the above sections. It can be observed that Thailand had the highest mean values of losses of rice, riverbank gardens and field and other property. Cambodia had the highest mean values of losses of aquaculture and livestock and poultry.

Figure 15 Value of all losses due to flooding in the last 12 months



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Summarizing this section on flooding, SIMVA 2014 found that a third of all sampled

villages and communities in the LMB corridor experienced flooding in the 12 months before the survey, i.e., in the period 2013-2014. Flooding affected the largest number of villages in Cambodia and Thailand at 61% and 48%, respectively, while flooding was on a much smaller scale in Viet Nam at 14% and Lao PDR at 9% of the villages. Impacts of flooding in the years before the survey were found to be even more widespread, with 69% of villages and communes having experienced flooding at some point in time. In Thailand and Cambodia, the figure was 86% and 81% of villages respectively, with fewer in Lao PDR and Viet Nam at 63% and 47% of the sample villages and communes, respectively. Flooding caused losses and damages to 61% of flood-affected households. The cost of these losses and damages was significant.

In conclusion, though flooding is a recurrent and known occurrence in the LMB corridor, and communities and people over centuries have adapted very well to this feature of the natural Mekong River system, flooding still causes extensive damages and losses, impacting hundreds of thousands of people.

4.2 Drought

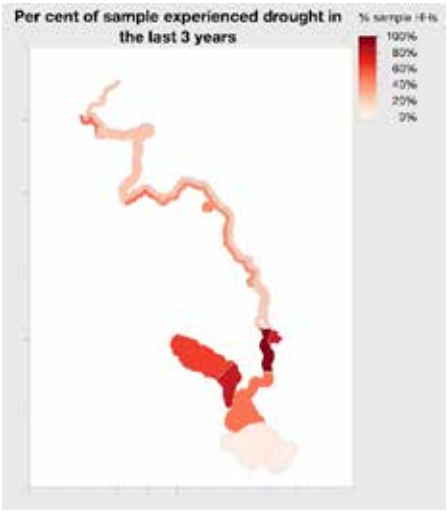
SIMVA's focus was on the impacts of drought and the survey questionnaire applied a simple concept of drought. It was found to be too complicated to ask the households specific questions about the four types of drought mentioned in the 'definitions' in the beginning of this report, which are meteorological drought, i.e., low rainfall; agricultural drought accounting for water needs of crops during different growing stages; hydrological drought referring to persistently low water volumes in streams, rivers and reservoirs; and lastly, socioeconomic drought that occurs when the demand for water exceeds the supply.

In the interviews, drought was therefore explained simply as meaning a period of time with a lack of water for various purposes. The results reflect drought as the interviewees perceived and experienced it.

4.2.1 Drought in the last 3 years and loss of assets

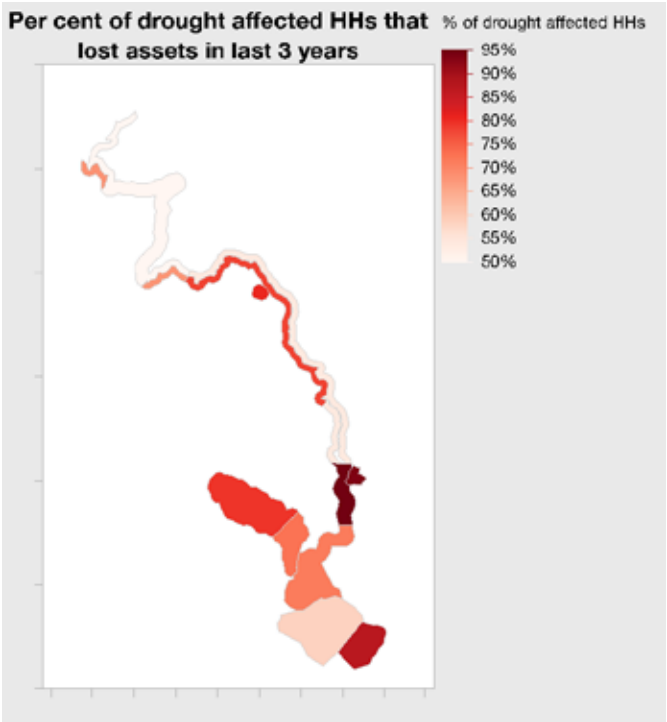
37% of all sample households experienced drought in the previous three years (Annex, Table 36, Map 14). The highest percentage was in Cambodia at 73% of the households, with 96% drought-affected households in Sub-zone Khone Falls to Kratie. In Thailand, 46% of the households reported having experienced drought in the previous three years, in Lao PDR 23% and in Viet Nam only 6%.

Map 14 Percentage of sampled households that experienced drought in the previous 3 years



Of the households that experienced drought the previous three years, 75% lost assets due to drought, with 83% in Cambodia, 73% in both Thailand and Viet Nam, and 52% in Lao PDR (Map 15).

Map 15 Percentage of drought-affected HHs that lost assets in the previous 3 years



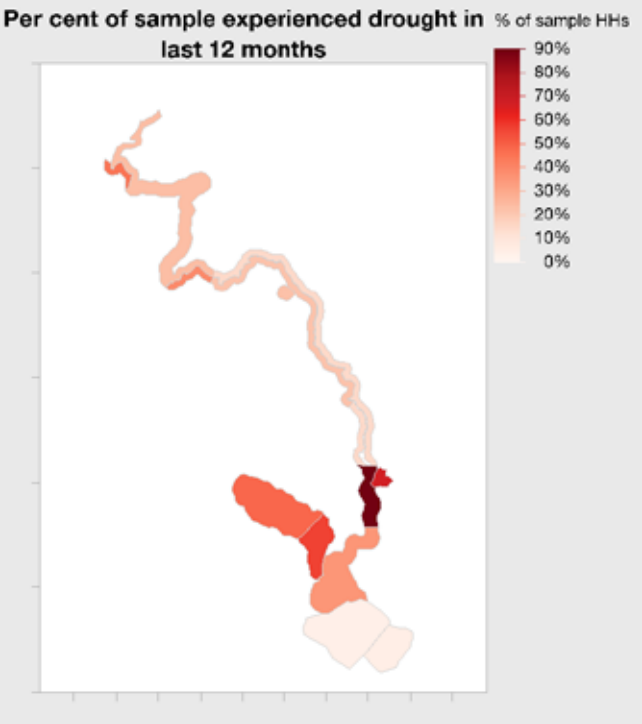
The difference between Sub-zones in the proportion of households that experienced drought in the previous 3 years was statistically significant with a probability larger than Chi-square at less than 0.0001 and Rsquare (U) at 0.26. Also, the difference in the proportion of households that lost assets due to drought in the previous 3 years was statistically significant with a probability larger than Chi-square at less than 0.0001 and Rsquare (U) at 0.12.

4.2.2 Drought in the 12 months before the survey and loss of assets

In the 12 months before the survey, 29% of the sampled households experienced drought (Annex, Table 37, Map 16). 60% of the households in Cambodia, and as much as 91% in Sub-zone Khone falls to Kratie, experienced drought. In Thailand, 32%, of which 45% of the households were in the Sub-zone Upper Thailand, had been drought-affected during this period. In Lao 19%, and in Viet Nam only 4.5% of the sampled households experienced drought in the previous 12 months.

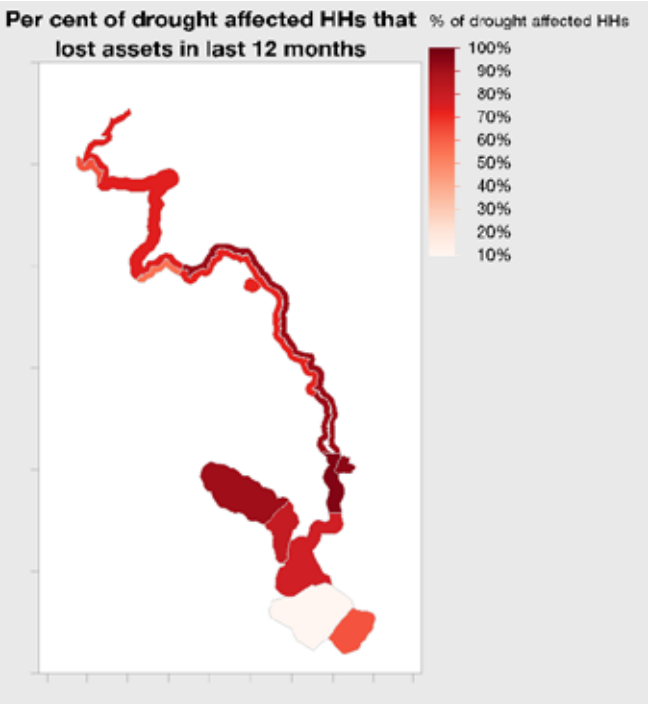
The difference between the Sub-zones in the percentage of households that were affected by drought in the 12 months before the survey was statistically significant with a probability larger than Chi Square at below 0.001, and Rsquare (U) at 0.17.

Map 16 Percentage of sampled households that experienced drought in the previous 12 months



As much as 79% of the households that experienced drought in the last 12 months also lost assets. In Cambodia 90%, in Lao PDR 81%, in Thailand 64%, and in Viet Nam 38% of these households lost assets. In Viet Nam, most were in saline zone in the Mekong Delta at 63% of the households (Map 17). The difference between Sub-zones with regard to the percentage of flood-affected households that lost assets due to drought was also statistically significant with probability larger than Chi-square at 0.0001 and Rsquare (U) at 0.16.

Map 17 Percentage of drought-affected HHs that lost assets in the previous 12 months



4.2.3 Salinity intrusion in the Mekong Delta in Viet Nam

The survey included a special section on salinity intrusion in the Mekong Delta, with a question on whether the households in Sub-zone 6B experienced any impacts on their agricultural or aquaculture land due to salinity intrusion in the previous 12 months (Table 10). 23% of the households in the saline Sub-zone (162 households) reported impacts from salinity intrusion in the previous 12 months. 89 households reported the number of ha. of their land that had been affected, and the average was 1.13 ha. per household. 26 households reported the area of aquaculture that had been affected by salinity, with an average of 2.33 hectare per household. In terms of losses due to salinity intrusion, the average agricultural loss per household was US$ 276, and the average aquaculture loss was US$ 297.

Table 10 Losses due to salinity intrusion in the previous 12 months

	Number of HHs affected	% of sampled HHs in Sub-zone	Means
HHs that experienced impacts from salinity intrusion on agricultural land or aquaculture land in the previous 12 months	162	23.01%	
Mean hectares of ***agricultural*** land per HH affected	89		1.13
Mean hectares of ***aquaculture*** area per HH affected	26		2.33
US$ - value of ***agricultural*** losses due to salinity	89		US$ 276
US$ - value of ***aquaculture*** losses due to salinity	26		US$ 297

4.2.4 Value of paddy land and rice production losses due to drought in the previous 12 months

Half (51%) of the 29% of the sampled households that experienced drought in the previous 12 months reported they had lost paddy land and rice production due to this reason (Annex, Table 38).

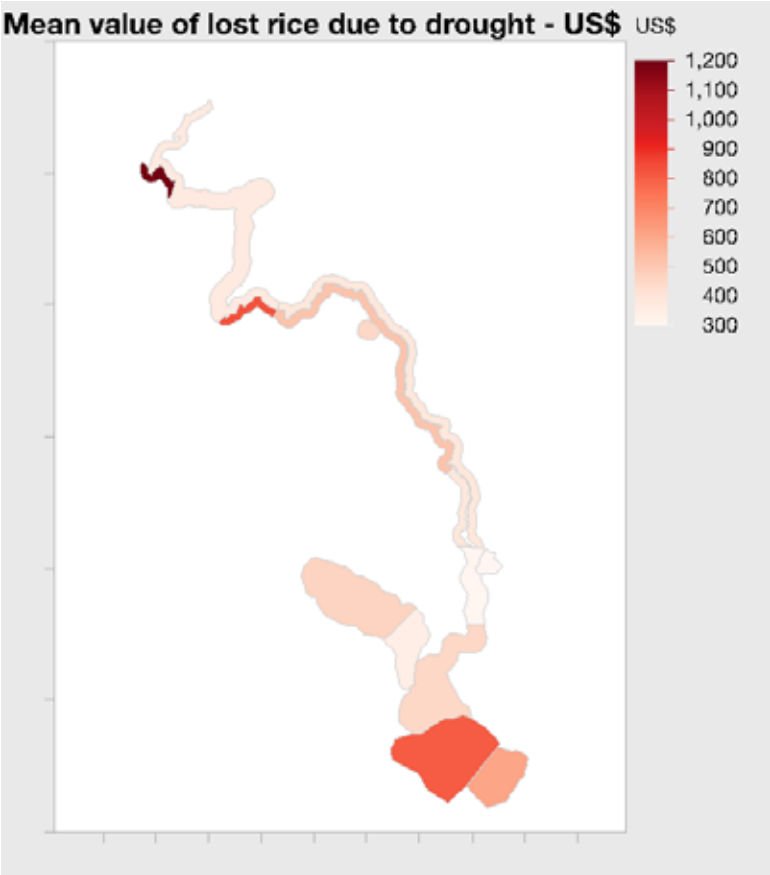
The highest proportion of households was in Lao PPR at 81%, followed by Cambodia at 61%, Thailand at 44%, while in Viet Nam only 2% of the drought-affected households reported to have lost paddy land or rice production. The highest percentage of households that had been affected by drought and lost paddy land and rice production was in Sub-zone 3A Lao mainstream, at 92% of the households.

The average size of land that was lost was one Hectare, with an average of 3 ha. in the Sub-zone 4 C Kratie to Viet Nam border and Sub-zone 2B Upper Thailand.

The average percentage of the total agricultural land affected by drought was 51%, ranging from a high of 80% experienced by only one household in the Mekong Delta freshwater zone, 63% in Sub-zone 5A along the Tonle Sap river in Cambodia, and lowest in Sub-zone 3C in the Songkhram area in Thailand. The average percentage of the usual rice production that lost due to drought was 50% across the sample, with a range similar to the percentage of total agricultural land affected by drought.

The average value of losses of rice production due to drought was US$ 454, highest in Thailand at US$ 730, lowest in Cambodia at US$ 368, and US$ 380 in Lao PDR and US$ 644 in Viet Nam (Map 18, Annex, Table 39).

Map 18 Mean value of lost rice production due to drought in the previous 12 months



4.2.5 Losses of livestock, poultry and property due to drought in the previous 12 months

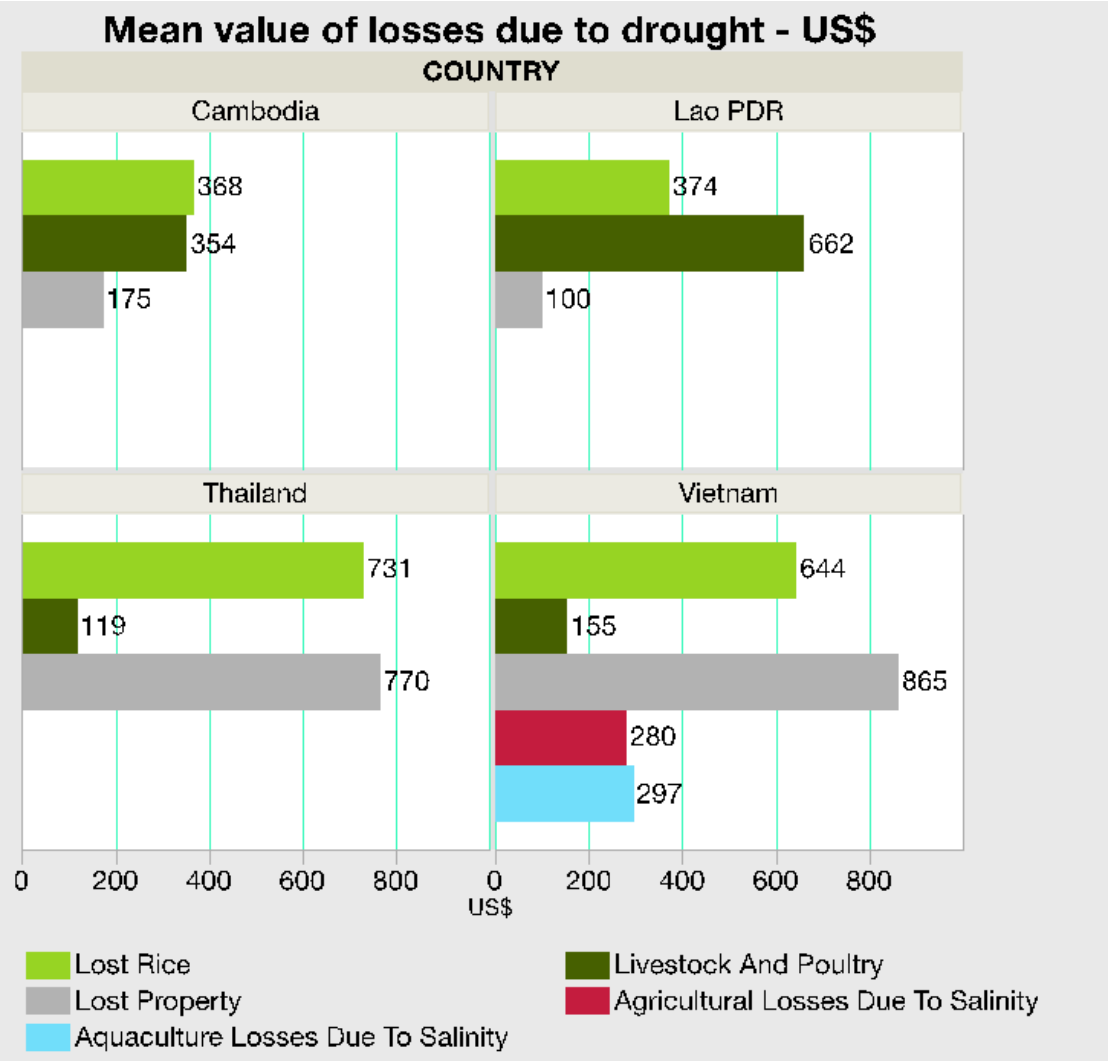
33% of drought-affected households in the previous 12 months lost livestock and poultry (Annex, Table 39). However, these households were almost all in Cambodia at 54% of the drought-affected households, while in Lao PDR, Thailand and Viet Nam only between 0.6% and 4% lost livestock and poultry.

13% of drought-affected households reported losing some property. In Thailand, 40% of households in Sub-zone 2B and 54% in 2C Upper and Lower Thailand reported loss of property. In the saline zone in the Mekong Delta the figure was 83%.

4.2.6 Value of all losses due to drought in the last 12 months

For the 28% (1,596 households) of the total sample that did lose rice production, livestock and poultry, and/or other property due to drought in the previous 12 months, the mean value of the losses was US$ 432 overall, with a mean of US$ 454 for rice, US$ 350 for livestock and poultry, and US$ 695 for property losses (Figure 16, Annex, Table 39).

Figure 16 Mean value of losses due to drought in the previous 12 months – US$



The highest average monetary value of loss of rice was in Thailand, in Sub-zone 2B and 2C Upper and Lower Thailand; the second highest values were in the freshwater and saline Sub-zones in the Mekong Delta in Viet Nam. The mean value of the livestock and poultry lost was highest in Lao PDR's zone 2A along the mainstream, and in Cambodia's zone 4A Khone Falls to Kratie, and zone 4B 3S.

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By way of conclusion, the SIMVA data on drought and impacts of drought reveal this to be a widespread and recurrent problem in the LMB corridor. Over the period 2011 to 2014, drought affected almost three-quarters of the sampled households in Cambodia, almost half of the households in Thailand, and a quarter of the households in Lao PDR. In Viet Nam, drought affected only a small proportion of the households during the 3-year period.

In the last year before the survey, more than half of the households in Cambodia and a third of those in Thailand were affected by drought. The impacts were found to be serious with almost 80% of the affected households having lost assets due to drought; the highest proportion in Cambodia, followed by Lao PDR, Thailand and lastly Viet

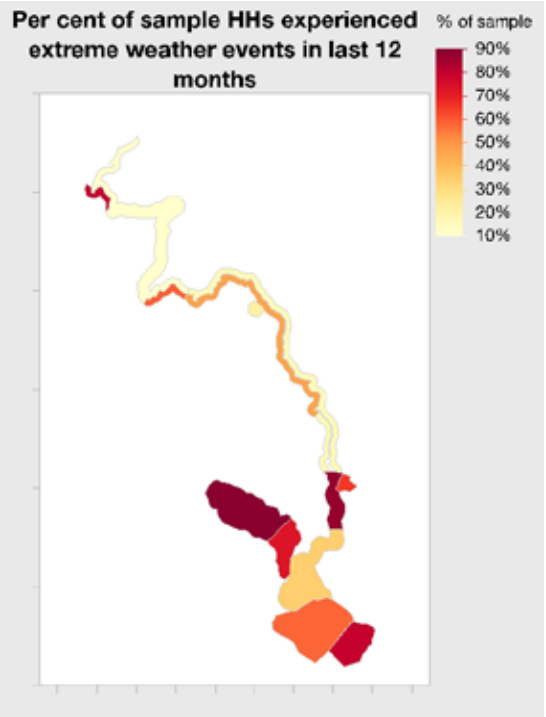
Nam. The values of losses due to drought in the last year were on average US$ 432 per affected household. Notably, in Cambodia almost 90% of drought-affected households lost assets at a mean value of US$ 357 per household.

For MRC, these results point to the relevance and importance of a continued and perhaps strengthened support to the Member Countries' own investigations for development of irrigation potential with a focus on Cambodia.

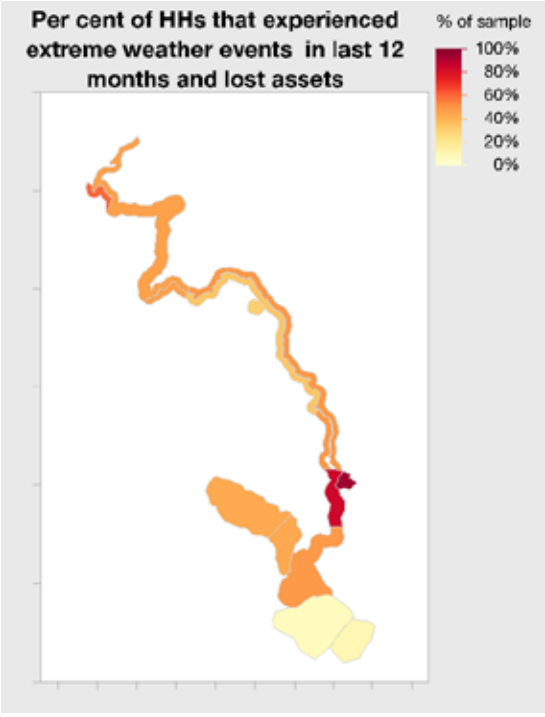
4.3 Extreme weather

The definition of 'extreme weather' was explained to the interviewees as 'any weather events that you would call out-of-the-ordinary' experienced in the last 12 months. As such, the correct definition is 'perceived extreme weather', but here referred to as just 'extreme weather'. In the 12 months before the survey, 52% of the whole sample reported that they had experienced extreme weather events, and of those 34% had lost assets (Annex, Table 40, Map 19, 20).

Map 19 Percentage of sample households experienced extreme weather events in previous 12 months



Map 20 Percentage of households that experienced extreme weather events in previous 12 months and lost assets

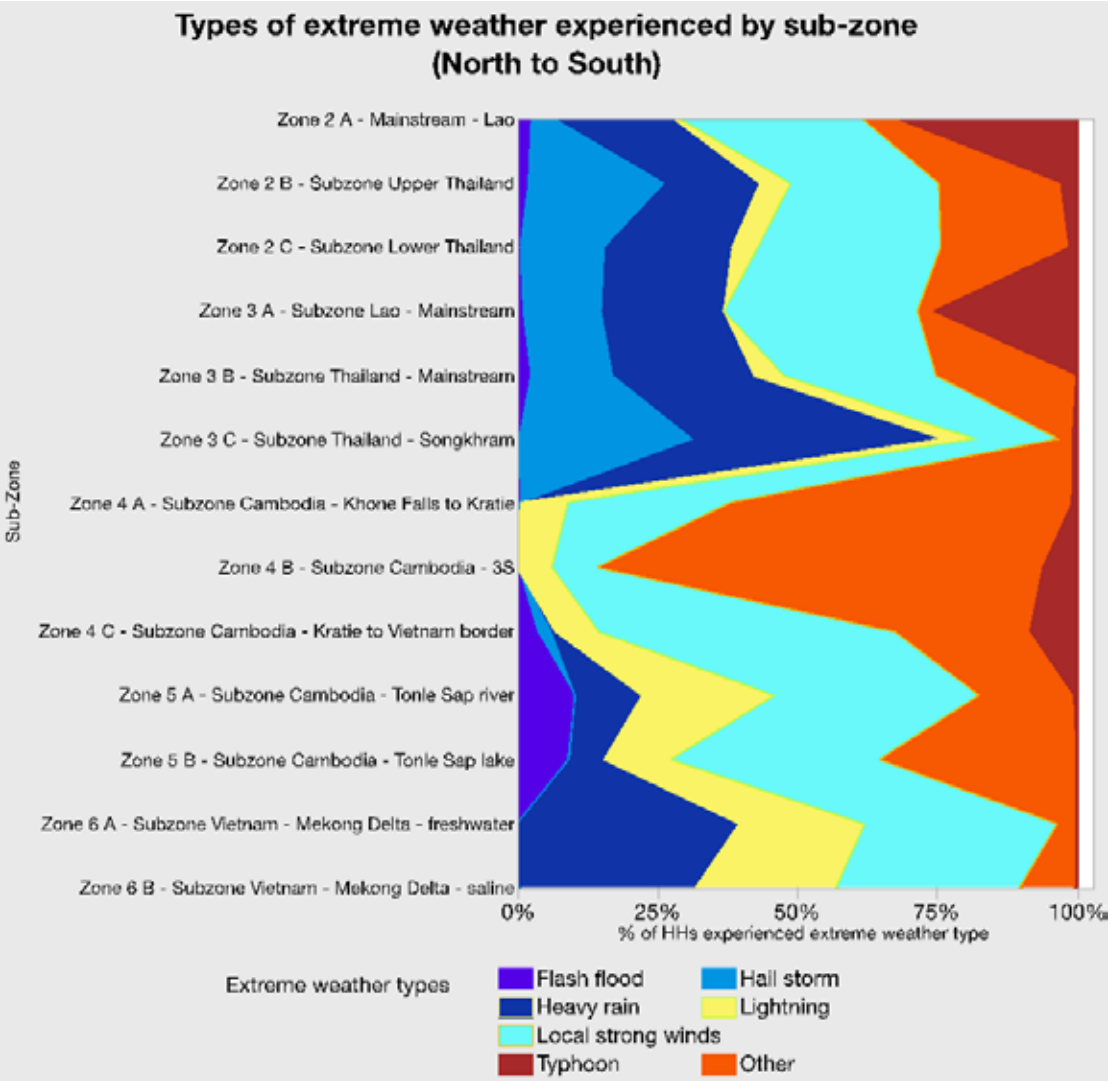


Most reports came from Cambodia with 73% of all households, topped by zone 5B around Tonle Sap Lake, and zone 4A Khone Falls to Kratie at 88% of households. In Viet Nam, 69% of the households reported extreme weather events in the previous 12 months, most reports coming from the saline zone at 80% of the households. Also, more than half of the households in Thailand reported extreme weather events in the previous 12 months, most in Zone 2B Upper Thailand at 80% of the households, and the lowest in Zone 3C Songkhram at 22%. The fewest reports from households came from Lao PDR, where 14% reported extreme weather events.

In terms of losses from extreme weather events, the highest proportion of households was in Cambodia at 59% of the households that reported having experienced extreme weather events (Map 16). In Cambodia, Zone 4B in the 3S area, as many as 95% of those households reported that they had lost assets, while 85% of households in Zone 4A Khone falls to Kratie had lost assets. In Thailand and Lao PDR, 47 - 48% of all households lost assets. In Viet Nam, only 8% reported losing assets due to extreme weather even though the percentage of households that experienced this was high at 69% of the sample, indicating functioning protection measures against these risks.

The types of extreme weather reported by the respondents (Annex, Table 41, Figure 17, Map 21) differed significantly between the Sub-zones at Probability > Chi-Square < 0.0001, and Rsquare (U) 0.16. Figure 17 shows the distribution of responses on the types of extreme weather arranged by Sub-zone approximately from North to South along the LMB corridor.

Figure 17 Types of extreme weather experienced in the previous 12 months by Sub-zone (North to South)

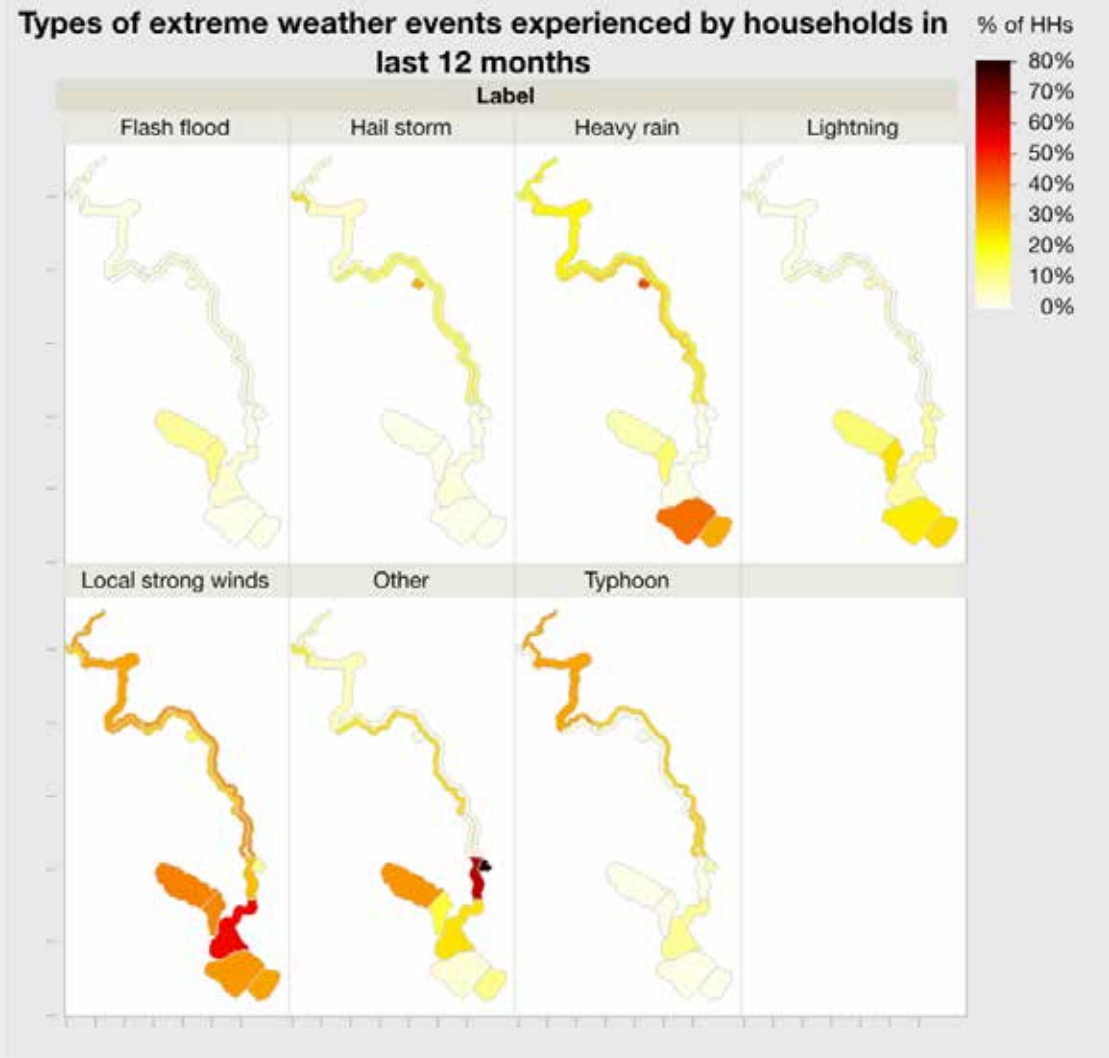


The graph depicts the data for each type of extreme weather as areas that are stacked on each other. This presentation is to give a sense of the continuous geographical area from the Lao PDR-China border down to the Mekong Delta.

Overall, local strong winds were the most reported weather type, reported by 33% of the sampled households. The second most reported type was heavy rain at 23%. Other (unspecified) extreme weather types were reported by 19%, and lightning by 16% of the households overall.

Map 21 shows the same data, i.e. the distribution of each type of extreme weather experienced by the percentage of households across the Sub-zones.

Map 21 Types of extreme weather experienced by households in the previous12 months by Sub-zone



5 Trends

The SIMVA process is gradually building a long-term data set that will eventually support identification of trends. As discussed in Chapter 2, it requires 5 or more data points to establish a trend, and for socio-economic trends the data should be spaced over more than 5 years.

At present, the SIMVA quantitative data are from 2011 and 2014 respectively, thus do not support a solid trend analysis on that basis. However, to document the steps in the gradual construction of the long-term monitoring data, a comparison of SIMVA 2011 and SIMVA 2014 data on the selected variables on flooding and droughts are presented in the Annex.

5.1 Trend analysis in the qualitative study

The study focussed on trends in fisheries, irrigation and community well-being in general. In a few villages where navigation was an important livelihood it was also included. The focus on fisheries and irrigation was with a view to narrow the discussions to activities immediately relevant to the Mekong River system, while community well-being as a broad notion would capture the effects of many other possible types of events and impacts on the community.

After construction of a timeline of important events over the last 10 years, the Focus Groups were asked to discuss, as relevant for their village, the overall trends in fisheries, irrigation, navigation and aquaculture and community well-being. A scale from 1 to 5 was applied and linked to the identified events. A score of 1 was the worst and 5 the best overall situation. The scale values were relative in the sense that the Focus Groups decided the community well-being score according to their assessment of the positive or negative impacts of events on fisheries, irrigation, navigation, aquaculture and community well-being (Refer Section 5.4 for examples).

The relationship between events, their impacts, their causes, and the coping strategies, if relevant, were discussed in the Focus Groups. Especially in Cambodia, the Focus Groups had a nuanced view on how different events had affected the community, noting that many events had both positive and negative impacts on community well-being. Typically, an event would have positive impacts for some people and negative impacts for others. An example is flooding that benefit the fisheries while making transport difficult especially for those without boats. Therefore, a number of events were described as having ‘both positive and negative impact’.

A few examples of village development activities that had both positive and negative impacts are given in the Box below. They are from the reports of Focus Groups in Cambodia:

Box: There are often Pros and Cons and winners and losers in community development

Reconstruction of dam: The villagers improve their living conditions because the dam can contain a lot of water, enough for rice fields, and they therefore get good harvests from dry-season rice farming. However, the contractor for reconstruction of the dam did not follow construction standards. The reconstruction took a very long time due to a lot of rain.

Road construction in the village: Easy to reach the village by car and motorcycle. Vendors can come to the village to buy the village's products, which can be sold at high prices. However, a few villager's trees were cut down in order to build the road.

Construction of the white gravel roads in the village: Make travelling easy, reduce the cost of travel and make it easy to do business in the village. However, some villagers lost some land for road construction.

Private electricity connected to the village: Villagers can use modern household appliances and reduce the time for cooking. However, villagers spend a lot of money for electricity fees (1 Kw =1050 Riels), the meter was not correct, and the meter reader cheated on the number of kilowatts used.

Construction of canal: Could provide water for rice fields and for cattle. Can do a lot of fishing. However, the canal does not have enough water for the villagers' needs.

An initial analysis of the identified events, impacts, causes and coping strategies, was done by the Research Teams immediately after the Focus Group Discussions. This was done by assigning pre-defined Key Words to each event, impacts, etc. Events were grouped hierarchically in Event Dimensions and Event Categories with the aim to reduce the very high number of particular events that the Focus Groups could remember. This allowed for quantification of similar types of events, impacts, etc. across the villages, with a view to identify patterns in the data. However, the study was not designed to be statistically solid, so the results are indicative. Selected findings from this analysis are presented in subsequent sections.

5.2 Types of events that affect community well-being

The Qualitative Study found that many different types of events had strong impacts on communities' well-being.

Combined analysis from all the study villages of the events that were characterized as having had strong impacts revealed the most important factors impacting on community well-being as: 1) events directly related to the Mekong, 2) agricultural events, 3) collective village activities, 4) weather-related events.

Figure 18 shows that the highest number of events with both strong positive and negative impacts and purely negative impacts were those directly related to the Mekong. Collective village activities, agricultural events, training and education events, and public and private forms of support were the most frequently reported types of events that had strong positive impacts. However, there was a high frequency of collective village activities with both positive and negative strong impacts.

The analysis indicates that communities are dependent on and sensitive to changes in the Mekong and associated aquatic resources, and it also confirms the prevalence of agricultural livelihoods in the LMB corridor. Further, the analysis highlights the

importance of local collective village activities, confirming that social and socio-economic conditions and actions are key factors for community well-being.

Figure 18 Types and frequency of events affecting communities' well-being 2004-2014

Source: Qualitative Village Study. Analysis of 266 community events with strong impacts in 25 villages over 10 years, 2004 – 2014

Figure 19 shows the frequencies of the event categories within the encompassing event dimensions providing a detailed breakdown of the data in Figure 18. In the dimension of events directly related to the Mekong, the category of flooding and water level related events stands out as having the strongest positive and negative and solely negative impacts. In the dimension of agricultural events, it is interesting that low prices for agricultural products was a frequently reported event with strong negative impacts, and conversely that high prices for agricultural products in many cases had strong positive impacts. This shows the dependency of LMB corridor agricultural livelihoods on national and international markets.

Figure 19 Detailed types and frequency of events with strong community impacts 2004- 2014

Source: Qualitative Village Study. Analysis of 266 community events with strong impacts in 25 villages over 10 years, 2004 – 2014

Village development activities were very frequently reported to have both strong positive and negative as well as purely positive impacts. Support from government was also frequently reported as having strong positive impacts.

All in all, the analysis of impacts of different types of events shows the multitude of factors and the complexity of their impacts on community well-being. The findings point to the need for grounding water resource-related development activities on detailed analysis of local conditions to ensure optimal positive effects on the communities in the LMB corridor.

5.2.1 Types of events that were unexpected

The thematic focus of SIMVA 2014 on shocks was addressed by identifying the types of impacts that had occurred abruptly, without warning, and at a scale so they could be considered shocks. Each event was described in terms of being 'expected', 'unexpected', 'perceived as a shock', 'perceived as a trend', and 'above normal level and extent' with regard to water level and weather-related events (Table 11).

Table 11 Events - expected or unexpected

	Expected event			Above normal level and extent			Unexpected event			Perceived as a Trend			All		
Event Dimension	N	Column %	Row %	N	Column %	Row %	N	Column %	Row %	N	Column %	Row %	N	Column %	Row %
An Event directly connected to the Mekong	20	17%	24%	21	46%	26%	40	**32%**	**49%**	1	8%	1%	**82**	**27%**	100%
B Work - employment	12	10%	86%				1	1%	7%	1	8%	7%	**14**	**5%**	100%
C Agricultural event	10	8%	22%				29	**23%**	**63%**	7	54%	15%	**46**	**15%**	100%
D Collective village activity	37	31%	90%				2	2%	5%	2	15%	5%	**41**	**13%**	100%
E Public and private forms of support	14	12%	100%										**14**	**5%**	100%
F Social relationships/ Social capital	5	4%	50%				5	4%	50%				**10**	**3%**	100%
G Governance	2	2%	50%				2	2%	50%				**4**	**1%**	100%
H Training and education	16	13%	100%				0	0%	0%				**16**	**5%**	100%
I Health	4	3%	29%				10	8%	71%				**14**	**5%**	100%
J Weather related	1	1%	2%	14	30%	34%	24	**19%**	**59%**	2	15%	5%	**41**	**13%**	100%
K Natural disaster				10	22%	56%	8	6%	44%				**18**	**6%**	100%
L Accidents				1	2%	100%							1	0%	100%
M Land conflict							3	2%	100%				**3**	**1%**	100%
All	121	100%	40%	46	100%	15%	124	100%	41%	13	100%	4%	304	100%	100%

The descriptions were applied to 304 events out of the 409; 103 events from villages in Thailand and 2 from Cambodia were not described in this way due to an error. A category of 'perceived as shock' was also included; however, only 4 events were given

that characteristic (two cases of earthquake in Thailand, one case of flooding in Viet Nam and one case of very hot weather in Viet Nam), and they have been categorized as 'unexpected' for the analysis.

The most frequent unexpected events that could possibly be considered 'shock's were events directly related to the Mekong, agricultural events and weather-related events (in Bold in Table). These events are of course to a large degree are caused by nature and beyond human control, as is the case with natural disasters. Referring to Figure 19 above, most of the Mekong-connected events with strong negative impacts were flooding and water level related, and as can be seen in Table 11 26% of the events directly connected to the Mekong were 'above normal level and extent'. With regard to agricultural events, low or high prices for agricultural products are caused by external market forces beyond the control of local people, and therefore often with unexpected impacts. Plant and livestock diseases were also frequently reported as having strong negative impacts. Events that were executed by the local people themselves or by government were naturally mostly expected.

The analysis leads to the conclusion that Mekong-related events such as flooding are a key cause of shocks to communities in the LMB corridor, together with any events that negatively affect agricultural livelihoods, including low prices for products, plant and animal disease and bad weather.

5.3 Trends in fisheries, irrigation and rice cultivation, navigation and aquaculture

The Focus Groups were asked to give a score on a general well-being scale to the events that had affected various livelihood activities in their community over the previous 10 years. As described in Section 5.1 above, the score is a qualitative indicator for the general 'health' or quality of the livelihood activity and its contribution to community well-being. The focus was on the water resources dependent livelihoods; fishing, irrigation and rice cultivation, and navigation. With a view to identify trends in the data, the scores were put on a yearly scale from 2004 to 2014.

This section presents the results for fisheries, irrigation and rice cultivation, navigation and aquaculture in an analytical way, with line of fit and confidence intervals. The graphs show the line of fit with the confidence interval overlaid on the individual scores given by each village. A trend in aquaculture was only relevant in two villages in Viet Nam, while navigation was only found relevant by Focus Groups in two villages in Lao PDR. In Cambodia, the Focus Groups only provided trend data for fisheries.

Fisheries

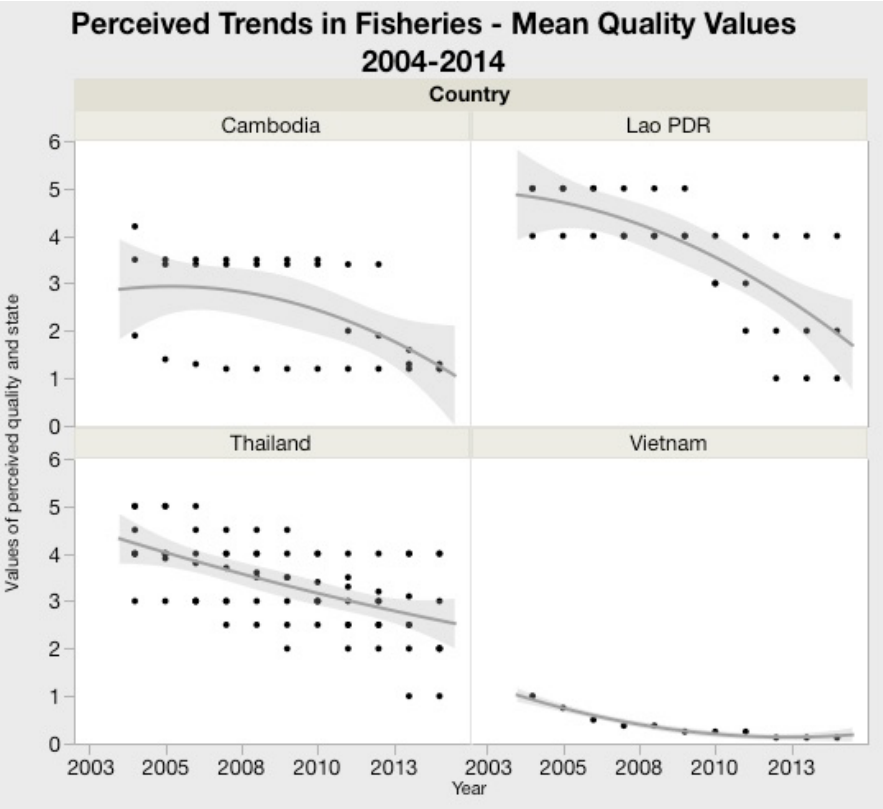
There were reports on trends in fisheries from 14 study villages: 3 in Cambodia, all 7 study villages in Thailand, 3 in Lao PDR and 1 village in Viet Nam. Figure 20 shows the data for each country.

It is evident that the perceived trend over the 10-year period was a decline in the quality and state of fisheries, and the contribution of fisheries to community well-being. This trend was perceived by the Focus Groups in the study villages in all four

countries.

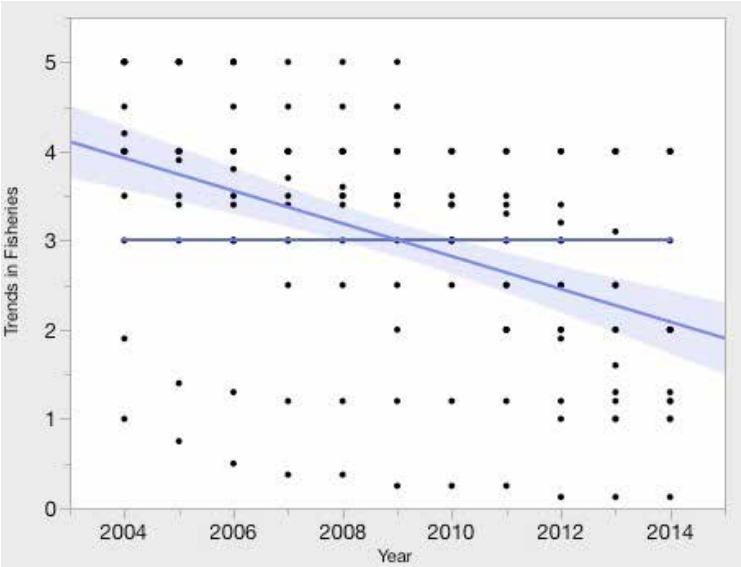
The level of scores indicates the general importance of the livelihood activity assigned by the Focus Groups. In Lao PDR, the score for fisheries was high at around 4 to 5 points in 2004, and the combined trend for Lao PDR had declined to around 2 points in 2014.

Figure 20 Perceived trend in fisheries – 2004-2014 by country



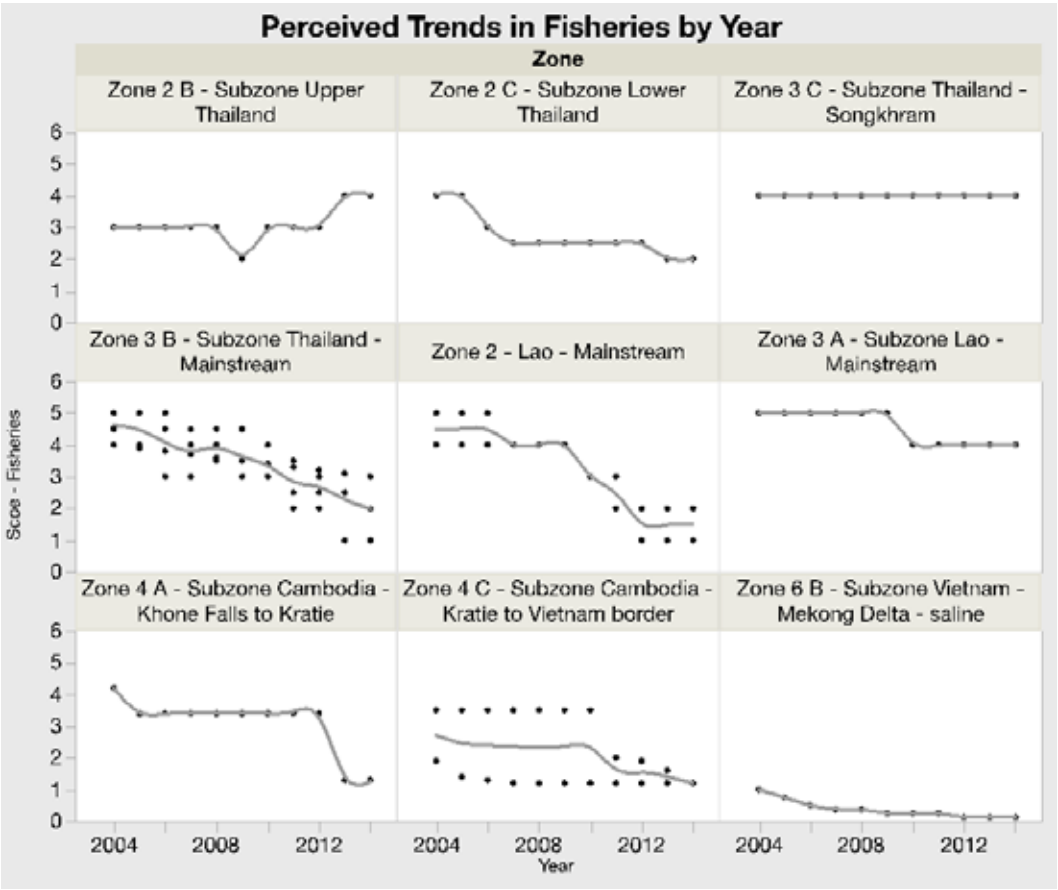
A combined analysis of all study villages (Figure 21) showed a mean of score of 3 across the years and a statistically significant downward trend of about 2 score points from 4 to 2. Though there was a statistically significant downward trend in the situation with regards to fisheries, the Focus Groups gave a number of different reasons for this, but with no clear pattern in the information.

Figure 21 Trends in fisheries, bivariate analysis for all study villages



The trends in fisheries reported from the study villages in the individual Sub-zones are shown in Figure 22. The steepest perceived declines were along the Mekong mainstream in Sub-zone 3B Thailand Mainstream and Zone 2 Lao Mainstream. In Sub-zone 2B Upper Thailand the trend was increasing indicating an improvement in fisheries.

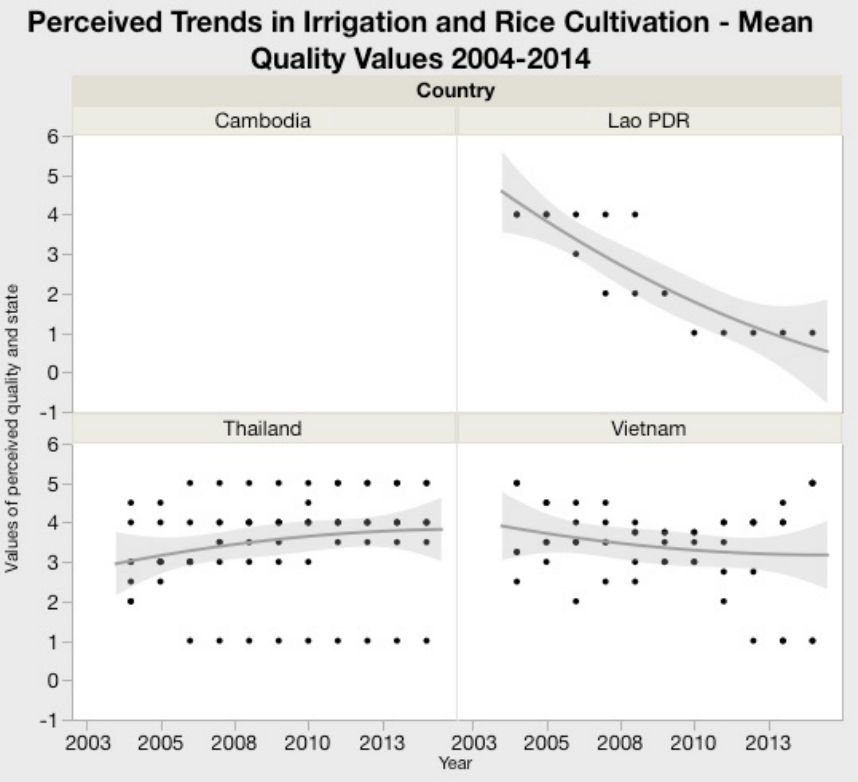
Figure 22 Perceived trends in fisheries by Sub-zone



Irrigation and rice cultivation

Trends in irrigation and rice cultivation were reported by the Focus Groups in 9 study villages in three countries, as shown in Figure 23. In the study villages in Lao PDR that reported on this, the trend was a decline, whereas in the study villages in Thailand and Viet Nam the perceived trend indicated a stable situation with regard to the quality and state of irrigation and rice cultivation, and the contribution of these activities to community well-being.

Figure 23 Perceived trend in irrigation and rice cultivation 2004-2014



Navigation, aquaculture and shrimp

Only two study villages in Lao PDR reported on the trend in navigation; one village reported a stable situation, while the other reported an increase in the quality, state, and contribution to community well-being from navigation (Figure 24). Trends in aquaculture and shrimp were reported from two villages in Viet Nam, and both showed an increase in the quality and contribution of these activities to community well-being (Figure 25).

Figure 24 Perceived trend in navigation – Lao PDR – 2004 2014

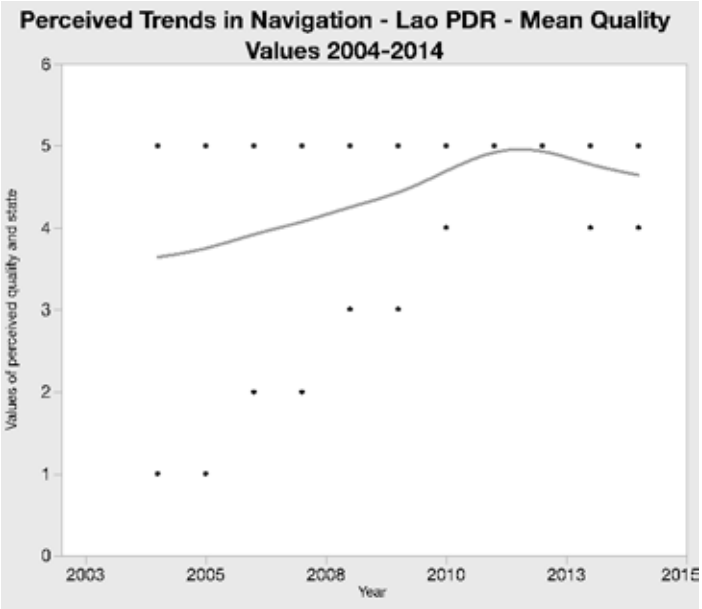
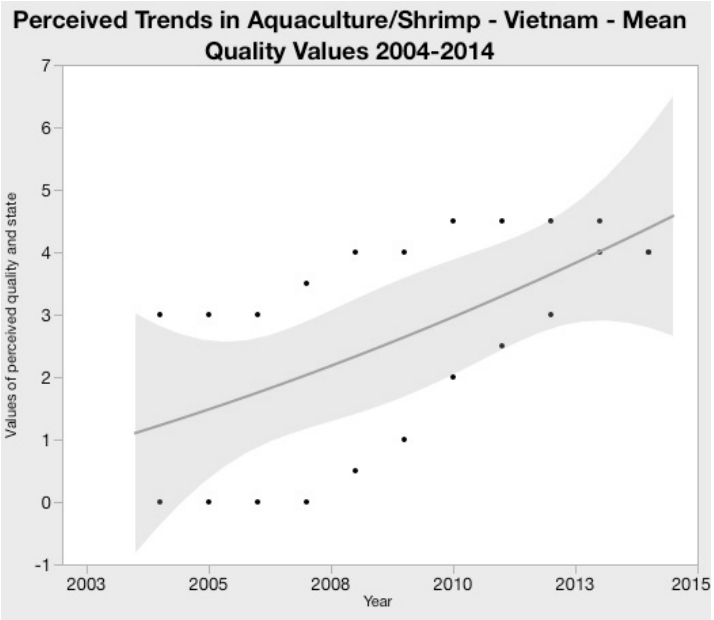


Figure 25 Perceived trend in aquaculture and shrimp – Viet Nam – 2004-2014



5.4 Trends in overall community well-being

Community well-being is a concept used in various social studies, including studies of poverty dynamics. It has been defined by Wiseman and Brasher as follows: "Community well-being is the combination of social, economic, environmental, cultural, and political conditions identified by individuals and their communities as essential for them to flourish and fulfill their potential."[11]

11 Community Well-being, Art and Culture, Challenges and Opportunities for Local Communities and Local Governments by John Wiseman and Dr. Kathleen Brasher
http://www.culturaldevelopment.net.au/expandingcultures/downloads/papers/Wiseman.pdf

Community well-being was used as a concept in the study "Moving Out of Poverty? Trends in community well-being and household mobility in nine Cambodian villages[12]" 2007. That study applied qualitative measures of well-being improvement over three different points in time. In the study, the authors observed that "Perceived changes in well-being are likely to be influenced by important past events and the current context, as well as by fears and worries about the future."

The well-being scales and scores were constructed with some variation in the four countries. The Box below gives examples of the values of community well-being scales that villagers defined based on events and situations identified in the timeline.

BOX: Examples of community well-being scales defined during Focus Group Discussions	
Pakngeum Village, Hongsa District, Champassak Province, Lao PDR	
2	From 2002 to 2007: area of agricultural production was limited, half of village households lived under the national poverty line with small income, no road access to village, poor sanitary conditions.
3	2008-2012: village has a primary school, sanitary conditions have improved, water drainpipes have been constructed, most households have sufficient resources for food consumption, most people have boats.
3.5	2013-2014: village has road access, number of household who lived under poverty line decreased, more job employment, income has increased since number of tourists entered to village increased (homestay), village has rice miller, some people have motorbike or car.
Xiengman village, Chomphet district, Champassak Province, Lao PDR	
2	From 2002 to 2004: area of agricultural production was limited, some households lived under the national poverty line, which accounted for 10% of the total households, access to finance was limited. Then, bad road conditions and small number of tourists.
3	2007: bad road conditions, less households could access finance, and some households had insufficient resources to meet basic needs (food, cloth and shelter).
4	2008: number of tourists increased slowly, agricultural production increased, people had boats and households had sufficient resources to meet basic needs.
5	2011: better road conditions, sufficient food, no poor households, expansion of tourism, substantial employment, people have cars or boats, incomes increase, and most people can access finance.
Ban Yang Ngoi Village, Si songkhram District, Nakhon phanom Province, Thailand	
2.5	2008-2009, 2011: Impact on rice farming and road conditions from flooding in 2008 and 2011.
3	2004: More sources of income from planting para rubber trees; Better road conditions than before; People's awareness raised by forest planting project.
3.5	2005-2007: Access to irrigation service from earthen lined canal constructed in 2005 for off season rice farming. 2012-2013: Higher price of rice.
4	2014: Better road condition.; Better incomes; Security of life (no thieves).
Ban don ko Village, Si chiang mai District, Nong khai Province, Thailand	

12 Moving Out of Poverty? Trends in community well-being and household mobility in nine Cambodian villages, August 2007 Ingrid FitzGerald and So Sovannarith with Chan Sophal, Kem Sithen and Tout Sokphally Cambodia Development Resource Institute (CDRI)

2.5	2008-2009: Loss of rice products due to impacts of flooding and rice disease caused by rice worms.
3	2004: Bad road conditions; Poor conditions and systems of electricity, transportation and communication.
3.5	2005-2007: More sources of income from off-season rice farming; Work on rice farming faster using tractors. 2011-2012: Higher price of rice
4	2013-2014: Good harvest of rice products; High price of rice, More health improvement activities; Security of life, Better transportation system, Better education system.

In Lao PDR, Thailand and Viet Nam, the study teams asked about general community well-being, as far as possible connected to specific events in the event timeline. In Cambodia, the study team decided to ask how specific types of activities affected community well-being. To make the Cambodia well-being score comparable with the others, the average score for all the reported types of activities for each year were used. The mean score over the 10-year period of all the well-being trends from the 25 villages is 3.3 points. Applying a bivariate analysis, a statistically significant trend towards increasing community well-being over the period 2004-2014 emerges (Figure 26).

Figure 26 Trend in community well-being – all study villages

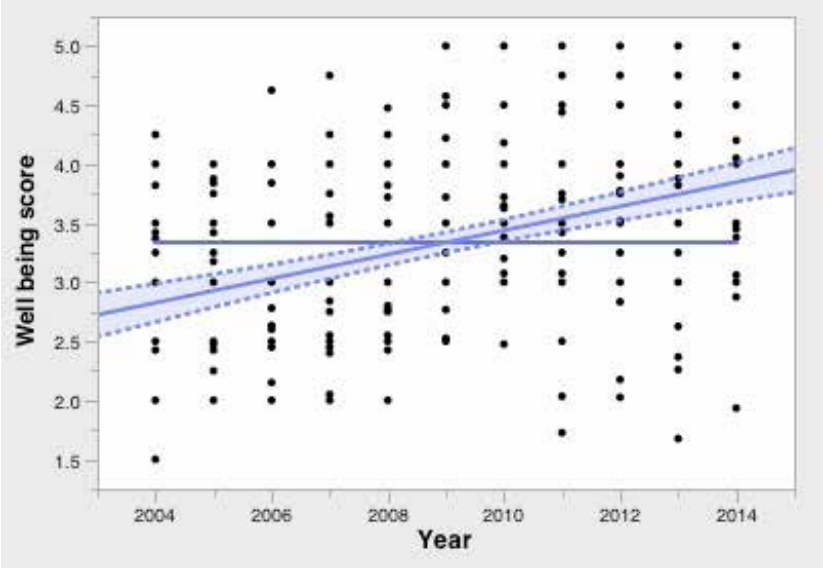
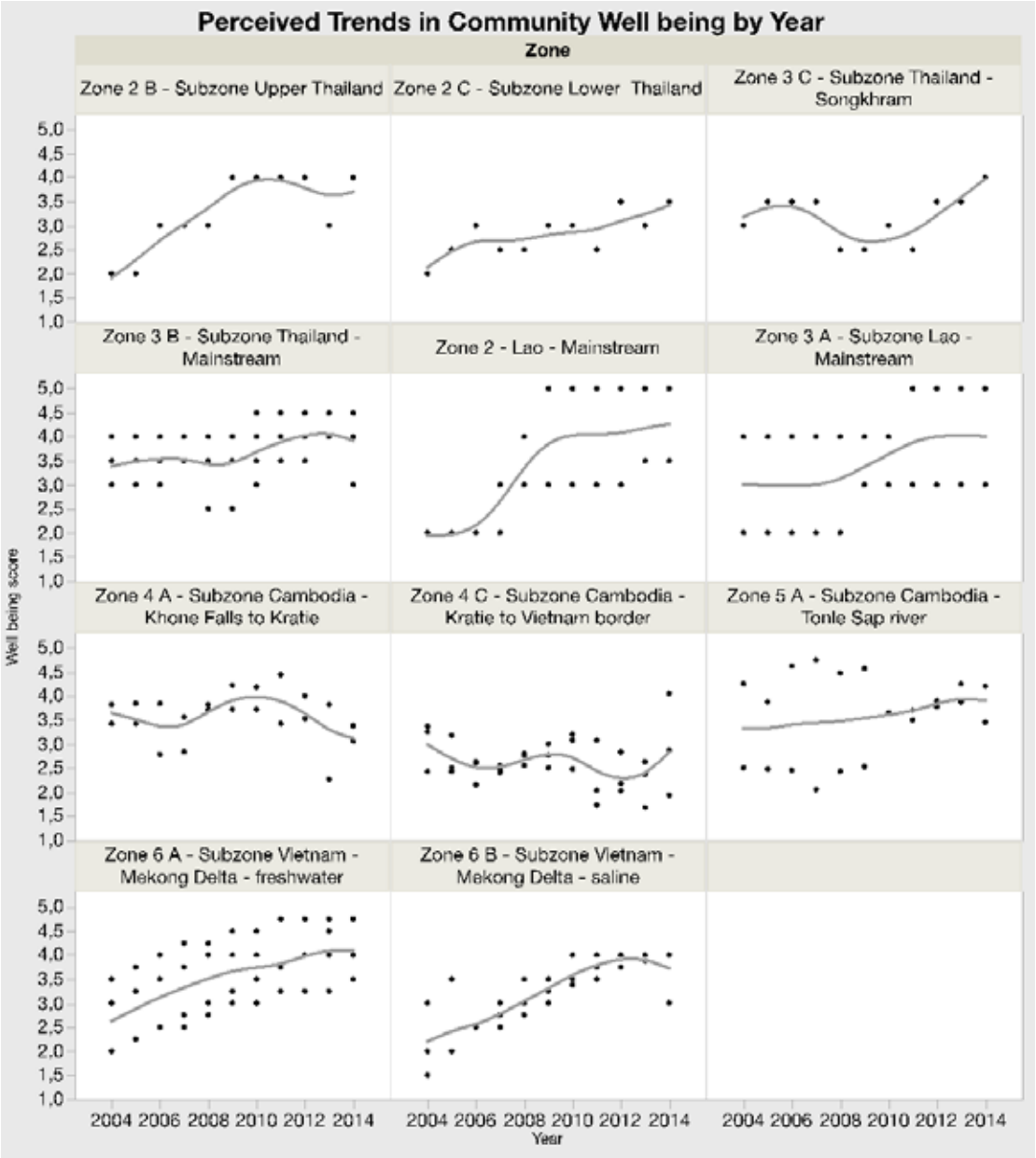


Figure 27 shows the community well-being scores and trends for the study villages in each Sub-zone. Only in Sub-zone 4A Cambodia Khone Falls to Kratie to Viet Nam border was the trend in community well-being slightly decreasing over the 10-year period. In Sub-zone 4C Cambodia Kratie to Viet Nam border and Sub-zone 3C Thailand Songkhram there were periods with a decrease in community well-being, but the trend ended at or slightly above the situation in 2004. In the other Sub-zones, the trend in community well-being increased throughout the 10-year period.

Figure 27 Perceived trend in community well-being by Zone



The discrepancy between the reported downward trend in fisheries and the increases in general community well-being show that fisheries, though an important part-time occupation contributing to household food and income, is only one of many livelihood activities in the communities. The findings from the Qualitative Study indicate that fisheries are not a determining factor in overall community well-being in villages in the LMB corridor.

6 Vulnerability, resilience and coping strategies

There are many external factors that affect the vulnerability and resilience of households to shocks and trends in the natural and socio-economic environment. This section presents analysis of survey data on other variables than the level of dependence on water resources presented in previous sections. These 'external-to-water resource dependent variables' include the social status of households and the status and functionality of collective assets.

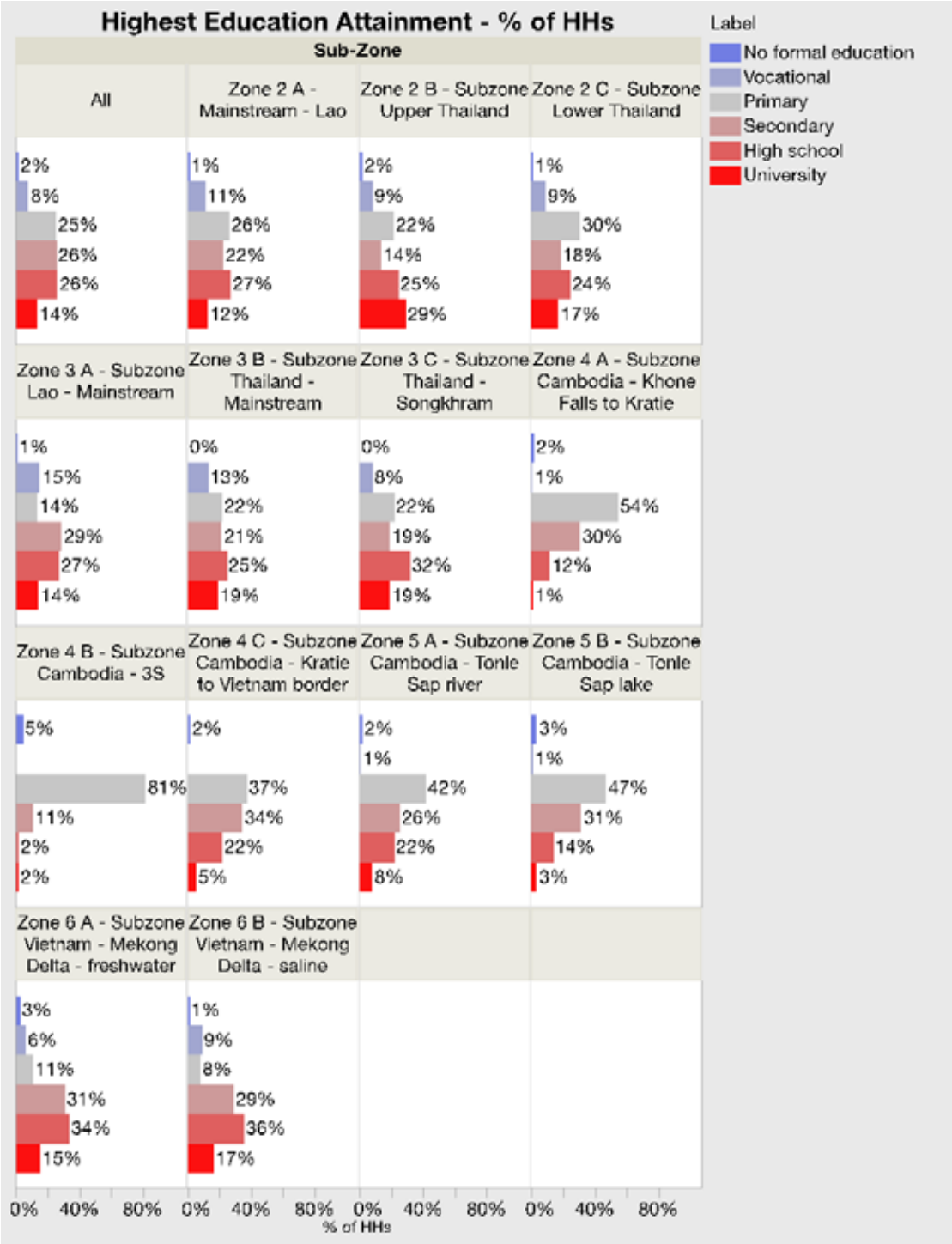
6.1 Social vulnerability

Apart from the dependencies on water resources related livelihoods that have been presented in preceding chapters, a number of indicators for social vulnerability were captured and analysed. These include dependency ratio (i.e., proportion of household members in working age to children and elderly), number of household members, marital status of household head, assuming single or widowed household heads are more vulnerable, and highest education attainment of any household member, assuming this to be an indicator of the household's general capacity to earn income. Annex, Table 42 shows the results by Country and Sub-zone.

The statistical analysis found significant but weak differences between the Sub-zones with regard to these social vulnerability indicators. For example, dependency ratio differs only slightly by country (Rsquare (Adjusted) at 0.017) and between Sub-zones (Rsquare (Adjusted) of 0.02).

The highest education attainment of any household member showed statistically significant differences between Sub-zones (Rsquare (Adjusted) 0.064). Figure 28 shows the percentage of households with the different education attainments by Sub-zone. It is evident that Cambodia has the highest percentages of households with primary school as the highest education, indicating relative higher social vulnerability.

Figure 28 Highest education attainments of household members



6.2 Indicators for resilience

An important indicator for resilience is the availability of various village infrastructure and services and their functionality, specifically the availability and functionality of education and health services. The findings in this indicator are presented in the next Section 6.2.1.

The situation in the LMB corridor villages regarding work migration is also included as an indicator for resilience as work migration is an option for securing livelihoods. As such, migration for work is an important alternative livelihood option. The findings are presented in Section 6.2.2.

The third indicator for resilience is the presence and nature of perceived alternative livelihood options, which is presented in Section 6.3.

6.2.1 Availability of services in the villages

Well-functioning and adequate village services are considered strong indicators for resilience to shocks and long-term negative impacts from decreases in the quality and availability of water-based livelihood services.

SIMVA 2014 introduced Village Profiles that captured the presence and quality of village services. The list of village infrastructure and services in the questionnaire included: Agricultural produce storage; Agriculture extension services; Aquaculture; Communication: Internet, Telephone; Conservation; Electricity: Generator, Grid; Feeder road; Fish processing facilities: Ice factory; Markets: Aquaculture products, fish, Vegetables, and a functional Pier.

The Key Informants were asked their assessment and opinion of the functionality/ quality of all relevant items on a scale from: very good, good, neutral, bad, very bad. Figure 29 (Annex, Table 43) presents the distribution of all the services and the assessment of each across the 352 sampled villages (note Sub-zones are arranged approximately North to South).

The amount of information in Figure 29 is very high, but at a glance it can be observed that the sampled villages in Cambodia had less available infrastructure services and the services were more often in a bad condition compared to other Sub-zones.

The lowest level of resilience measured by this indicator was found in the Sub-zones 3S Khone Falls to Kratie, and Sub-zone Kratie to Viet Nam border. Thailand and Viet Nam were well covered overall with village services of good functionality.

Figure 29 Availability and status of services in villages

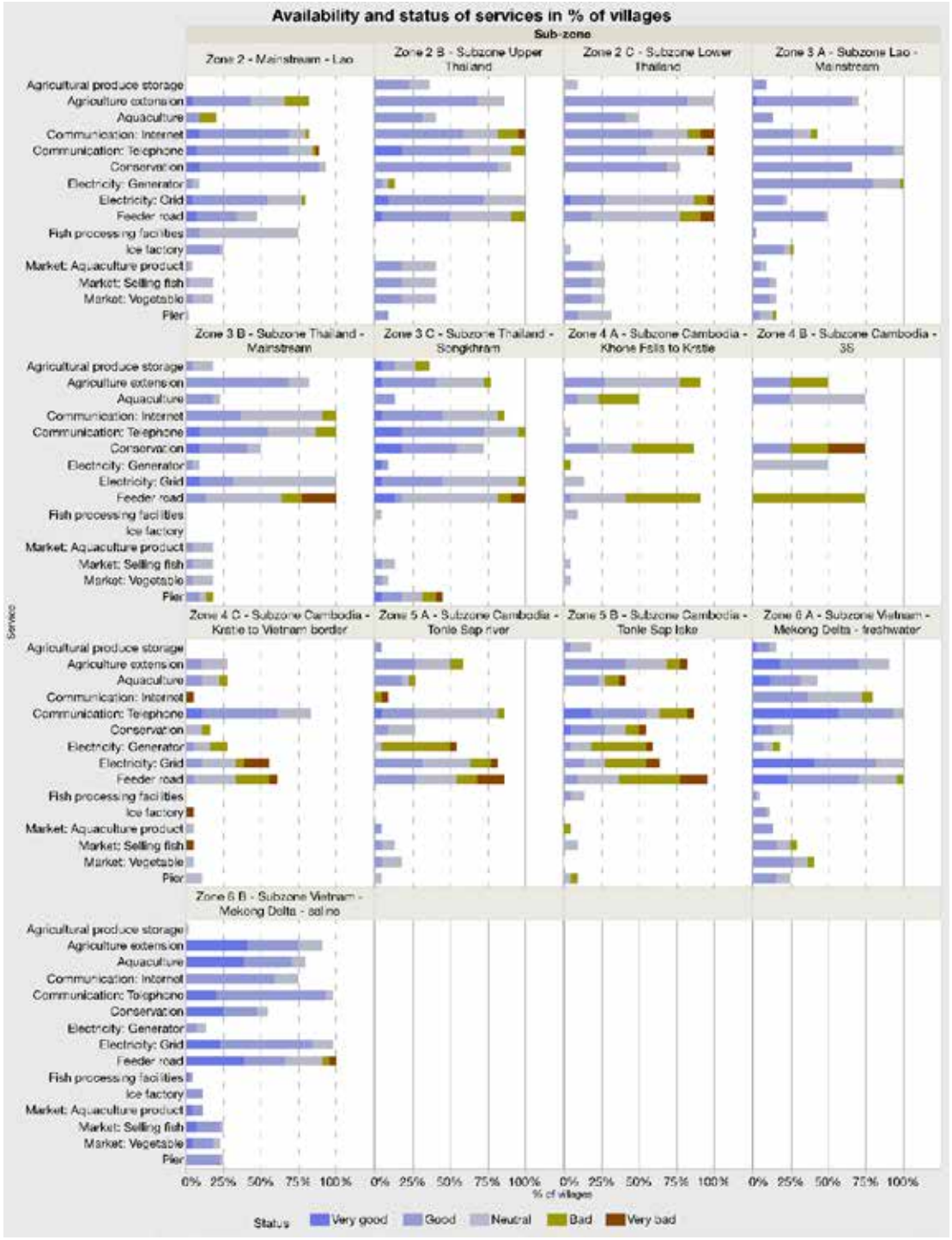
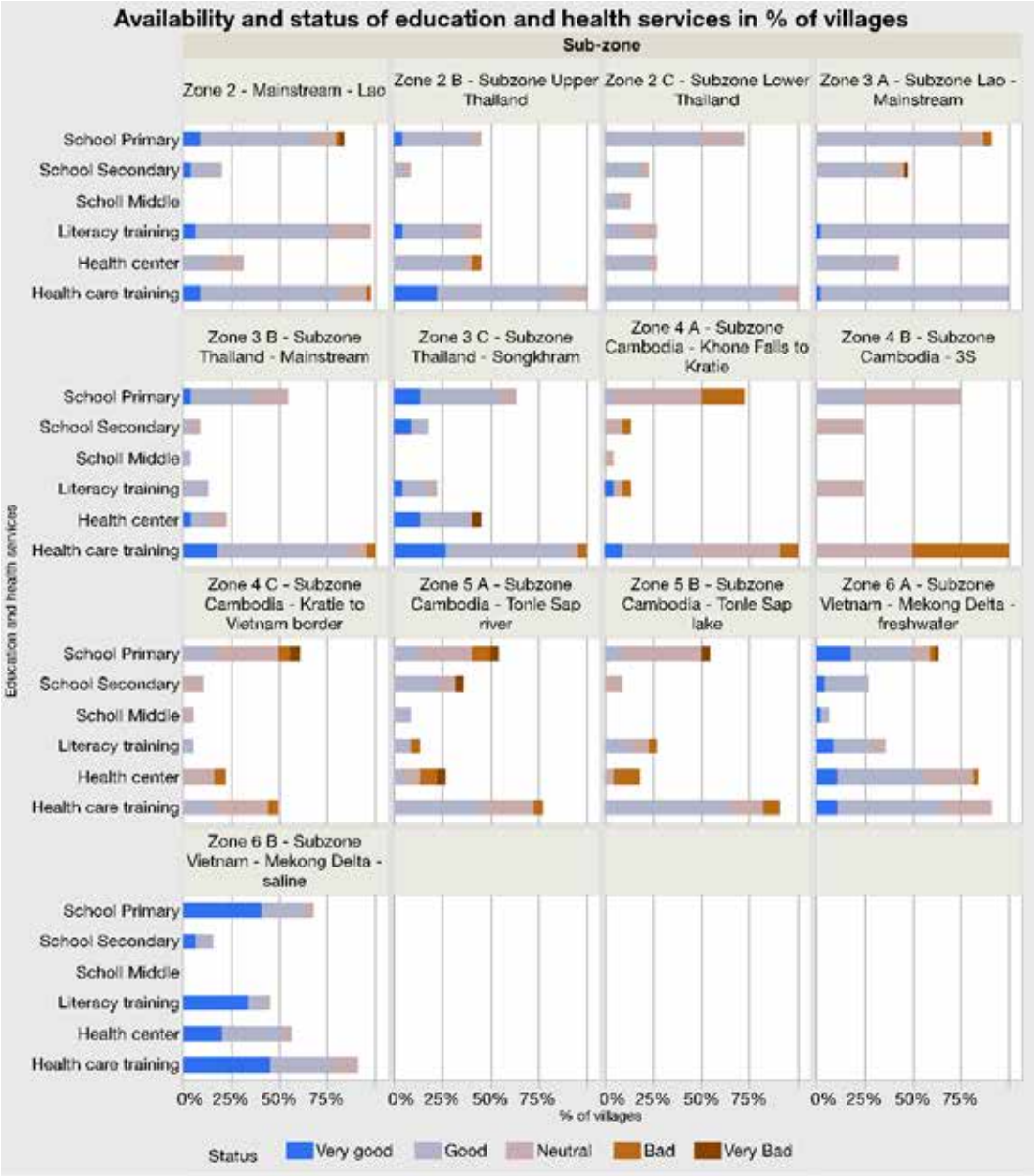


Figure 30 (Annex, Table 44) presents similar findings on education and health services. The Sub-zones that stand out in terms of the quality of education and health services are in Cambodia, where there are villages in all Sub-zones reporting bad or very bad conditions. On the other hand, the saline Sub-zone in Viet Nam has a high proportion of reports of very good education and health services, due to improvements that have been made in the previous 10 years. Villages in Thailand and Lao PDR report mainly good conditions of these services, with some cases of very good.

Figure 30 Availability and status of education and health services in villages

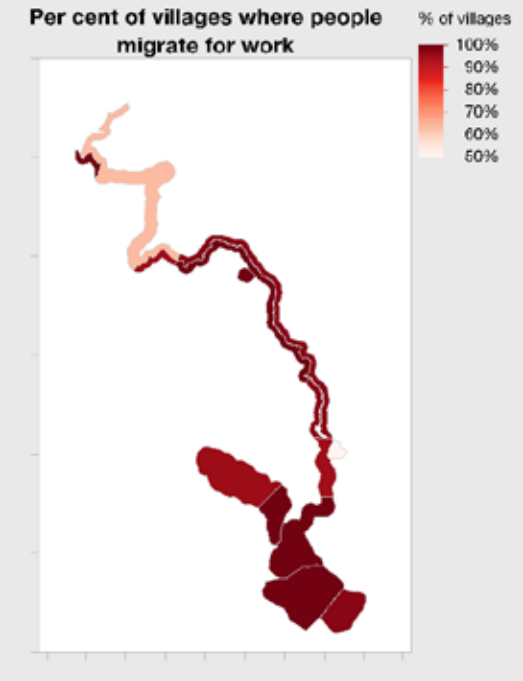


6.2.2 Work migration

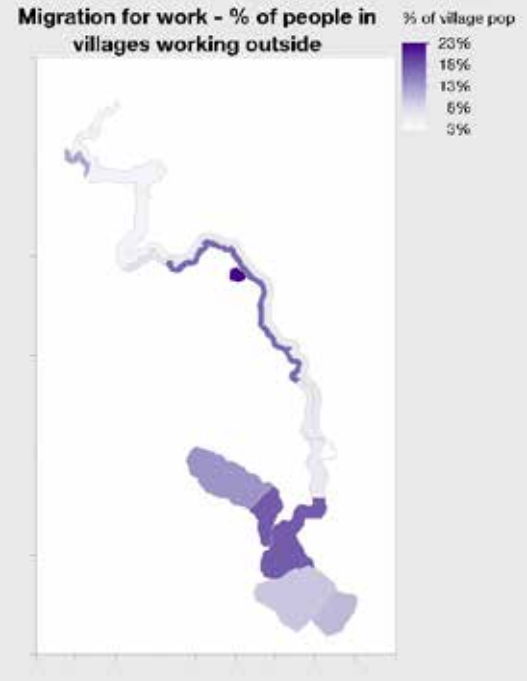
Almost all sampled villages had people who work outside the village (Annex, Table 45, Map 22). However, in Sub-zone 4B 3S in Cambodia, and in Sub-zone 2A Mainstream Lao PDR only 50% and 64% of the villages, respectively, had people who worked outside the villages, the lowest number of villages with this characteristic.

For the total sample, the mean percentage of the village population that worked outside the village was 11%. This was highest in the Songkhram area in Thailand at 23% of the population, but the proportion was also high in the Sub-zone 3B Thailand mainstream at 16%. In Cambodia, Sub-zones 4C Kratie to Viet Nam border and 5A Tonle Sap River, the percentage of village populations working outside the village was similarly high, at 17%-18% (Map 23).

Map 22 Per cent of villages where people migrate for work



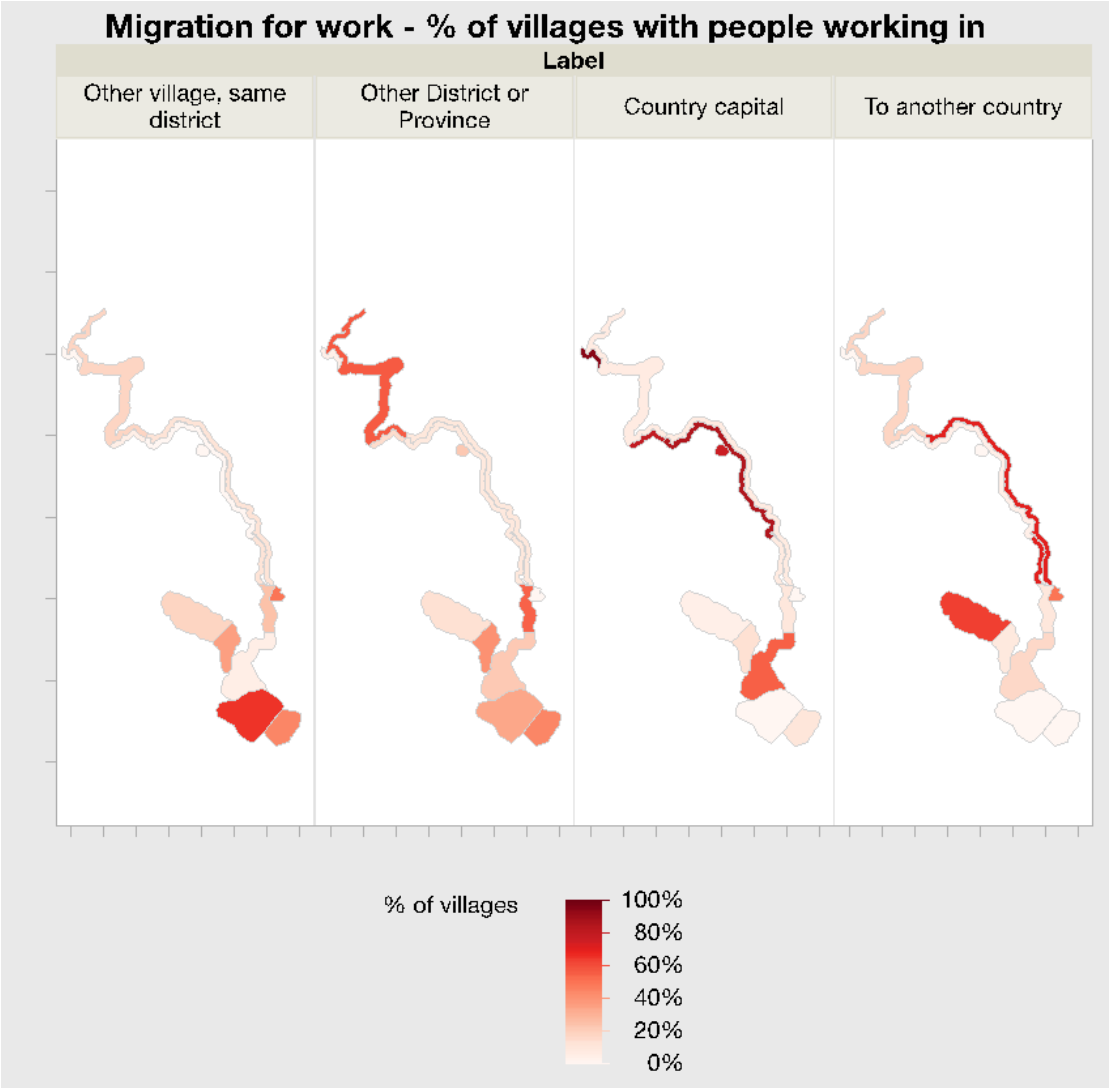
Map 23 % of village population working outside village



The destination for work migration is an indicator for both the time spent in the work place, i.e., the further away the work place is, the longer the working periods away from the home village are likely to be. The destination of work place is also an indicator for the mobility of the work force and thereby for locations of concentrations of economic development and opportunities.

Map 24 (Annex, Table 45) shows the percentages of village populations that worked in: 1) another village in the same district, indicating level of local work force mobility; 2) the percentage that worked in another district or province, indicating level of within-country regional economic integration; 3) the percentage that worked in the country capital, indicating country level urban concentration in large urban conglomerates; and 4) finally the percentage that worked in another country, indicating the level of economic opportunities within the country compared to regional work opportunities. Local level work integration was high in Viet Nam, especially in the freshwater zone, with 66% of the villages having people that worked in another village within the same district. Slightly lower levels were found in the Sub-zone saline in Viet Nam at 45% and in Sub-zone 3S in Cambodia at 50% of the villages. The highest percentage of villages that have people who work in another district or province was in Sub-zone 2 mainstream Lao PDR, at 57% of the villages. In Cambodia Sub-zones 4A Khone Falls to Kratie and Sub-zone 5A Tonle Sap River, the percentages are also high at 55% and 41% of the villages, respectively. In Thailand, work migration from the LMB corridor to the country capital, i.e., Bangkok is very high: 85% of the villages reported people working there. Work migration to another country was highest from Sub-zone 3A mainstream Lao PDR. Though the destination was not asked for, it is likely to be Thailand. In Sub-zone 5B Tonle Sap Lake, 64% of the villages reported that village people were working in another country.

Map 24 Migration for work - % of villages with



The survey results indicate that work migration for shorter or longer periods of time is a widespread and economically important alternative livelihood option for households in the LMB corridor.

It can be concluded that the LMB corridor is an important source of workers for other areas within the Member Countries, and also for exporting workforce to other countries. The possibility of work migration is an element of resilience of the households in the LMB corridor; however it must be noted that SIMVA does not include data on the work conditions in the work places migrated to, or the benefits and costs to the households from work migration.

6.2.3 Travelling outside the home village for fishing in other places

The case of households that travel outside their village to do fishing is a special type of work migration, which is of relevance to MRC. The Village Profiles included the collection of this information (Annex, Table 46). In the whole LMB corridor, 27% of the sampled villages had households that travelled outside the village to fish. Most were in Cambodia at 39%, and in Viet Nam at 37.5% of the villages. 15% of the villages in Lao PDR and in Thailand had households that travelled for this purpose.

In those village, on average 10% of the households had members who travelled for fishing. The typical duration away from the village for fishing in other places was less than 1 month; however in two Sub-zones in Cambodia, one in Thailand and in both Sub-zones in Viet Nam, there were fishers who spent between 1 and 3 months away, and even in a few villages between 3 and 6 months. The cases where fishers are away for longer periods indicate specialised fishing and full-time fishers.

The relatively frequent occurrence of people that go fishing in other fishing habitats away from the home village tells us that calculating fishing effort and thereby pressure on fish resources needs to take moveable fishing activities into account. Likewise, efforts to manage and regulate LMB inland fisheries must include considerations of temporary increases in fishing in certain places by outsiders.

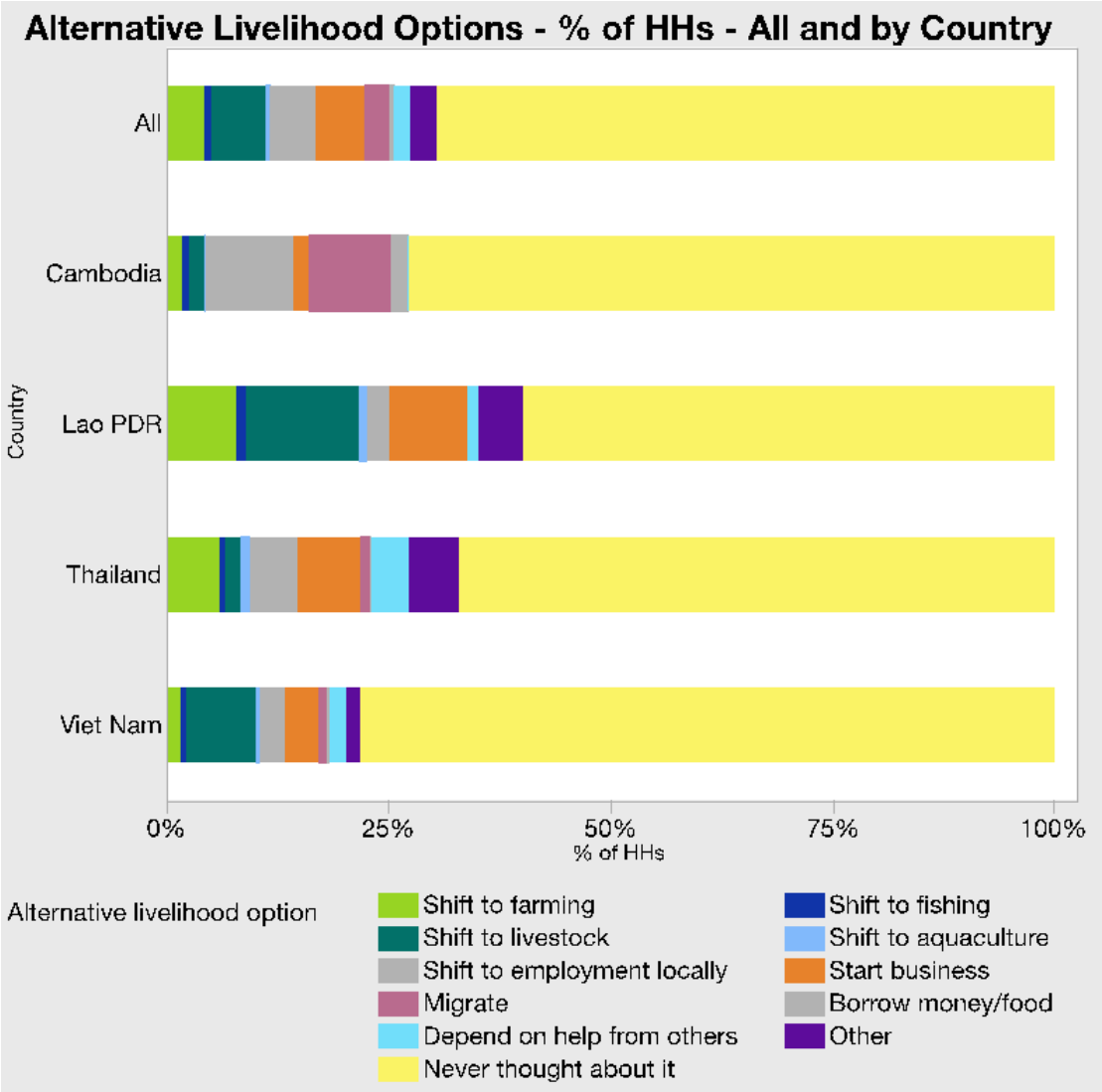
6.3 Alternative livelihood options

In the cases where households cannot continue to rely on their present main livelihoods, the existence of alternative livelihood options is important for their resilience.

The survey asked the sampled households what they would do if they could not continue their present livelihood (Figure 31, Annex, Table 47). The finding that 70% of all households answered that they never thought about it, is perhaps not surprising, but could be a cause for concern.

However, 30% of the households had given thought to the possibility of alternative livelihoods. Country-wise, the highest percentage of households that had thought about alternative livelihood options was in Lao PDR, at 40% of the households.

Figure 31 Alternative livelihood options – percentage of households - all and by country



Of these, 13% would shift to livestock, 9% would start a business, and 8% would shift to farming, while the remaining few per cent had various other plans. In Sub-zone 3A mainstream Lao PDR, 55% had thought about alternatives. Of these, 15% would shift to livestock, 11% start a business, another 11% start farming, and 8% had other options.

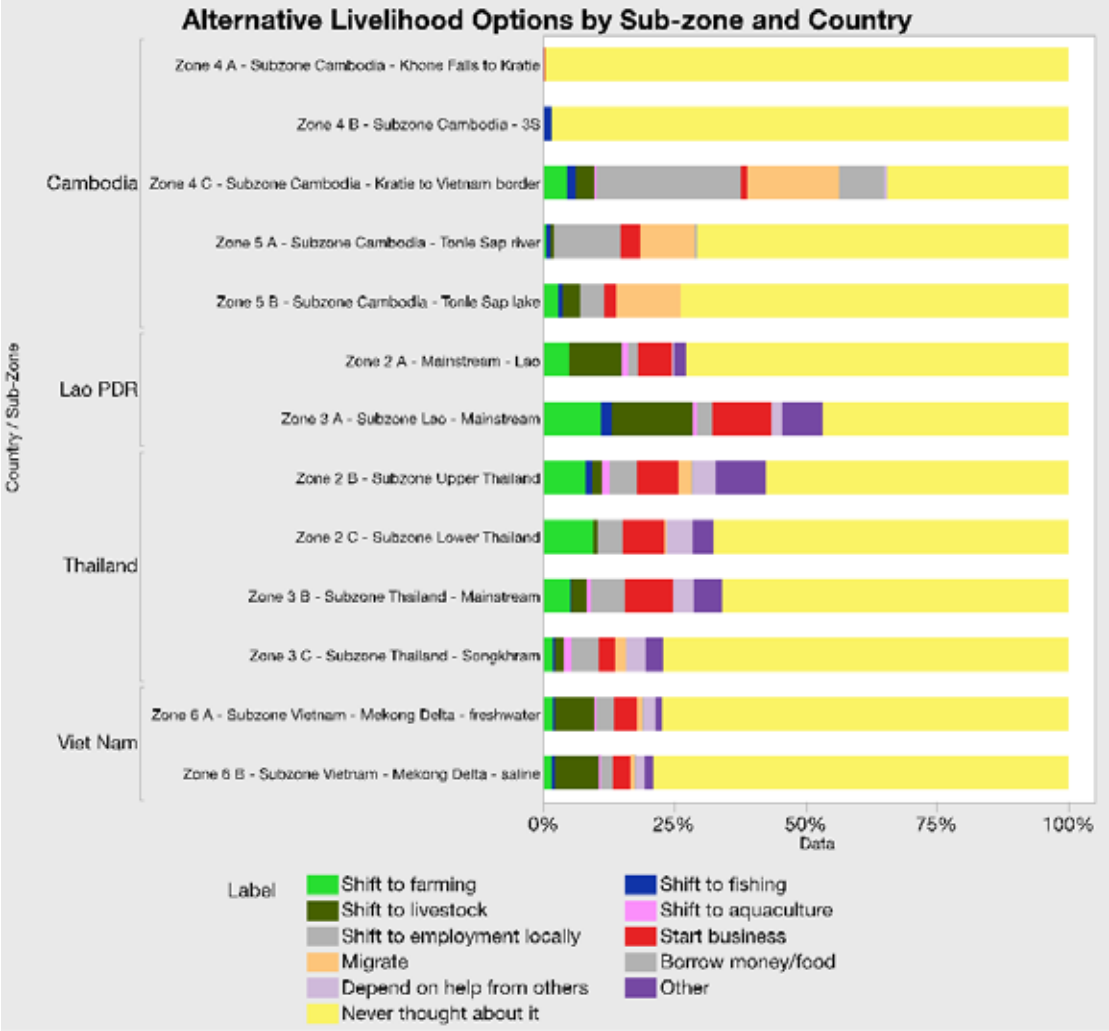
In Cambodia overall, 10% of the households would shift to employment locally, while 9% would migrate. Notably, in any of the Sub-zones the highest percentage of households that had thought about alternative livelihood options was in Sub-zone 4C Kratie to Viet Nam border. Here, 28% would shift to employment locally and 17% would migrate, while 8% would borrow money or food.

In Thailand, 7% would start a business, 5% shift to employment locally, 6% shift to farming and another 6% would do something other. In Thailand, only 1% of households answered that they would migrate, probably indicating that those who would want to do so have gone already.

In Viet Nam, 6% would shift to livestock, 5% would start a business, another 5% shift to employment locally, while 4% would start farming and 3% had other options.

Statistically, alternative livelihood options differed significantly by Sub-zone (Likelihood Ratio Probability > Chisquare <.0001; Rsquare (U) 0.129; with warning that 20% of cells have expected counts less than 5). Figure 32 shows the distribution of alternative livelihood option across the Sub-zones.

Figure 32 Alternative livelihood options by Sub-zone



Overall, the survey found that most people in the LMB corridor in general did not think about alternative livelihood options. There could be several reasons for this. One reason could be that people did not feel any threat to their present ways of maintaining their lives and incomes, another could be that they were not exposed to the idea of alternatives or encouraged to think that they could change their livelihoods. A third possibility could be that there were no or few alternatives available. If the latter should be the case, it would be a strong factor in households' vulnerability to changes on the basis of their present livelihoods. However, in most Sub-zones the need to consider alternatives to their present livelihood was a present concern for a third or more of the households.

6.4 Coping strategies for impacts of flooding

Households' coping strategies for the impacts of flooding showed quite a lot of variation with many different approaches. Figure 33 shows the distribution across the sample by country (Annex, Table 48).

The most common coping strategy was in the category 'Other', unfortunately not specified, with 30% of all responses. Especially in Viet Nam, 'Other' coping strategies accounted for as much as 89% of the responses. Further analysis of the data may elicit clarification on what the 'Other' category covers.

Overall, the second-most common coping strategy was to borrow money, thirdly to receive assistance form government, and to receive assistance from NGOs or other organizations was the fourth option.

Figure 33 Coping strategies for impacts of flooding of households affected by flooding in the previous 3 years

The coping strategies also differed statistically significantly between the Sub-zones at probability larger than ChiSquare at less than 0.0001, and Rsquare (U) at 0.28.

Selling of productive assets, which is a desperate coping strategy, was mostly found in Cambodia in Sub-zones 4A and 4B, Khone Falls to Kratie and to Viet Nam border. In these Sub-zones, help from family and relatives was also more common than in other LMB corridor zones. Starting to fish as a coping strategy was mostly reported from Lao PDR, Zone 3A along the mainstream, and in Cambodia. The highest proportion of households that had government assistance as their coping strategy was in Thailand.

The many coping strategies for the impacts from floods reported by the LMB corridor households, and the very high proportion of the 'Other' coping strategies, indicate that further research into this would be relevant. Some coping strategies such as selling of productive assets and borrowing money can lead to impoverishment and indebtedness. For MRC, it would be a relevant undertaking to carry out further research to be able to present a more detailed picture of coping strategies to national government agencies with a view to design the most effective and appropriate assistance programs to help impacted households.

6.5 Coping strategies for impacts of drought

Households' coping strategies for impacts of drought were very similar to the coping strategies for impacts of flooding (Annex, Table 49, Figure 35). The category 'Other' was the most common response, accounting for 34% of all responses.

Of the remaining coping strategies, borrowing money was the most common strategy overall, followed by receiving assistance from government and from NGOs or other organizations.

Figure 34 Households' coping strategies for impacts of drought

The coping strategies for impacts from drought also differed statistically significantly between the Sub-zones with Probability> Chi-square at 0.0001 and Rsquare (U) 0.23 (however with the warning that 20% of cells have expected count less than 5, Chi-square suspect.)

Further research would be worthwhile with a view to provide informed advice to national government agencies on the design of drought relief support interventions.

6.6 Adaptation to changing weather patterns

SIMVA also provides data and information that feed into the climate change, climate change adaptation research, and design of actions. The survey included questions to obtain information about adaptation to changing weather patterns, i.e., changes that had occurred over the longer term, and as such, different from extreme weather. The respondents were asked if they had changed the season for growing rice, i.e., from wet to dry season or vice versa, and/or had changed the timing of growing/planting to earlier or later than what they had usually done before.

6.6.1 Change of season or timing for growing rice

Overall, only 5% of the sampled households had changed the season for growing rice (Annex, Table 50). In Cambodia, 6% had changed seasons, in Lao PDR 4%, in Thailand 9% and in Viet Nam 1% of the households. In the Sub-zones, the highest proportion that had changed season was in Sub-zone 3C Thailand Mainstream at 12% of the households. Of the households that had changed season, 43% had changed from

wet season to dry season, and 57% had changed from dry season to wet season. In Cambodia, the change from wet to dry or vice versa was split fifty-fifty; in Lao PDR, 62% had changed from wet to dry season and 38% the other way around. In Thailand and in Viet Nam (with very few households that had changed at all) around 68% had changed from dry season to wet season.

In terms of changing the timing of planting, 15% of the sampled households had changed to planting later and 7% to planting earlier; 77% of the households that had changed growing practices had not changed their timing (Annex, Table 51).

The results from the survey indicate that in general farmers had not changed farming practices in terms of season or timing changes due to changing weather patterns.

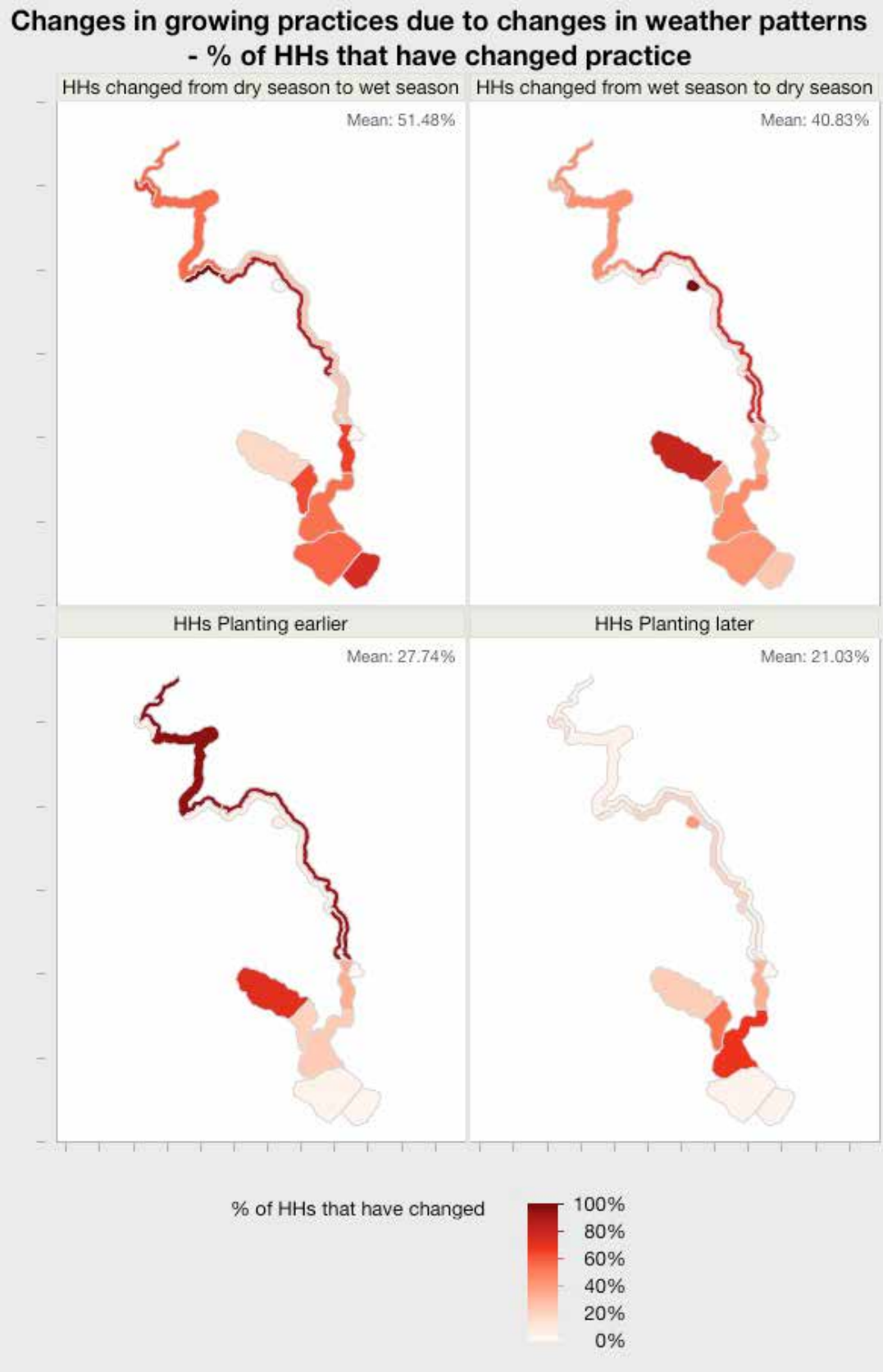
6.6.2 Change of crops

Respondents were asked if they had changed crops or crop varieties due to floods, drought, increasing or falling temperatures or other reasons (Annex, Table 52).

Of 2,610 responding households, 85% had not changed crops, and 7% had changed for reasons other than weather or climate. Only 4% of the sampled households had changed crops due to drought; of these most were in Sub-zone 2A Mainstream Lao, where 44% (12 HHs) had changed for this reason.

Only 3% of the respondent households had changed crops due to flooding; of these most were in Sub-zone 5B Tonle Sap Lake at 33% (15 HHs) of the sampled households in that Sub-zone. Only 1.3% (33 HHs) of the households responding to this question reported they had changed crops due to either falling or increasing temperatures.

Map 25 Adaptation to changing weather patterns - changes in rice growing practices by the 5% of sample households that changed planting season and the 7% of households that changed the timing of planting



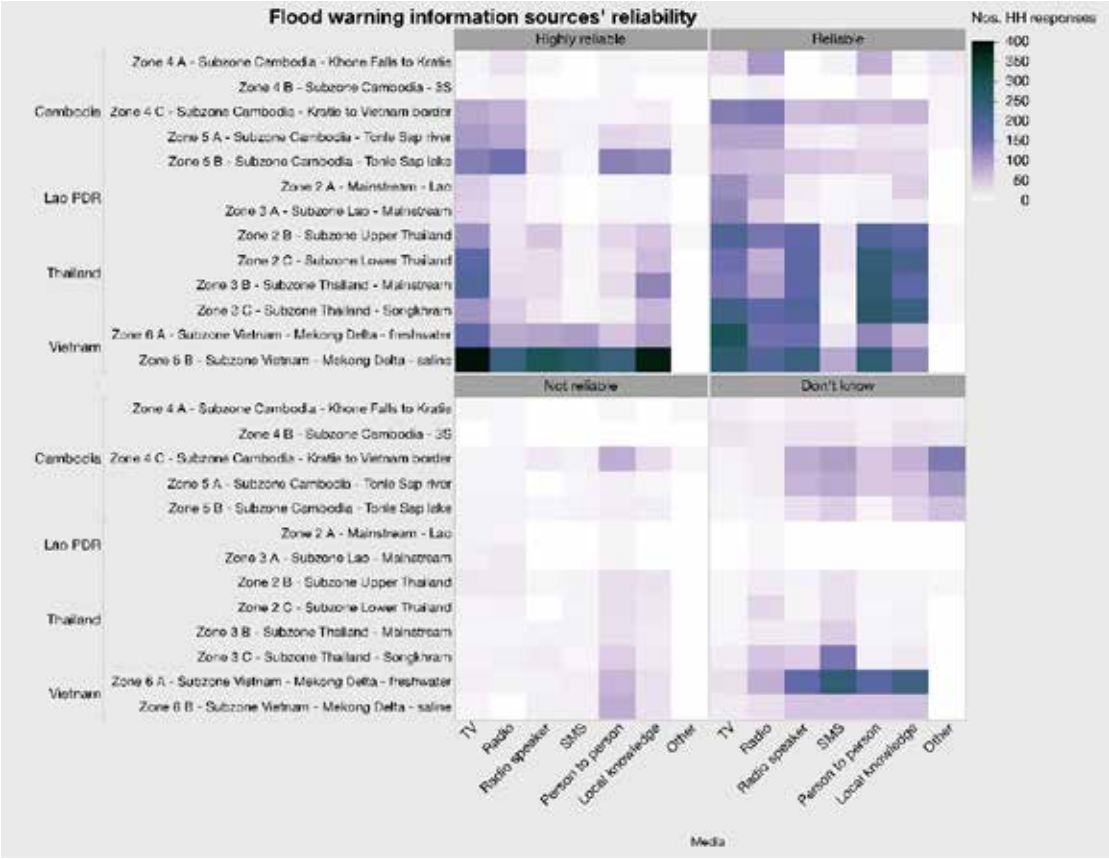
6.7 Early warning and disaster preparedness

Flood warning systems in some form were available to 69% of the sampled households in the LMB corridor, while 23% of the households reported no available flood warning; 8% responded they did not know if such information was available (Annex, Table 53).

In Lao PDR, 57% of all households reported that they had no flood warning information, and in Cambodia this was the case for 25%. Thailand and Viet Nam are much better covered, with 98% and 82% of households reporting they had access to flood warning information. Notably though, 11% of the households in the Sub-zone 6A – freshwater in Viet Nam said they did not have flood warning information, which would appear critical in view of the very flood prone area.

In terms of flood warning systems and people's perception of the reliability of information, the system in Sub-zone 6B – saline – in Viet Nam was assessed as generally highly reliable for all media, including local knowledge (Figure 35). Around the Tonle Sap Lake, the flood warning system through all media was also considered mostly highly reliable. In Thailand, TV was considered the most highly reliable source of flood warning information, with other sources considered reliable too. Overall, person-to-person information was considered the most unreliable source of flood warning information.

Figure 35 Flood warning information sources and their reliability

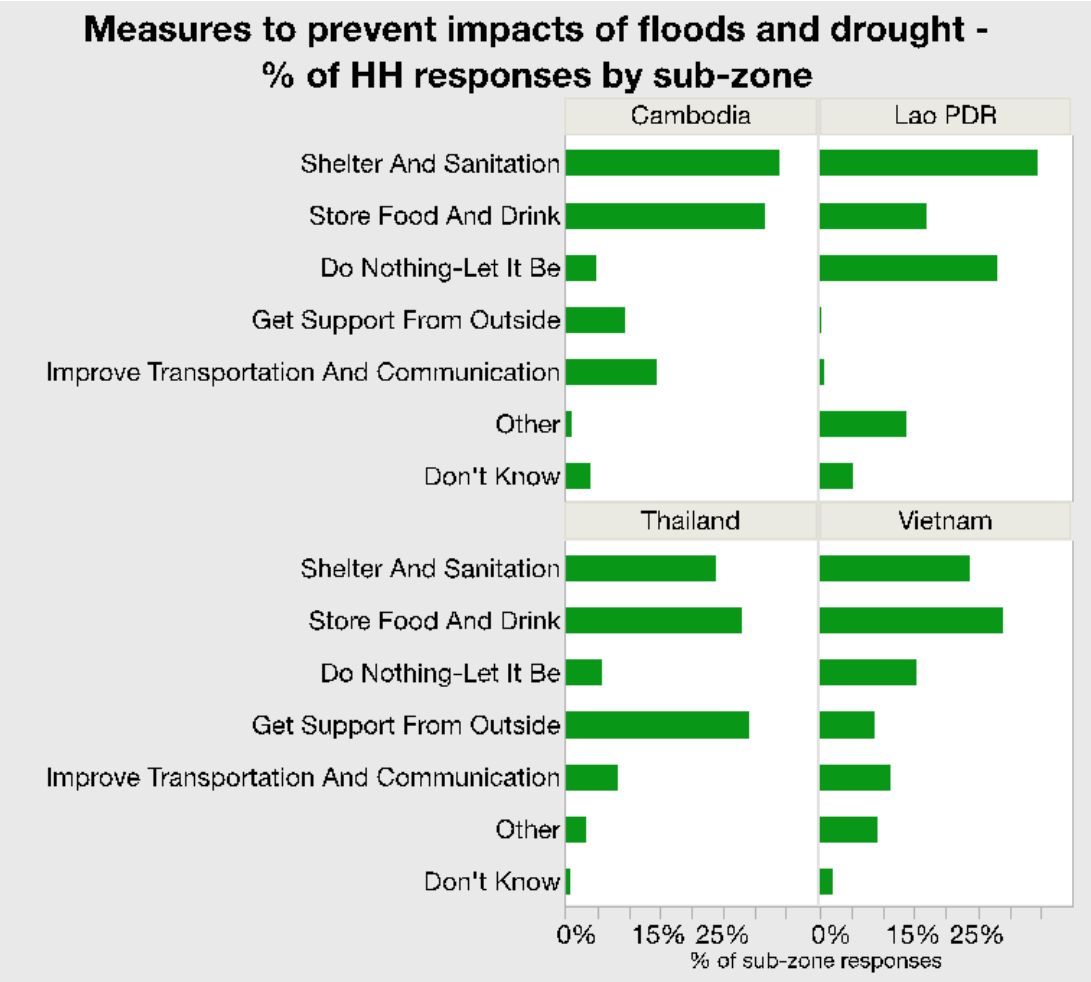


6.8 Measures to prevent impacts

The survey asked respondents if and how they tried to prevent impacts from flood and drought by various measures (multiple response), assuming they anticipated that flooding and drought would happen. Storage of food and drink and ensuring shelter and sanitation were the most important measures households reported taking. 28% of all sampled households, more or less equally distributed across all the Sub-zones, reported these measures (Annex, Table 54, Figure 36). Improving transportation and communication was mentioned by 11% of the households as a preventive measure. 16% identified getting help from outside as an important measure to prevent impacts; notably, in Thailand this was mentioned by 29% of the households, while in Lao PDR less than 1% mentioned this option.

While the results also reflect the different structures and levels of social support systems in the countries, the main finding is that LMB corridor households in general think about and are prepare for impacts from floods and droughts.

Figure 36 Measures to prevent impacts from floods and drought - % of responses by Sub-zone



7 Conclusions and recommendations

The SIMVA 2014 data are meant to provide the basis for a broad range of specific, more detailed analysis beyond the scope of the present report. Examples of relevant further use of the data include: economic analysis of costs of floods and droughts; identification of weak areas in flood warning systems; analysis of the structure of occupations and livelihoods; inland fisheries assessments including utilization of habitats and fishing effort; analysis of water resource use for agriculture; monitoring of levels and quality of public services; and analysis of adaptation to climate change.

This report is expected to be a valuable reference document for the further analysis and utilization of the SIMVA 2014 data. Recent important studies of the MRCS have used SIMVA 2011 and 2014 data, including the Council Study, namely "a study on the sustainable management and development of the Mekong River, including impacts of mainstream hydropower projects," or the Technical Review to support the Procedures for Notification, Prior Consultation, and Agreement (PNPCA) process on the proposed Pak Beng hydropower project.

7.1 Conclusions

SIMVA 2014 was designed to obtain data on shocks to households and communities in the LMB corridor. The focus was on impacts from floods, droughts, and extreme weather. Further, SIMVA aimed to identify other types of events that impact communities, and identify longer-term trends.

Though flooding is a recurrent and well-known situation in the LMB corridor, and the livelihoods in many ways are adapted to the natural Mekong River system, the survey has documented the scale and the extensive impacts of flooding. Flooding affects more than a third of the LMB corridor sample population at regular intervals, causing damages and losses of assets to a third of the population every year. Cambodia and Thailand are most affected, but it is also a problem in Lao PDR and Viet Nam. Drought was also found to be a widespread and serious problem in the LMB corridor, especially in Cambodia and Thailand. Almost a third of the sampled households experienced drought in the previous 12 months, and more than three quarters of those lost assets due to drought.

The findings on floods and drought lead to the conclusion that flood protection and flood preventive measures have potential for extensive positive effects and similarly for drought mitigation measures, such as development of irrigation potential in the LMB corridor in Cambodia, Lao PDR and also in Thailand.

The largest number of events that were unexpected by the communities, i.e. that could be considered shocks, were events directly related to the Mekong, primarily flooding. The second was agricultural events, including plant and livestock diseases and events caused by external factors, such as low prices for agricultural products; and third, weather related events, such as drought and very hot weather. Together with collective village activities, these were also the types of events with the strongest impact on communities' overall well-being.

The results from the qualitative study supported the research design focus on floods, droughts and extreme weather while adding insights into the larger social and socio-economic context; for example, the finding that local collective village activities are key factors that influence community well-being. This is a good illustration of the notion that social and socio-economic conditions and actions must be considered and integrated into analysis of impacts from flooding and drought.

The most noteworthy long-term trend over the previous 10 years was an overall increase in community well-being in LMB corridor villages and communities. Though not statistically solid, this trend was found in the study villages in most Sub-zones and indicates general socio-economic development and progress with regard to availability of services and opportunities. An overall trend of decreasing quality and contribution of fisheries to community well-being was identified; however, this had not affected the general trend of improvement in community well-being. This points to the fact that societies and livelihoods in the LMB corridor are changing in step with socio-economic development.

The findings on the high levels of migration for work also indicate that rural communities are becoming increasingly integrated into national economies. Further findings that indicate that existing livelihoods are increasingly under pressure and that new opportunities emerge were those regarding alternative livelihood options. Though 70% of the sampled households in the LMB corridor had not thought about alternative livelihood options, 30% had given this thought.

One of the goals of SIMVA was to identify socio-economic conditions that determine resilience to shocks. This question was mainly addressed by the collection of data for the indicators for resilience; namely, the availability and quality of village infrastructure and public services, and level of migration. The survey found significant differences between the Sub-zones and countries in this regard, indicating that LMB corridor villages in Cambodia particularly are more vulnerable to water resource related shocks due to relatively less coverage and lower quality of public services. The combination of a high proportion of flood and drought-affected households and relatively less availability of public services indicates that the negative impacts from flooding and drought are most severe in Cambodia. On the other hand, migration to the country capital and to other countries was also found to be common in Cambodia.

A key design feature of SIMVA 2014 was to create a statistically solid basis for comparing and detecting differences between Sub-zones. The various analyses of frequencies and distributions by Sub-zones in this report show many cases of statistically significant differences between the Sub-zones. This is important because it confirms the relevance of the socio-ecologically defined Sub-zones for both research and planning purposes.

The analyses of the indicators of the frequency and size of households' losses from floods and droughts have provided a number of measures for the strength and severity of negative, and to a smaller degree positive, impacts. There is no absolute yardstick to measure strength and severity of impacts, but flooding that impacts more than two-thirds, and in many areas more, of the communities, and 40% of the households in the LMB corridor, must be considered severe. Similarly, the loss of assets by close to two-thirds of flood-affected households must be considered a severe negative impact. The value of losses is also an indicator for the severity of impacts.

Regarding coping strategies, a weakness in the survey was realised in that the category of 'Other' coping strategies, which was the most frequent response, was not specified during data collection. Apart from the 'Other' category, the most common strategies for coping with negative impacts were found to be to borrow money and to receive assistance from the government. The coping strategies were significantly different in the Sub-zones and countries, indicating different levels of government support and differences in local social support structures.

SIMVA 2014 also had the ambition to identify the various conditions that determine whether changes in the water resources situation or other changes had positive or negative effects. This was addressed mainly through spatial analysis by Sub-zone of the frequencies and distributions of all indicators. The temporary dimension of the time of year as a factor was analysed in the use of fishing habitats and habitats for collection of OAA/Ps. This analysis showed that in the different Sub-zones, particular habitats were exploited differently over the year, thereby bringing temporal and spatial dimensions together in the analysis. No overall conclusion emerges from this level of analysis, but the results can be used as an example for modelling impacts from water resource development activities. During data analysis various correlations of variables for households' socio-economic status and the impacts from changes in the external environment were undertaken. However, the initial results made it clear that more in-depth analysis beyond the scope of the present report would be required.

7.2 Main lessons learned

SIMVA 2014 was a major effort by MRCS and the national Mekong Committees in Cambodia, Lao PDR, Thailand, and Viet Nam. It was a long process where the design stage, mobilization, field data collection, data entry and cleaning, and data analysis took more than two years.

The SIMVA process is a key MRC activity for bringing the member countries' national statistical departments and research communities together in a joint effort to produce new and consistent knowledge of the LMB. SIMVA contributes to harmonize national statistical data for the LMB, which is a project also being pursued by MRC's work on the LMB Socio-economic Database.

The national teams did the first data analysis of the national data and produced very good national reports on that basis. This was a valuable exercise, creating in-depth knowledge of the data and ownership. Compared to SIMVA 2011, the national teams were more involved in SIMVA 2014. It was an important step in the decentralization of MRC functions as well as the institutional arrangements for strengthening the integration of MRC data with the national statistical systems.

Due to the long implementation period with delays compared to the original schedule, there were changes in key personnel in MRC and a change of the consultant statistician midway through the process, which created further delays. Though such events cannot be avoided, keeping to a tight timeline can minimize them.

It was also reconfirmed that manual data entry and data cleaning takes more time than planned.

SIMVA 2014 was conceptualized to be more focussed and limited in scope compared to SIMVA 2011. However, the questionnaires used in SIMVA 2014 were still extensive, demanding large resources for data collection, data entry and analysis.

7.3 Recommendations

It is recommended that:

MRC considers increasing its activities on flood and drought preventive and protection measures that at the same time respects the natural aquatic ecosystems that sustains the fisheries and the abundant other aquatic animals and plants, both of which play such an important role in the livelihoods and food supply of the LMB corridor population.

MRC may undertake an economic assessment of the impacts of floods and droughts based on the SIMVA 2014 data. The survey data on the value of losses due to floods and droughts provides an important input to economic assessment of the total cost of floods and droughts in the LMB corridor.

MRC continues and strengthens its support to the Member Countries' own investigations for development of irrigation potential, with a focus on Cambodia, and makes an inventory of water extraction points for drinking water from the Mekong.
SIMVA 2014 data on consumption of fish and OAA/Ps should be used to update earlier studies on fish and OAA/Ps consumption in the LMB.

MRC consider instigating further data collection of riverbanks and islands to assess the economic value of these vulnerable agricultural areas.

MRC consider continuing to apply the Sub-zones defined in SIMVA 2014, with certain revisions, across MRC's various activity areas.

The findings of the Qualitative Study point to the importance of engaging with communities in MRC's work on water resources development (refer to recommendation for future SIMVA below).

7.4 Recommendations for future SIMVA surveys and studies

It is recommended:

To continue to apply the Sub-zones defined in SIMVA 2014. The application of 13 Sub-zones in SIMVA 2014 was found to be relevant since there were statistically significant differences between these on many variables.

That future surveys make use of tablets for data collection to increase efficiency. Furthermore, data analysis tabulations, including dummy tables for analysis for National and Regional reports as well as data auto cleaning programs and syntax should be developed and applied in advance.

In terms of sample size, there is scope for reducing this in future SIMVAs. SIMVA 2014 is statistically robust and can be used for calculating future optimal sample sizes. The subject matter of future SIMVA should guide further analysis of the statistical distribution of the main variables under consideration.

That future SIMVA builds on and feeds into the MRC Socio-economic Database, which contains harmonized official national statistical data.

An option that should be considered is to build a smaller panel of households from the SIMVA 2014 sample. A panel of households that will be visited again over time would be very useful for monitoring purposes, since changes at the household level can be monitored. Furthermore, having a panel of households would make it possible to design more cost-effective ways of data collection compared to randomized surveys such as SIMVA 2014. It is expected that a number of households selected for the panel will move to another location before the next survey. However, the SIMVA 2014 sample is large enough to have a back-up pool of households, which can replace households who move away.

7.4.1 Building a network of monitoring villages

SIMVA 2014 collected Village Profile data that gave new information about relevant variables at the community level, such as the existence and quality of water related services. The Village Profiles also included fishing gear counts, which is a traditional method for measuring fishing effort. The Village Profiles exemplified how local knowledge can be a source of relevant data for MRC.

The Qualitative study in 25 villages with Focus Groups produced interesting data on trends over the past 10 years in community well-being, fisheries, irrigation and rice cultivation, navigation and aquaculture. From this study, it is clear that the social and socio-economic development in LMB corridor villages involves many variables with complex interrelationships. In addition, the study was an example of how communities can be involved in data collection and data exploration.

Based on the experiences from SIMVA 2014, it is recommended to build up a network of monitoring villages along the Mekong mainstream, in all the Sub-zones, where the village leadership, helped by local knowledgeable informants, provide monitoring data on the variables of interest to MRC on a yearly basis.

The monitoring villages, or at least some of them, should be located close to existing MRC monitoring stations for water quality, sediment, fisheries etc., to allow for analysis of relationships between these and socio-economic data.

The types of data could be both quantitative and qualitative. Collection of quantitative data would require consideration of the sample and number of villages. The definition of the variables of interest should be harmonized with national statistical systems with a view to avoid duplication of effort and to ensure consistency necessary for analysis of the data in combination with other official statistics.

The data collection could be done in pre-defined simple formats, which could be collected in the villages, initially by national MRC specialists, later as part of the national statistical data collection system. At some stage in the not too far future it would be possible to do this via the Internet.

SIMVA data gives detailed pictures of the situations in the LMB corridor regarding livelihoods, dependency on the Mekong water related resources, and communities' strategies to cope with shocks. As such, Member Countries can make use of this data in analysing the conditions of people in the corridor, and how they may be affected by development plans that could alter their livelihood options. This analysis will be helpful in understanding more fully the potential costs and benefits of proposed projects and support the development of effective mitigation measures in dealing with potential impacts.

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Annexes 1

Annex A: Full team of SIMVA 2014

Cambodia team: Mr. They Kheam, Director of Demographics Statistics Census and Survey Department, Team Leader and SIMVA National Expert, trainer and supervisor for all activities for both studies; Mr. Noun Nisykosal, Deputy Director of Socio Economic Statistics Department, Assistant of qualitative study; Mr. Pen Socheat, Deputy Director of Demographics Statistics Census and Survey Department Assistant of quantitative study; Mr. Saint Lundy, Director of Information Communication and Technology, Department Team leader of data processing.

Field team: Mr. Duch Chamroeurn; Mr. Touch Minea; Mr. Oun Chamrouen; Mr. Liv Toch Veasna; Mr. Koeung Sokcheat; Mr. Moung Narith; Ms. Som Somaline; Ms. Loch Satim; Ms. Mao Vannoeun; Ms. Hoem Sokna. Data quality control and processing team: Mr. Pen Socheat; Mr. Vy Vithialy; Mr. Saint Lundy; Ms. Men Tola; Ms. Seng Chhanthavy; Ms. Pok Saream. Special thanks to the National Institute of Statistics of Cambodia, which provided guidance on this work. The Qualitative Study team comprised of Mr. They Kheam; Mr. Nounnisay Kosal; Ms. Oun Sokunthea; Mr. Moeng Tithyaroat; Mr. Moeung Satiarath; Ms. Yit Vilia.

Lao PDR team: Ms. Phetsamone Sone, former Director-General of Department of Economics Statistics, Lao Statistics Bureau, Team Leader and SIMVA National Expert; Ms. Salika Chanthalavong, Chief of National Accounts Division of Lao Statistic Bureau (LS), assistant to Team Leader; Mr. Bounlert Vannalat (PhD); Mme. Phonesaly Souksavath, Mr. Sypaseuth Navongsa; data processing specialists. Ms. Thanhasone Libounheun; Ms. Manisone Lachanthaboun;. Field team: Ms. Soudavone Phanthavy; Ms. Phouth Outha; Ms. Santisouk; Mr. Thanin; Ms. Manisone Lacanthaboun; Mr. Anousack Kong vichith; Ms. Phaithong Vonglokham; Ms. Nithdavone; Ms. Nithtanhya Phiathep; Ms. Thanhasone Lybounheung; Mr. Dalika; Mr. Khonsith. Special thanks to the Lao Statistical Bureau for support throughout the work.

Thailand team: Dr. Sirisuda Jumnongsong, Team Leader and SIMVA National Expert; Dr. Idsariya Wudtisin. Much appreciation is extended to the staff of TNMC, in particular, EP TNMC Coordinator Ms. Ruamporn Ngamboriruk and Ms. Thitima Phuavong. Data collection for both the quantitative and qualitative survey was carried out by a national research team from Kasetsart University (Bangkhane Campus in Bangkok and Chalermphrakiat Sakon Nakhon Province Campus). Thanks are extended to colleagues in both campuses and to the students who conducted the interviews and were field facilitators.

Viet Nam team: Mr. Pham Trong Thinh, PhD, Director of Southern Sub-Institute of Forest Inventory and Planning and University of Agriculture and Forestry (SSFIPI), Team Leader and SIMVA National Expert, trainer and supervisor for all activities of the team. Mr. Truong Cong Khanh, MS, Director of Centre for Forest Resources and Ecology, SSFIPI, Assistant, qualitative surveyor, qualitative controller; Mrs. Pham Thuy Dung, MS, Lecturer, Faculty of Economy, University Agriculture and Forestry, qualitative surveyor, qualitative controller, entry quantitative data; Mr. Chu Huu Nam, economist, entry quantitative data; Mrs. Ha Dang, Viet Namese National Mekong Committee, qualitative trainer; Mr. Tran Duc Thang, Eng., Deputy Director, Centre for Forest Sustainable Management, Assistant qualitative surveyor; Mr. Nguyen Manh Tien, Eng., qualitative survey; Mr. Nguyen Bao Quoc, Eng., qualitative Survey. Acknowledgement is given to the efforts of the team from Southern Sub-Institute of Forest Inventory and Planning and University of Agriculture and Forestry for their hard work and fruitful cooperation in carrying out the field survey. Field team: Eng. Dang Van Hai, Head; Eng. Tran Van Vuong, Head; Eng. Pham Truong Giang, Head; Eng. Vu Van Vinh; Eng. Pham Van Ban; Eng. Đao Trong Dong; Eng. Pham Vu Linh; Eng. Luu Van Khich; Eng. Pham Gia Lam; Eng. Nguyen Bao Quoc; Eng. Nguyen Ngoc Tri; Eng. Le Truc Huan; Eng. Tran Phuoc Hung; Eng. Le Van Thieu; Eng. Vu Van Toan.

In MRCS, the SIMVA team was Dr. Thim Ly, Social Science Specialist; Mr. Dararath Yem, Environmental Management Specialist; Mr. Prachvuthy Men, Social Science Specialist. Special thanks to Chief Technical Advisor Mr. Henrik Larsen; Environment Programme Coordinator Mr. Nguyen Van Duyen; Mr. Nguyen Dinh Tung, JRP and to Ms. Vannida Chanpradith, Programme Secretary and since December 2016, Ms. Nguyen Thi Ngoc Minh, Socio-Economic Specialist.

International Consultant, Statistical Specialist Dr. Sonam Tshering did the data quality control, calculated weights, and produced the analysis templates for the national reports. International Consultant, Statistical Specialist Dr. Sithon Khun was responsible for the data base structure, the detailed sampling frame and guideline for statistical data gathering, quality control and entry. International Consultant, Social Anthropologist Jens Grue Sjorslev was overall responsible for the detailed design of the survey and qualitative study, questionnaire design, fieldwork guidelines, training of national researchers, data quality control, analysis of qualitative and quantitative regional data, and for drafting the Regional Report.

SIMVA 2014

HOUSEHOLD SURVEY

INTRODUCTION BY INTERVIEWER

Please read out loud before starting the interview:

"Thank you for giving your time to provide some information to this survey by the Mekong River Commission (MRC). I would like to start by giving you some information about this survey.

MRC is an organization formed by Cambodia, Lao PDR, Thailand and Vietnam in 1995 with the purpose "To promote and coordinate sustainable management and development of water and related resources for the countries' mutual benefit and the people's well-being". MRC works in the whole Mekong River Basin which is the large area where rivers and streams flows down into the Mekong – from the border of Lao PDR and China and all the way down to the Mekong Delta in Vietnam.

MRC conducts many studies and research into water resources, and also conducts socio-economic surveys and studies about people's use of water resources.
MRC provides information to governments and the public that they can use for development planning.

This survey we are conducting is called 'SIMVA', which means Social Impact Monitoring and Vulnerability Assessment. The purpose of the SIMVA is to find out how people use the water resources, for example for irrigation, navigation on the rivers, or fishing, or if water resources affect people, for example if there is flooding. More precisely, the survey will try to find out if some people are dependent on the water resources for their livelihood and income, and if they experience problems related to water resources, and the use of water resources.
This information will be made public in a report and on a website so everybody can see it.

Our SIMVA survey is carried out in 364 villages in the four countries, 87 villages in each country. We will interview 16 households in each village, and you are one of these 16 households. You have been selected by random selection, simply by counting down the village list of households. This is so the survey will represent all people who live along the Mekong river and Tonle Sap river and lake.

We will ask for your name, but this will not be entered into the database or used or shared with anybody in any way.

It should take about 1 hour to finish the interview.

Please ask any question you may have before we start."

ANSWER ANY QUESTION THE INTERVIEWEE MAY HAVE REGARDING THE SURVEY AND THE INTERVIEW

HOUSEHOLD QUESTIONNAIRE SIMVA 2014						
I	**IDENTIFIERS**					
1.	Questionnaire ID	Number 1 - 1384	Number:		|_____|
2.	Household ID number	Number 1 – 16:	Number:		|_____|
3.	Village Profile ID	Number 1 - 88 :	Number		|_____|
4.	Country	|_____|	5.	Country Code	|__|1 digit
6.	Province	|_____|	7.	Provincial Code	|__ __| 2 digits
8.	District	|_____|	9.	District Code	|__ __| 2 digits
10.	Commune	|_____|	11.	Commune Code	|__ __| 2 digits
12.	Village	|_____|	13.	Village Code	|__ __| 2 digits
14.	Zone	|_____|	15.	Zone Code	|__ __| 2 digits
16.	Sub-zone	|_____|	17.	Sub-Zone Code	|__ __| 2 digits
18.	National Village/ Commune ID number	|__|__ __|__ __|__ __|__ __|__ __|__ __|__ __|__ __			
19.	Area	Urban----------1 Rural----------2 Rural without road---3 (Lao PDR only)			
20.	Date of interview	/____/_____/2014	21.	Name of interviewer 1	|_____|
22.	Name of supervisor	|_____|			
23.	Respondent	Household head.....1 If not HH head, relation to HH head: Spouse.....2 Child.....3 Parent.....4 Other (Specify).....5 |_____|	If applicable: respondent 2: Spouse..... 2 Child ..... 3 Parent ..... 4 Other (Specify).....5 |_____|		
24.	Age of respondent	|_____|_____| years			
25.	Respondent name	|_____|			
26.	Respondent telephone	|_____|			

II	**DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS**		
	QUESTION	RESPONSE	INSTRUCTION
27.	Number of household members	|_____|	Use national Census definition
28.	Number household members below 15 years of age	|_____|	
29.	Number of household members above 60 years of age	|_____|	
30.	Sex of Household Head	Male---------- 1 Female---------- 2	Use national Census definition
31.	Age of Household Head	|_____| Years	
32.	Marital status of Household Head Circle one	Married---------- 01 Single---------- 02 Widowed---------- 03 Divorced---------- 04 Separated ---------- 05	
33.	Ethnicity of household head	|_____|	Use national names for ethnicity
34.	Highest education of any Household member Circle one	No formal education---------- 00 Primary---------- 01 Secondary ---------- 02 High school---------- 03 Vocational---------- 04 University---------- 05	

35.	MAIN AND SECONDARY occupation of family members in the last 12 months. Instruction: Please ask about each member of household, and then enter a '1' or '2' into the cell of occupation corresponding to each member of household. If more than 9 household members, use an additional questionnaire form for this information. 1= Main occupation (only one occupation); 2= Secondary occupation (one, or multiple occupations, or none (don't write anything), if applicable)									
	Occupation	a. **HH Head**	b. **HH Member 2**	c. **HH Member 3**	d. **HH Member 4**	e. **HH Member 5**	f. **HH Member 6**	g. **HH Member 7**	h. **HH Member 8**	i. **HH Member 9**
	Crops farmer (incl. gardening)									
	Livestock worker									
	Fishing – only fish									
	Collecting OAA/Ps									
	Aquaculture									
	Fish processing									
	Navigation - river transport									
	Sand mining from river									
	Forestry									
	Tourism industry									
	Construction work									
	Casual work									
	House work									
	Permanent employment (wage)									
	Business/trading									
	Handicraft									
	Voluntary work									
	Seeking work									
	Self-employed									
	Dependent (child, student, disabled, elderly)									

III	LIVELIHOOD ACTIVITIES in the past 12 months			
36.	What has been the importance of the following activities for the livelihood (income, assets, resources, consumption) of your household in the past 12 months? Tick,	a. Most Important (One tick)	b. Second Most Important (One tick)	c. Sometimes Important (Multiple ticks, if applicable)
i.	Farmer			
ii.	Livestock worker			
iii.	Fishing			
iv.	Collecting OAA/Ps			
v.	Aquaculture			
vi.	Fish processing			
vii.	Navigation – river transport			
viii.	Sand mining from river			
ix.	Forestry			
x.	Collect Non-Timber Forest Products			
xi.	Tourism industry			
xii.	Casual work			
xiii.	Construction work			
xiv.	House work			
xv.	Permanent employment (wage)			
xvi.	Business/trading/rental-lease income			
xvii.	Handicraft			
xviii.	Self-employed			
xix.	Other, please specify_____			

37.	Regarding the above activities: Could you please tell me if any household member has been engaged in any of the following water related livelihood activities in the past 12 months: <u>Circle (multiple, if applicable)</u>	Fishing----------01 Collecting OAA/Ps ---------- 02 Aquaculture----------03 Irrigated farming---------- 04 Non-irrigated farming ---------- 05 River bank cultivation---------- 06 Other, please specify---------- 07 None ---------- 08 Don't know---------- 99	Read out the options. Other, specify

III a	**Alternative livelihood options**		
38.	Alternative livelihood options If your household no longer could do the livelihood activities you have just mentioned in Q36, what would you do? Circle one	Shift to fishing 01 Shift to livestock---------- 02 Shift to farming 03 Shift to aquaculture---------- 04 Shift to employment locally 05 Migrate---------- 06 Start business 07 Borrow money/food---------- 08 Depend on help from others 09 Other (specify)---------- 10 Never thought about it---------- 11	Other, specify
IV	**AGRICULTURE**		
39.	Has your household cultivated any crops in the last 12 months? Circle one	Yes 1 No 0 Don't know 99	If Yes, continue to next question. If No, or Don't know skip to q#43.
40.	If yes, what are the most important crops? Circle one	Rice 01 Vegetable---------- 02 Industrial crops 03 Other (specify)---------- 04	Other, specify:
41.	How many hectares of land that can be cultivated does your household own?	|_____|Hectares	
42.	How many hectares did your household actually cultivate in the last 12 months? (include owned, rented, leased, used land)	|_____|Hectares	
43.	What are the main water sources for your agricultural production? Circle (up to 3, if applicable)	Pumped water from Mekong---------- 01 Pumped water from other surface water sour ce---------- 02 Irrigation water from Mekong-------- 03 Irrigation from other surface water sour ce---------- 04 Pumped water from well---------- 05 Rain-fed---------- 06 Other, please specify---------- 07	Other, specify:

V	RIVERBANK AND ISLAND CULTIVATION		
44.	Has your household cultivated any crops on riverbanks or islands in the last 12 months?	Yes_____1 No_____0 Don't know_____99	*Mekong Delta: include cultivation of morning glory and Nipa palm* If Yes, continue to next question. If No or Don't know, skip to q#46.
45.	If yes, What is the size of the land on the riverbank or island that you cultivated?	|_____| Hectares	Convert local values to hectares.
46.	If yes, approximately what percent of your total riverbank or island field produce did you sell in the last 12 months?	|_____|%	
VI	**FISHERIES**		
47.	Can you confirm, has anybody in your household fished in the past 12 months? *Circle one*	Yes_____1 No_____0 Don't know_____99	Check answer to q#36. If No, or Don't know skip to q#49. If Yes, continue to next question.

48.	If yes, where do you or he/she normally fish during the months? *Tick, multiple if applicable*	**Month**												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Don't know
i.	Mekong mainstream													
ii.	Other river/ stream													
iii.	Tonle Sap lake													
iv.	Other lake/ wetlands/swamp													
v.	Rice fields													
vi.	Ponds													
vii.	Irrigation reservoir/canal													
viii.	Hydropower reservoir													
ix.	River estuary													
x.	Offshore sea													
xi.	Other, please specify _____													
xii.	Don't know													

49.	What do you do with your fish catch? Circle, multiple, if applicable	Freshly cook and eat---------- 01 Process and eat later---------- 02 Share with neighbors---------- 03 Sell---------- 04 Process and sell---------- 05 Other---------- 06	Other, specify: _____
50.	How often do your household buy fish? Circle one	Every day ---------- 01 2 -3 times a week ---------- 02 1 time a week ---------- 03 2 times a month---------- 04 Varies a lot over the year ---------- 05 Never---------- 06 Don't know---------- 99	
51.	Fish consumption - how often do your household eat fish? Circle one	Every day ---------- 01 2 -3 times a week ---------- 02 1 time a week---------- 03 2 times a month---------- 04 Varies a lot over the year ----------05 Never---------- 06 Don't know ---------- 99	
52.	Where does the fish that you consume MAINLY come from? Circle one	Own fresh catch ---------- 01 Own aquaculture produce---------- 02 Bought----------03 Own preserve ---------- 04 Get from neighbor or relative----------05 Don't know----------99	
53.	How many Kg of fish did you cook for the latest meal your household had that included fish?	|_____| Kilogram	
54.	Did your household have a meal with fish in the last 24 hours?	Yes----------1 No----------0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#56.
55.	If yes, where was the fish from? Circle one	Own fresh catch----------01 Own aquaculture produce---------- 02 Bought----------03 Own preserve ----------04 Get from neighbor or relative--------- 05 Don't know----------99	
56.	If you did have a meal with fish in the last 24 hours, how many Kg of fish did you cook?	|_____| Kilogram per person	Ask how many people eat together: breakfast, lunch, dinner, snacks - and calculate

VII	**COLLECTING OTHER AQUATIC ANIMALS AND PLANTS (OAA/Ps)**													
57.	Can you confirm, has anybody in your household collected OAA/Ps in the past 12 months? Circle one	Yes ---------- 1 No---------- 0 Don't know ---------- 99												Please check answer to q#36 If No or Don't know, skip to q#59 If Yes, continue to next question.
58.	If yes, where do you or he/she normally collect OAA/Ps during the months? Tick, multiple if applicable	**Month**												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Don't know
	Mekong mainstream													
	Other river/ stream													
	Tonle Sap lake													
	Other lake/ wetlands/ swamp													
	Rice fields													
	Ponds													
	Irrigation reservoir/canal													
	Hydropower reservoir													
	Other													
	Don't know													
59.	What do you do with the OAA/Ps collected? Circle (multiple, if applicable)	Freshly cook and eat ---------- 01 Process and eat later---------- 02 Share with neighbors----------03 Sell---------- 04 Process and sell ---------- 05 Other---------- 06												Other, specify:
60.	How often do you buy OAA/Ps?	Every day ---------- 01 2 -3 times a week ---------- 02 1 time a week ---------- 03 2 times a month---------- 04 Varies a lot over the year ---------- 05 Never---------- 06 Don't know ---------- 07												
61.	How many Kg of OAA/Ps did you cook for the latest meal your household had that included OAA/Ps? Separate for animals and plants	OAA |_____| kilogram per person OAPs |_____| kilogram per person												
62.	OAA/P consumption - did your household have a meal with OAA/Ps in the last 24 hours?	Yes ---------- 1 No ---------- 0 Don't know ---------- 99												If Yes, continue to next question. If No or Don't know, skip to q#64

63.	If yes, where was the OAA/P from?	Own fresh catch ---------- 01 Own aquaculture produce-----02 Bought ---------- 03 Own preserve ----------04 Get from neighbor or relative---------05 Don't know----------99	
64.	If you did have a meal with OAA/Ps <u>in the last 24 hours,</u> how many Kg of OAA/Ps did you cook? <u>Separate for animals and plants</u>	OAA |_____| Kilogram per person OAPs |_____| Kilogram per person	<u>Ask how many people eat together: breakfast, lunch, dinner, snacks - and calculate.</u>
VIII	**FLOODING**		
65.	Has your household experienced any flooding the last 3 years?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#66.
66.	If yes, did your household lose any assets or experience any damages from flooding in the last 3 years?	Yes----------1 No---------- 0 Don't know----------99	
67.	Has your household experienced any flooding the last 12 months?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#109.
68.	If yes, did your household lose any assets or experience any damages from flooding in the last 12 months?	Yes----------1 No---------- 0 Don't know----------99	
69.	For how many days did the flooding last in total over the last 12 months?	|_____| Number of days	<u>If more than one flood event, add up the number of days.</u>
70.	How did the most serious flooding in terms of losses and damages in the last 12 months happen? <u>Circle, multiple if applicable</u>	River overflowed---------- 01 Lake overflowed---------- 02 Canal overflowed----------03 Rain water could not drain away------- 04 Other---------- 05 Don't know---------- 99	If Other, specify
71.	What was the source of floodwater in the most serious flooding in terms of losses and damages in the last 12 months?	Normal rains/monsoon---------- 01 Extended monsoon ---------- 02 Extreme weather/typhoon---------- 03 Hydropower reservoir release---------- 04 Other---------- 05 Don't know---------- 99	If Other, specify _____ _____
A.	**Loss of paddy land due to flooding in the last 12 months**		

72.	If yes to 67, did you lose, or was any paddy land temporarily damaged?	Yes----------1 No---------- 0 Don't know----------9	If Yes, continue to next question. If No or Don't know, skip to q#76.
73.	If yes to q#71, how many hectares were lost or damaged?	|____| Hectares	(Note: meaning: damages leading to loss of productivity)
74.	What percent of your total paddy land area was lost or damaged?	|____| %	
75.	What percent of your usual total rice production was lost?	|____| %	
76.	What was the value of your loss of rice production?	|_____|	Note: use national currency
B.	**Loss of riverbank and island cultivated production due to flooding in the last 12 months**		
77.	If yes to 67, did you lose, or was any riverbank and island fields temporarily destroyed?	Yes ---------- 1 No---------- 0 Don't know ---------- 99	If Yes, continue to next question. If No or Don't know, skip to q#81.
78.	If yes to q#76, how many hectares were lost?	|____|____| Hectares	
79.	What percent of your total riverbank and island cultivated area was lost or damaged?	|____|____|%	
80.	What percent of your usual production from the riverbank and islands was lost?	|____|____|%	
81.	What was the value of your loss of riverbank and island production?	|_____|	Note: use national currency

C.	**Loss of aquaculture due to flooding in the last 12 months**		
82.	If yes to 67, did you lose, or was any aquaculture temporarily destroyed?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#85.
83.	If yes to q#81, how many Kg of production was lost?	|____| Kilogram	
84.	What percent of your annual production is that?	|____| %	
85.	What was the value of your loss of aquaculture production?	|_____|	Note: use national currency
D.	**Loss of cows due to flooding due to flooding in the last 12 months**		
86.	If yes to 67, did you lose any cows?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#88.
87.	If yes to Q86, how many were lost?	|_____|	
88.	What is the value of the cows you have lost?	|_____|	Note: use national currency
E.	**Loss of buffalo due to flooding in the last 12 months**		
89.	If yes to 67, did you lose any buffalo?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#91.
90.	If yes to Q88, how many were lost?	|_____|	
91.	What is the value of the buffalo you have lost?	|_____|	Note: use national currency
F.	**Loss of pigs and goats due to flooding in the last 12 months**		
92.	If yes to 67, did you lose any pigs and goat? Pigs: Tick / Goats: Tick	Yes ---------- 1 No---------- 0 Don't know ---------- 99	If Yes, continue to next question. If No or Don't know, skip to q#94.
93.	If yes to 92, how many were lost?	|_____|	
94.	What is the value of the pigs and goats you have lost?	|_____|	Note: use national currency
G.	**Loss of chicken and ducks due to flooding in the last 12 months**		

95.	If yes to 67, did you lose any chickens and ducks?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#97.
96.	If yes to 95, how many were lost?	|_____|	
97.	What is the value of the chicken and duck you have lost?	|_____|	Note: use national currency
H.	**Loss of other property due to flooding in the last 12 months**		
98.	If yes to 67, did you lose any other property?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#99.
99.	What is the value of other property you have lost?	|_____|	Note: use national currency
I.	**Loss of working days due to flooding in the last 12 months**		
100.	If yes to 67, did you lose any working days?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#101.
101.	If yes, how many days did your household lose?	|_____| Days	Note: person days X number of persons.
J.	**Loss of life due to flooding in the last 12 months**		
102.	Did any in your household lose their life due to flooding?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#103.
103.	If yes, How many of your household lost their life?	|_____| Person(s)	
K.	**Access to clean drinking water due to flooding in the last 12 months**		
104.	Did your household experience days without clean drinking water due to flooding?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#105.
105.	If yes, How many days without clean drinking water?	|_____| Days	
L.	**Access to sanitation due to flooding in the last 12 months**		
106.	Did your household experience days without access to sanitation due to flooding?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#107.
107.	If yes, How many days without sanitation?	|_____| Days	
M.	**Injuries due to flooding in the last 12 months**		

108.	Was anybody in your household injured due to flooding?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#109.
109.	If yes, how many persons were injured?	|_____| Person(s)	
IX	**COPING STRATEGIES FOR IMPACTS OF FLOODING**		
110.	If you experienced flooding in the last 3 years - What did your household do to cope with the impacts of flooding? Did you and anybody in the household do one or more of the following: <u>Circle, multiple if applicable</u>	Started fishing----------01 Changed to farming from another activity---------- 02 Changed to casual work in the village----------03 Found work outside the village------ 04 Made goods to sell---------- 05 Sold productive assets such as land, cattle, boat---------- 06 Received help from family, relatives, friends---------- 07 Received assistance from government---------- 08 Received assistance from NGO or other organization----------09 Borrowed money---------- 10 Relied on non-timber forest products----------11 Other---------- 12	If No to Q64 (experienced flooding) skip to Q110 Other, specify
X	**DROUGHT**		
111.	Has your household experienced drought <u>in the last 3 years</u>?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question If No or Don't know, skip to q# 112
112.	If yes, did your household lose any assets or experience any damages from drought <u>in the last 3 years?</u>	Yes----------1 No---------- 0 Don't know----------99	
113.	Has your household experienced any drought in <u>the last 12 months</u>?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#138.
114.	If yes to Q112, did your household lose any assets due to drought in the last 12 months?	Yes----------1 No---------- 0 Don't know----------99	
A.	**Loss of paddy land due to drought in the last 12 months**		
115.	If yes to q#112, did you lose, or was any paddy land temporarily destroyed?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#119.
116.	If yes to q#114, how many hectares were lost?	|_____|	

117.	What percent of your total land area is that?	|_____|%	
118.	What percent of your usual production did you lose?	|_____|%	
119.	What was the value of your loss of agricultural produce?	|_____|	
B.	**Loss of cows due to drought in the last 12 months**		
120.	If yes to q#112, did you lose any cows?	Yes---------- 1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#122.
121.	If yes to q# 119, how many were lost?	|_____|	
122.	What is the value of the cows you have lost?	|_____|	
C	**Loss of buffalo due to drought in the last 12 months**		
123.	If yes to q#112, did you lose any cows?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#125.
124.	If yes to q#122, how many were lost?	|_____|	
125.	What is the value of the buffalo you have lost?	|_____|	
D.	**Loss of pigs and goats due to drought in the last 12 months**		
126.	If yes to q#112, did you lose any pig and goat?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#128.
127.	If yes to q#125, how many were lost?	|_____|	
128.	What is the value of the pigs and goats you have lost?	|_____|	.
E.	**Loss of chicken and ducks due to drought in the last 12 months**		
129.	If yes to q# 112, did you lose any chicken and duck?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#131.
130.	If yes to q#128, how many were lost?		
131.	What is the value of the chicken and duck you have lost?	|_____|	

F.	**Loss of other property due to drought in the last 12 months**		
132.	If yes to q#112, did you lose any other property?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No or Don't know, skip to q#133.
133.	What is the value of other property you have lost?	|_____|	
N.	**Salinity intrusion (Mekong Delta)**		
134.	Have you experienced any impacts on your agricultural land or aquaculture land due to salinity intrusion in the last 12 months?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to Q134. If No, or Don't know skip to Q138.
135.	If yes to Q133, how many hectares of your <u>agricultural</u> land have been affected?	|_____| Hectares	
136.	If yes to Q133, how many hectares of your <u>aquaculture</u> land have been affected?	|_____| Hectares	
137.	If yes to Q133, what is the value of your losses of agricultural production in the last 12 months due to salinity intrusion?	|_____|	
138.	If yes to Q133, what is the value of your losses in aquaculture production in the last 12 months due to salinity intrusion?	|_____|	
XII	**COPING STRATEGIES FOR IMPACTS OF DROUGHT**		
139	If you experienced drought in the last 3 years - What did your household do to cope with the impacts of drought? Did you and anybody in the household do one or more of the following: <u>Circle, multiple if applicable</u>	Started fishing ---------- 01 Changed to farming from another Activity 02 Changed to casual work in the village ----- 03 Found work outside the village ---------- 04 Made goods to sell ---------- 05 Sold productive assets such as land, cattle, boat ---------- 06 Received help from family, relatives, friends ---------- 07 Received assistance from government --- 08 Received assistance from NGO or other organization ---------- 09 Borrowed money ---------- 10 Relied on non-timber forest products --- 11 Other---------- 12	If No to Q110 (experienced drought) skip to Q139
XIII	**EXTREME WEATHER EVENTS**		
140.	Has your household experienced any weather events that you would call out-of-the-ordinary (extreme) the last 12 months?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No, or Don't know, skip to q#142.
141.	If yes, did your household lose any assets?	Yes----------1 No---------- 0 Don't know----------99	

142	Have you experienced any of the following weather events in the last 12 months?	Typhoon ---------- 01 Hail storm---------- 02 Flash flood----------03 Heavy rain---------- 04 Local strong winds----------05 Lightning---------- 06 Other ---------- 07	Other, specify _____
XIV	**ADAPTATION TO CHANGING WEATHER PATTERNS**		
143.	Has your household changed season for growing rice?	Yes----------1 No---------- 0 Don't know----------99	If Yes, continue to next question. If No, or Don't know skip to q#146.
144.	If yes, how have you changed it?	From wet season to dry season---------- 01 From dry season to wet season ----------02	
145.	Has your household changed the timing of growing rice?	Yes, planting earlier---------- 01 Yes, planting later---------- 02 No change ---------- 03 Don't know---------- 99	
146.	Has your household changed any crop, or crop variety, due to the following reasons?	Yes, due to floods---------- 01 Yes, due to drought---------- 02 Yes, due to increasing temperatures------ 03 Yes, due to falling temperatures------- 04 No, has not changed crops ---------- 05 Changed crops for other reasons----- 06	Select all that apply.

XV	EARLY WARNING AND DISASTER PREPAREDNESS					
147.	Is there a way that your household can know if a flood is coming?	Yes----------1 No---------- 0 Don't know----------99			If Yes, continue to next question. If No, or Don't know skip to q#148.	
148.	If yes to Q146, How reliable is the information you get from the following Tick one for each row	a. Not available	b. Not reliable	c. Reliable	d. Highly reliable	e. Don't know
i.	Radio					
ii.	TV					
iii.	SMS					
iv.	Radio speaker in the village					
v.	Local knowledge					
vi.	Person-to-person					
vii.	Other					
149.	To prevent impacts from floods and droughts what would your household do? Please select 3 options Circle 3	Shelter and sanitation---------- 01 Store food and drink---------- 02 Improve transportation and communication----------03 Get support from outside---------- 04 Other----------05 Do nothing----------Let it Be---------- 06 Don't know ----------99				

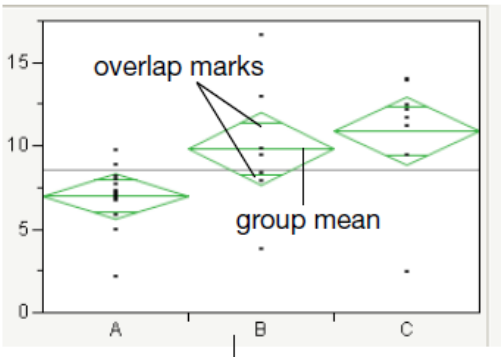
THANK YOU VERY MUCH – THE INTERVIEW IS OVER

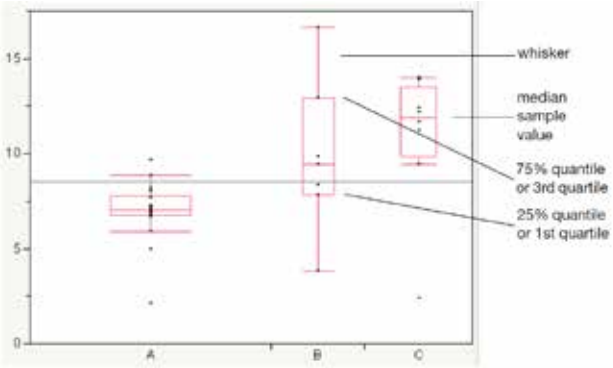
XVI Remarks

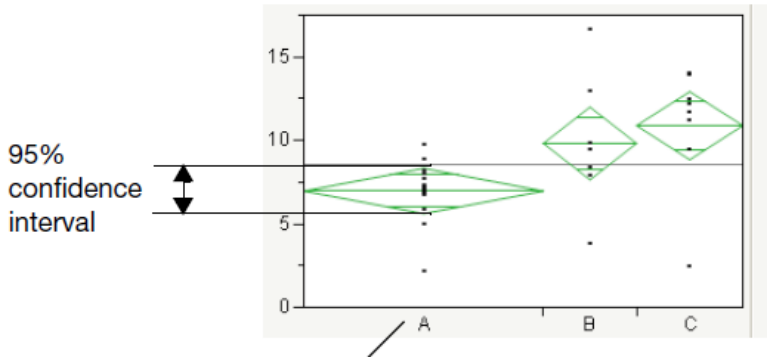
150.	Interviewer's remarks	|_____|
151.	Field supervisor's remarks	|_____|

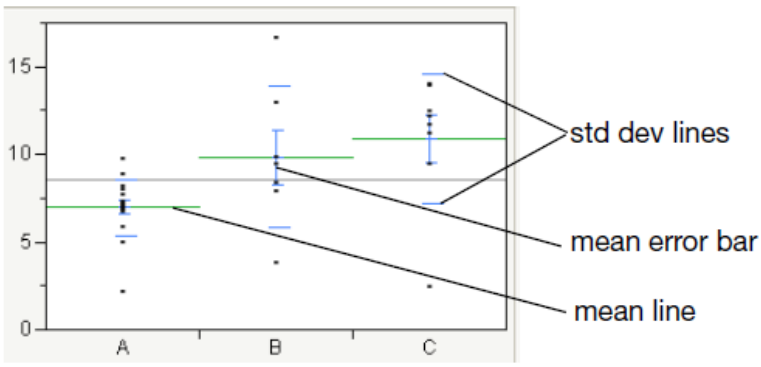
Annex C: Guidance for reading One-way analysis graphs

Below are explanations for the various elements of one-way analysis graphs as produced in the JMP Statistical Analysis software (by SAS Institute).









Annex D: Example of comparison of SIMVA 2011 and SIMVA 2014 data on floods and droughts

When more SIMVA data becomes available in the future it will be possible to construct and analyse timelines of similar types of data and thereby establish trends. To give an example of such trend lines, a comparison was made of data from SIMVA 2011 and SIMVA 2014 on the percentages of sampled households that had experienced flooding and drought in the 12 months before the survey, and of those households, the percentages that lost assets[1]. The comparison table shows the trend lines (or 'spark lines') for the two data points of percentages of households that experienced flooding and drought and who lost assets. The reduced extent of the survey area in SIMVA 2014 compared to SIMVA 2011 needs to be taken into consideration in the interpretation.

The main differences between SIMVA 2011 and SIMVA 2014 with regard to percentage of households that experienced flooding were in Cambodia, which was around 45% more households in 2013 - 2014 compared to 2010 -2011. Overall, in the LMB corridor, 18% more households experienced floods in the year 2013 - 2014 than in 2010 - 2011, up from 12% to 30%. Overall, the percentages of those households that experienced flooding and lost assets due to flooding increased by 6.5 percentage points to 87.8%. There was a decrease of 8 percentage points in the households that experienced drought in 2013-2014 compared to 2010-2011, down to 28.7%. However, more households reported they had lost assets due to drought, up from 62.5% to 79.2% of the drought-affected households.

Example of trend lines based on SIMVA 2011 and SIMVA 2014 data on floods and drought

	Cambodia			Lao PDR			Thailand			Vietnam			Survey area		
	2011	2014	Trendline	2011	2014	Trendline	2011	2014	Trendline	2011	2014	Trendline	2011	2014	Trendline
Percentages of HH having experienced flooding in last 12 months	13.7%	59.0%		9.7%	22.2%		17.6%	27.4%		7.1%	11.2%		12.0%	30.0%	
Percentage of those HHs that lost assets	90.3%	90.4%		89.4%	85.6%		70.8%	79.2%		79.2%	100.0%		81.3%	87.8%	
Percentage of HH that experienced drought in the last 12 months	35.6%	59.3%		47.5%	19.0%		42.4%	32.1%		21.5%	4.5%		36.7%	28.7%	
Percentage of those HHs that lost assets	95.0%	89.8%		29.7%	81.0%		68.8%	64.4%		68.5%	37.5%		62.5%	79.2%	

1 Note that in the SIMVA 2011 Report, Table 32, which shows loss of assets due to flooding and drought in the last 12 months - % of HHs, shows the % of total sample households, while the comparison here uses the % of only those households that had experienced flooding and drought, thus it is a much higher percentages.

Annex 2: Analysis output tables

Data sources:
The data source for the tables is the SIMVA Household Survey, unless indicated otherwise. Most tables come from the SIMVA Household Survey, the rest from the SIMVA

Chapter 3 Population and livelihoods related to water resources

Table 1 Ethnicity of the sampled households

	Cambodia			Lao PDR			Viet Nam			Thailand			All	
Ethnicity of household head	N	Row %	Column %	N	Row %	Column %	N	Row %	Column %	N	Row %	Column %	N	Column %
Kinh							1,319	100.0%	93.7%				1,319	23.5%
Khmer	1,201	100.0%	85.3%										1,201	21.4%
Lao	136	11.4%	9.7%	1,053	88.6%	74.8%							1,189	21.2%
Thai										1,101	100.0%	78.8%	1,101	19.6%
Kuemmu				164	100.0%	11.6%							164	2.9%
Lue				66	50.8%	4.7%				64	49.2%	4.6%	130	2.3%
Nyo										114	100.0%	8.2%	114	2.0%
Lolo				95	100.0%	6.7%							95	1.7%
Kho Me							85	100.0%	6.0%				85	1.5%
Other Local	53	100.0%	3.8%										53	0.9%
Isan Thai										32	100.0%	2.3%	32	0.6%
Kaloeng										31	100.0%	2.2%	31	0.6%
Yoi										22	100.0%	1.6%	22	0.4%
Hmong										16	100.0%	1.1%	16	0.3%
Other	13	100.0%	0.9%										13	0.2%
Saek										11	100.0%	0.8%	11	0.2%
Cham	5	83.3%	0.4%				1	16.7%	0.1%				6	0.1%

Gnuan				6	100.0%	0.4%							6	0.1%
Phouthay				6	100.0%	0.4%							6	0.1%
Hinhi				4	100.0%	0.3%							4	0.1%
Katang				4	100.0%	0.3%							4	0.1%
Taoy				4	100.0%	0.3%							4	0.1%
Hoa							3	100.0%	0.2%				3	0.1%
Mong				3	100.0%	0.2%							3	0.1%
Akha										2	100.0%	0.1%	2	
Phuthai										2	100.0%	0.1%	2	
Cheng				1	100.0%	0.1%							1	
Lao Klang										1	100.0%	0.1%	1	
Prai				1	100.0%	0.1%							1	
Tung Nueng										1	100.0%	0.1%	1	
Xuay				1	100.0%	0.1%							1	
All	1,408	25.0%	100.0%	1,408	25.0%	100.0%	1,408	25.0%	100.0%	1,397	24.9%	100.0%	5,621	100.0%

Table 2 Main and secondary occupations of working household members – all sampled households

	Main occupation		Secondary occupation		All	
Occupations	**Column %**	**Number persons in sampled households**	**Column %**	**Number persons in sampled households**	**Column %**	**Number persons in sampled households**
Crop farmer (incl. gardening)	59.3%	11,107	7.0%	1,267	33.7%	12,374
Livestock worker	1.4%	267	29.2%	5,244	15.0%	5,511
Fishing (only fish)	1.7%	316	19.3%	3,465	10.3%	3,781
Permanent employment (wage)	13.0%	2,441	3.3%	594	8.3%	3,035
Collecting OAA/Ps	0.2%	31	15.5%	2,792	7.7%	2,823
Casual work	7.8%	1,458	6.4%	1,153	7.1%	2,611
House work	4.5%	851	5.0%	894	4.8%	1,745
Business/trading	4.7%	880	2.8%	499	3.8%	1,379
Self-employed	2.2%	405	2.3%	416	2.2%	821
Construction work	2.1%	388	1.6%	294	1.9%	682
Handicraft	1.3%	252	2.3%	413	1.8%	665
Aquaculture	0.5%	87	2.6%	462	1.5%	549
Forestry	0.1%	14	1.5%	265	0.8%	279
Seeking work	0.6%	113	0.2%	32	0.4%	145
Voluntary work	0.1%	26	0.4%	72	0.3%	98
Fish processing	0.1%	10	0.3%	55	0.2%	65
Navigation	0.1%	21	0.2%	34	0.1%	55
Other	0.2%	31	0.0%	3	0.1%	34
Other	0.1%	25	0.1%	9	0.1%	34
Sand mining from river	0.1%	14	0.1%	12	0.1%	26
Tourism industry	0.0%	7	0.0%	3	0.0%	10
All	100.0%	18,744	100.0%	17,978	100.0%	36,722

Table 3 Main and secondary occupations of household head by country

	Cambodia			Lao PDR			Thailand			Vietnam			All
	Main	Secondary	All	Main	Secondary	All	Main	Secondary	All	Main	Secondary	All	All
Occupation	%	%	%	Column %	Column %	Column %	Column %	Column %	Column %	Column %	Column %	Column %	Column %
Crop farmer (incl. gardening)	74%	5%	29%	74%	4%	28%	77%	7%	40%	68%	11%	51%	35%
Livestock worker	1%	31%	21%	2%	32%	22%	1%	20%	11%	2%	36%	12%	17%
Fishing (only fish)	6%	22%	16%	1%	30%	20%	0%	25%	13%	2%	8%	4%	14%
Collecting OAA/ Ps	0%	17%	11%	0%	12%	8%	0%	12%	6%	0%	9%	3%	8%
Casual work	2%	1%	1%	2%	4%	4%	5%	15%	10%	9%	12%	10%	6%
Permanent employment (wage)	4%	6%	5%	9%	1%	3%	3%	1%	2%	6%	3%	5%	4%
Business/ trading	2%	2%	2%	8%	3%	5%	2%	2%	2%	4%	6%	5%	3%
Self-employed	4%	5%	5%	1%	0%	1%	4%	4%	4%	1%	0%	1%	3%
Construction work	3%	3%	3%	2%	3%	3%	1%	2%	2%	1%	1%	1%	2%
House work	1%	4%	3%	0%	1%	1%	2%	1%	2%	3%	3%	3%	2%
Aquaculture	0%	1%	1%	0%	3%	2%	0%	5%	2%	2%	8%	4%	2%
Handicraft	1%	1%	1%	1%	1%	1%	2%	6%	4%	1%	0%	1%	2%
Forestry	0%	0%	0%	0%	5%	3%	0%	0%	0%	0%	0%	0%	1%
Voluntary work	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Other	0%	0%	0%	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%
Fish processing	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Navigation	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%
Seeking work	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%
Sand mining from river	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Tourism industry	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
All	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 4 Main and secondary occupations of working household members by country

	Cambodia			Lao PDR			Thailand			Viet Nam			All
	Main occupation	Secondary occupation	All	Main occupation	Secondary occupation	All	Main occupation	Secondary occupation	All	Main occupation	Secondary occupation	All	
Occupation	Column %	Column %	Column %	Column %	Column %	Column %	Column %	Column %	Column %	Column %	Column %	Column %	Column %
Crop farmer (incl. gardening)	61%	8%	27%	67%	6%	33%	59%	6%	37%	52%	9%	42%	34%
Livestock worker	2%	30%	20%	1%	33%	19%	1%	20%	9%	2%	29%	8%	15%
Fishing (only fish)	5%	17%	12%	0%	25%	14%	0%	22%	9%	2%	6%	3%	10%
Permanent employment (wage)	10%	6%	8%	12%	1%	6%	16%	2%	10%	14%	3%	12%	8%
Collecting OAA/Ps	0%	24%	15%	0%	10%	6%	0%	11%	4%	0%	9%	2%	8%
Casual work	4%	1%	2%	5%	5%	5%	9%	17%	13%	12%	16%	13%	7%
House work	5%	5%	5%	1%	4%	3%	3%	2%	3%	8%	13%	9%	5%
Business/trading	3%	2%	2%	9%	4%	6%	2%	2%	2%	5%	5%	5%	4%
Self	3%	3%	3%	1%	1%	1%	4%	5%	4%	1%	0%	1%	2%
Construction work	4%	2%	2%	3%	2%	2%	2%	2%	2%	1%	0%	1%	2%
Handicraft	2%	1%	1%	1%	3%	2%	2%	6%	3%	1%	1%	1%	2%
Aquaculture	0%	1%	1%	0%	2%	1%	0%	4%	2%	1%	7%	3%	1%
Forestry	0%	0%	0%	0%	4%	2%	0%	0%	0%	0%	0%	0%	1%
Seeking work	0%	0%	0%	1%	0%	0%	1%	0%	0%	1%	1%	1%	0%
Voluntary work	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Fish processing	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Navigation	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%
Other	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Other	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Sand mining from river	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Tourism industry	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
All	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Note: without “dependents”

Table 5 Main and secondary occupations related to water resource dependent occupations and other groups

	Cambodia			Lao PDR			Thailand			Viet Nam			All
	Main occupation	Secondary occupation	All	Main occupation	Secondary occupation	All	Main occupation	Secondary occupation	All	Main occupation	Secondary occupation	All	
Occupations by group	Column %	Column %	Column %	Column %	Column %	Column %	Column %	Column %	Column %	Column %	Column %	Column %	Column %
Farming and livestock	62.8%	38.0%	47.1%	67.8%	39.0%	51.8%	59.8%	25.9%	45.7%	53.8%	37.4%	49.9%	48.7%
Water resource dependent	5.1%	42.2%	28.7%	0.7%	37.3%	21.1%	0.4%	37.7%	15.9%	3.9%	23.2%	8.5%	19.9%
Self-employed and business	6.6%	4.8%	5.4%	9.6%	4.5%	6.7%	6.4%	6.8%	6.6%	5.3%	5.5%	5.3%	6.0%
Permanent employment (wage)	10.1%	6.1%	7.5%	11.6%	0.8%	5.6%	15.6%	1.8%	9.9%	14.3%	2.9%	11.6%	8.3%
Casual, domestic work and other	9.6%	6.4%	7.5%	6.9%	9.6%	8.4%	14.1%	20.1%	16.6%	21.0%	29.2%	23.0%	12.7%
Handicraft and construction	5.9%	2.5%	3.7%	3.3%	4.6%	4.0%	3.6%	7.6%	5.2%	1.6%	1.3%	1.5%	3.7%
Forestry and related	0.0%	0.1%	0.1%	0.1%	4.2%	2.4%	0.1%	0.1%	0.1%	0.1%	0.4%	0.2%	0.8%
All	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 6 Four Main Livelihoods of people in the sampled villages

		Crop farming		Livestock (incl. poultry)		Fishing		Casual wage work (in other sectors)		Trading and markets		Plantation work		Handicrafts		Aquaculture		Private service sector		Other		Public services		Industry work		Navigation and river transport	
Country	**Sub-Zone**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	22	25%	15	17%	17	19%	13	15%	5	6%	13	15%	2	2%	0	0%	0	0%	1	1%	0	0%	0	0%	0	0%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	21	24%	16	19%	9	10%	6	7%	9	10%	3	3%	1	1%	0	0%	5	6%	1	1%	2	2%	11	13%	1	1%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	18	21%	14	16%	16	19%	19	22%	7	8%	3	3%	2	2%	1	1%	1	1%	2	2%	2	2%	0	0%	1	1%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	18	23%	13	17%	17	22%	2	3%	6	8%	1	1%	1	1%	3	4%	2	3%	2	3%	1	1%	11	14%	1	1%
	Zone 4 B - Subzone Cambodia - 3S	4	29%	3	21%	3	21%	1	7%	0	0%	2	14%	0	0%	0	0%	0	0%	1	7%	0	0%	0	0%	0	0%
	All	***83***	***24%***	***61***	***17%***	***62***	***18%***	***41***	***12%***	***27***	***8%***	***22***	***6%***	***6***	***2%***	***4***	***1%***	***8***	***2%***	***7***	***2%***	***5***	***1%***	***22***	***6%***	***3***	***1%***
Lao PDR	Zone 2 - Mainstream - Lao	41	26%	34	21%	30	19%	1	1%	19	12%	3	2%	2	1%	1	1%	10	6%	5	3%	8	5%	0	0%	3	2%
	Zone 3 A - Subzone Lao - Mainstream	40	23%	29	17%	15	9%	3	2%	27	16%	8	5%	15	9%	0	0%	14	8%	4	2%	12	7%	0	0%	5	3%
	All	***81***	***24%***	***63***	***19%***	***45***	***14%***	***4***	***1%***	***46***	***14%***	***11***	***3%***	***17***	***5%***	***1***	***0%***	***24***	***7%***	***9***	***3%***	***20***	***6%***	***0***	***0%***	***8***	***2%***

		Crop farming		Livestock (incl. poultry)		Fishing		Casual wage work (in other sectors)		Trading and markets		Plantation work		Handicrafts		Aquaculture		Private service sector		Other		Public services		Industry work		Navigation and river transport	
Country	**Sub-Zone**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**
Thailand	Zone 2 B - Subzone Upper Thailand	22	26%	5	6%	6	7%	17	20%	10	12%	12	14%	4	5%	5	6%	1	1%	1	1%	1	1%	1	1%	0	0%
	Zone 2 C - Subzone Lower Thailand	22	25%	4	5%	10	11%	7	8%	9	10%	21	24%	7	8%	8	9%	0	0%	0	0%	0	0%	0	0%	0	0%
	Zone 3 B - Subzone Thailand - Mainstream	22	25%	7	8%	8	9%	16	18%	6	7%	17	19%	6	7%	3	3%	0	0%	2	2%	1	1%	0	0%	0	0%
	Zone 3 C - Subzone Thailand - Songkhram	22	25%	16	18%	18	20%	6	7%	2	2%	9	10%	10	11%	2	2%	0	0%	3	3%	0	0%	0	0%	0	0%
	All	***88***	***25%***	***32***	***9%***	***42***	***12%***	***46***	***13%***	***27***	***8%***	***59***	***17%***	***27***	***8%***	***18***	***5%***	***1***	***0%***	***6***	***2%***	***2***	***1%***	***1***	***0%***	***0***	***0%***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	39	22%	36	21%	3	2%	18	10%	30	17%	0	0%	5	3%	13	7%	12	7%	10	6%	3	2%	4	2%	2	1%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	44	25%	43	24%	12	7%	30	17%	9	5%	0	0%	7	4%	22	13%	4	2%	1	1%	0	0%	1	1%	3	2%
	All	***83***	***24%***	***79***	***23%***	***15***	***4%***	***48***	***14%***	***39***	***11%***	***0***	***0%***	***12***	***3%***	***35***	***10%***	***16***	***5%***	***11***	***3%***	***3***	***1%***	***5***	***1%***	***5***	***1%***
All	**All**	**335**	**24%**	**235**	**17%**	**164**	**12%**	**139**	**10%**	**139**	**10%**	**92**	**7%**	**62**	**4%**	**58**	**4%**	**49**	**4%**	**33**	**2%**	**30**	**2%**	**28**	**2%**	**16**	**1%**

Source: Village Profiles from 352 sampled villages

Table 7 Importance of livelihood activities (grouped) in the last 12 months by Sub-zone – mean importance values and percentages by Sub-zone

	Water resource dependent		Farming and livestock		Handicraft and construction		Self-employed and business		Casual, domestic and other		Permanent employment (wage)		Forestry and related	
Sub-Zone	**Mean**	**Row %**	**Mean**	**Row %**	**Mean**	**Row %**	**Mean**	**Row %**	**Mean**	**Row %**	**Mean**	**Row %**	**Mean**	**Row %**
Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	1.29	6.7%	3.19	16.7%	2.78	14.5%	3.11	16.2%	3.39	17.7%	2.41	12.6%	3.00	15.6%
Zone 4 B - Subzone Cambodia - 3S	1.13	9.5%	3.35	28.0%	1.00	8.4%	2.88	24.1%	1.40	11.7%	2.19	18.3%	.	.
Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	1.33	9.5%	3.50	25.0%	2.29	16.4%	2.23	15.9%	1.76	12.6%	2.86	20.5%	.	.
Zone 5 A - Subzone Cambodia - Tonle Sap river	1.29	8.4%	3.36	21.7%	2.42	15.7%	2.76	17.8%	2.39	15.5%	3.23	20.9%	.	.
Zone 5 B - Subzone Cambodia - Tonle Sap lake	2.51	12.5%	3.63	18.0%	3.25	16.1%	3.00	14.9%	2.65	13.2%	3.11	15.4%	2.00	9.9%
Zone 2 A - Mainstream - Lao	1.23	7.5%	3.94	24.0%	2.12	13.0%	3.25	19.9%	1.62	9.9%	3.03	18.5%	1.19	7.3%
Zone 3 A - Subzone Lao – Mainstream	1.30	7.2%	3.81	20.9%	2.38	13.1%	3.09	16.9%	2.56	14.1%	3.51	19.3%	1.57	8.6%
Zone 2 B - Subzone Upper Thailand	1.30	6.6%	4.08	20.6%	3.09	15.6%	3.64	18.4%	2.94	14.9%	2.97	15.0%	1.74	8.8%
Zone 2 C - Subzone Lower Thailand	1.88	9.9%	4.54	23.8%	2.59	13.5%	3.00	15.7%	3.25	17.0%	2.61	13.7%	1.22	6.4%
Zone 3 B - Subzone Thailand – Mainstream	1.50	8.5%	4.17	23.6%	2.47	13.9%	3.31	18.7%	2.58	14.6%	2.67	15.1%	1.00	5.6%
Zone 3 C - Subzone Thailand – Songkhram	1.52	9.6%	3.97	25.2%	1.95	12.3%	2.81	17.8%	1.92	12.2%	2.59	16.4%	1.00	6.3%
Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	1.70	7.0%	4.29	17.6%	3.16	12.9%	3.65	15.0%	3.22	13.2%	3.37	13.8%	5.00	20.5%
Zone 6 B - Subzone Vietnam - Mekong Delta - saline	3.83	18.2%	4.15	19.7%	3.19	15.1%	3.43	16.3%	3.19	15.1%	3.29	15.6%	.	.
All	**1.68**	**9.4%**	**3.85**	**21.4%**	**2.51**	**14.0%**	**3.09**	**17.2%**	**2.53**	**14.1%**	**2.91**	**16.2%**	**1.97**	**7.6%**

Notes: No weights applied. Values: Most important = 5; Second most important = 3; Sometimes important = 1.

Table 8 Index of importance of livelihood activities (grouped) in the last 12 months

	Water resource dependent		Farming and livestock		Handicraft and construction		Self-employed and business		Casual, domestic and other		Permanent employment (wage)		Forestry and related	
Sub-Zone	**Mean**	**Row %**	**Mean**	**Row %**	**Mean**	**Row %**	**Mean**	**Row %**	**Mean**	**Row %**	**Mean**	**Row %**	**Mean**	**Row %**
Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	24.3	8.90%	180.8	66.28%	1.9	0.71%	23.7	8.67%	9.9	3.62%	32.0	11.73%	0.2	0.09%
Zone 4 B - Subzone Cambodia - 3S	22.5	8.23%	206.3	75.47%	0.1	0.05%	20.6	7.54%	1.4	0.52%	22.4	8.18%	.	.
Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	25.1	8.93%	198.5	70.50%	8.6	3.06%	9.7	3.43%	11.1	3.95%	28.5	10.13%	.	.
Zone 5 A - Subzone Cambodia - Tonle Sap river	12.0	4.05%	184.5	62.44%	20.5	6.95%	30.1	10.19%	13.6	4.59%	34.8	11.78%	.	.
Zone 5 B - Subzone Cambodia - Tonle Sap lake	46.1	14.31%	184.7	57.30%	27.3	8.47%	27.3	8.48%	24.8	7.68%	11.8	3.67%	0.3	0.08%
Zone 2 A - Mainstream - Lao	12.8	3.90%	251.8	76.64%	5.8	1.77%	26.4	8.02%	9.6	2.93%	19.1	5.82%	3.0	0.92%
Zone 3 A - Subzone Lao – Mainstream	10.8	3.25%	222.0	66.90%	14.0	4.21%	29.0	8.74%	19.3	5.81%	36.5	11.00%	0.3	0.09%
Zone 2 B - Subzone Upper Thailand	18.1	5.48%	190.8	57.81%	19.2	5.83%	34.5	10.46%	48.3	14.64%	15.8	4.78%	3.3	1.00%
Zone 2 C - Subzone Lower Thailand	30.4	8.21%	258.1	69.74%	6.7	1.82%	21.9	5.91%	44.0	11.89%	8.5	2.30%	0.5	0.13%
Zone 3 B - Subzone Thailand – Mainstream	17.4	5.13%	232.8	68.53%	13.4	3.96%	24.9	7.33%	32.7	9.64%	18.2	5.37%	0.1	0.04%
Zone 3 C - Subzone Thailand – Songkhram	24.3	7.77%	230.9	73.71%	12.5	3.99%	14.9	4.77%	16.8	5.38%	13.7	4.37%	0.0	0.01%
Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	9.4	2.53%	211.8	56.74%	9.9	2.64%	39.8	10.65%	54.7	14.66%	47.2	12.65%	0.5	0.13%
Zone 6 B - Subzone Vietnam - Mekong Delta - saline	36.3	9.58%	218.4	57.59%	6.2	1.63%	31.0	8.17%	40.9	10.78%	46.5	12.25%	.	.
All	**22.3**	**6.88%**	**213.2**	**65.80%**	**11.3**	**3.47%**	**25.7**	**7.92%**	**25.2**	**7.77%**	**25.8**	**7.96%**	**0.9**	**0.20%**

Table 9 Water resource dependent livelihoods – percentage of households by Country and Sub-zone

		Water resource dependent livelihoods						
		Most important		Second most important		Sometimes		Total sample
Country	Sub-Zone	Row %	N	Row %	N	Row %	N	N
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	4.3%	15	13.1%	46	80.4%	283	352
	Zone 4 B - Subzone Cambodia - 3S	0.0%	0	12.5%	8	98.4%	63	64
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	3.8%	11	16.3%	47	75.3%	217	288
	Zone 5 A - Subzone Cambodia - Tonle Sap river	2.0%	7	6.0%	21	45.2%	159	352
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	16.8%	59	15.1%	53	28.1%	99	352
	All	***6.5%***	***92***	***12.4%***	***175***	***58.3%***	***821***	***1,408***
Lao PDR	Zone 2 A - Mainstream - Lao	0.7%	5	7.4%	52	45.2%	318	704
	Zone 3 A - Subzone Lao - Mainstream	0.4%	3	7.5%	53	39.6%	279	704
	All	***0.6%***	***8***	***7.5%***	***105***	***42.4%***	***597***	***1,408***
Thailand	Zone 2 B - Subzone Upper Thailand	0.6%	2	13.6%	48	54.8%	193	352
	Zone 2 C - Subzone Lower Thailand	0.9%	3	29.3%	103	32.7%	115	352
	Zone 3 B - Subzone Thailand - Mainstream	0.3%	1	16.5%	58	40.6%	143	352
	Zone 3 C - Subzone Thailand - Songkhram	1.7%	6	22.4%	79	56.3%	198	352
	All	***0.9%***	***12***	***20.5%***	***288***	***46.1%***	***649***	***1,408***
Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	1.1%	8	6.1%	43	12.4%	87	704
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	10.7%	75	4.8%	34	2.7%	19	702
	All	***5.9%***	***83***	***5.5%***	***77***	***7.5%***	***106***	***1,406***
All	**All**	**3.5%**	**195**	**11.5%**	**645**	**38.6%**	**2,173**	**5,630**

Note: Water resource dependent livelihoods comprise Fishing, Collecting OAA/Ps, Aquaculture, Fish processing, Navigation and river transport, Sand mining from river.

Table 10 Water resource dependent activities in the previous 12 months – households with a member involved in activity (multiple choice)

Frequency – number of responses per Sub-zone Rate per case - % of HHs per Sub-zone	Fishing	Collecting OAA/Ps	Aqua-culture	Irrigated farming	Non-irrigated farming	River bank cultivation	Other	None	Total Responses	Total Cases Responding
Zone 2 A - Mainstream - Lao	460 65.8%	230 32.9%	47 6.7%	65 9.3%	445 63.7%	94 13.4%	6 0.9%	88 12.6%	1435	699
Zone 2 B - Subzone Upper Thailand	136 38.7%	130 37.0%	38 10.8%	90 25.6%	206 58.7%	1 0.3%	36 10.3%	27 7.7%	664	351
Zone 2 C - Subzone Lower Thailand	148 42.3%	118 33.7%	19 5.4%	17 4.9%	265 75.7%	2 0.6%	39 11.1%	22 6.3%	630	350
Zone 3 A - Subzone Lao - Mainstream	495 70.5%	323 46.0%	41 5.8%	84 12.0%	457 65.1%	126 17.9%	18 2.6%	102 14.5%	1646	702
Zone 3 B - Subzone Thailand – Mainstream	166 47.3%	107 30.5%	25 7.1%	34 9.7%	256 72.9%	1 0.3%	37 10.5%	28 8.0%	654	351
Zone 3 C - Subzone Thailand – Songkhram	260 74.3%	95 27.1%	23 6.6%	42 12.0%	328 93.7%	0 0.0%	1 0.3%	10 2.9%	759	350
Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	273 77.8%	1 0.3%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	77 21.9%	351	351
Zone 4 B - Subzone Cambodia - 3S	61 95.3%	1 1.6%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2 3.1%	64	64
Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	182 63.4%	215 74.9%	15 5.2%	38 13.2%	185 64.5%	0 0.0%	1 0.3%	32 11.1%	668	287
Zone 5 A - Subzone Cambodia - Tonle Sap river	109 31.1%	100 28.6%	1 0.3%	1 0.3%	75 21.4%	12 3.4%	1 0.3%	197 56.3%	496	350
Zone 5 B - Subzone Cambodia - Tonle Sap lake	170 48.9%	135 38.8%	2 0.6%	1 0.3%	0 0.0%	2 0.6%	1 0.3%	126 36.2%	438	348
Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	109 17.5%	240 38.6%	48 7.7%	335 53.9%	30 4.8%	13 2.1%	15 2.4%	173 27.8%	965	622

Table 11 Disposal of households' own fish catches

	% of responses	Freshly cook and eat	Process and eat later	Share with neighbors	Sell	Process and sell	Other	Total Responses	Total Cases	Total Cases Responding
Cambo-dia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	58%	13%	4%	23%	2%	0%	474	352	275
	Zone 4 B - Subzone Cambodia - 3S	64%	11%	6%	19%	0%	0%	97	64	62
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	61%	10%	2%	21%	7%	0%	297	288	181
	Zone 5 A - Subzone Cambodia - Tonle Sap river	59%	16%	5%	17%	4%	1%	192	352	113
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	43%	22%	3%	27%	5%	0%	393	352	169
All		***55%***	***15%***	***4%***	***23%***	***4%***	***0%***	***1453***	***1408***	***800***
Lao PDR	Zone 2 A - Mainstream - Lao	70%	10%	6%	13%	0%	0%	627	704	442
	Zone 3 A - Subzone Lao - Mainstream	44%	31%	7%	16%	2%	0%	1105	704	491
All		***54%***	***23%***	***7%***	***15%***	***2%***	***0%***	***1732***	***1408***	***933***
Thailand	Zone 2 B - Subzone Upper Thailand	56%	16%	12%	15%	1%	0%	302	352	170
	Zone 2 C - Subzone Lower Thailand	65%	8%	17%	11%	0%	0%	288	352	186
	Zone 3 B - Subzone Thailand - Mainstream	53%	17%	18%	12%	1%	0%	358	352	188
	Zone 3 C - Subzone Thailand - Songkhram	46%	24%	10%	17%	3%	0%	585	352	270
All		***53%***	***18%***	***14%***	***14%***	***1%***	***0%***	***1533***	***1408***	***814***
Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	53%	17%	9%	20%	0%	1%	132	704	70
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	44%	8%	5%	43%	0%	0%	75	704	33
All		***50%***	***14%***	***8%***	***29%***	***0%***	***0%***	***207***	***1408***	***103***
All		**54%**	**19%**	**8%**	**17%**	**2%**	**0%**	**4925**	**5632**	**2650**

Table 12 – Frequency of fish consumption and source of fish

Frequency of fish consumption		Cambodia			Lao PDR			Thailand			Viet Nam			All		
	Main source of fish	Row %	Column %	N	Row %	Column %	N	Row %	Column %	N	Row %	Column %	N	Row %	Column %	N
Every day	Own fresh catch	39.0%	20.1%	283	22.8%	11.8%	165	26.2%	13.5%	190	12.0%	6.2%	87	100.0%	12.9%	725
	Own aquaculture produce	8.8%	0.2%	3	8.8%	0.2%	3	20.6%	0.5%	7	61.8%	1.5%	21	100.0%	0.6%	34
	Bought	43.5%	42.8%	602	3.8%	3.8%	53	17.8%	17.5%	246	34.9%	34.4%	484	100.0%	24.7%	1.385
	Own preserve	50.0%	0.1%	1	0.0%	0.0%	0	50.0%	0.1%	1	0.0%	0.0%	0	100.0%	0.0%	2
	From neighbor or relative	50.0%	0.3%	4	0.0%	0.0%	0	37.5%	0.2%	3	12.5%	0.1%	1	100.0%	0.1%	8
	Don't know	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%	0	100.0%	0.4%	5	100.0%	0.1%	5
	All	41.4%	63.4%	893	10.2%	15.8%	221	20.7%	31.8%	447	27.7%	42.5%	598	100.0%	38.5%	2.159
2 -3 times a week	Own fresh catch	13.2%	6.1%	86	46.2%	21.6%	301	34.0%	15.8%	222	6.6%	3.1%	43	100.0%	11.6%	652
	Own aquaculture produce	8.1%	0.4%	5	29.0%	1.3%	18	30.6%	1.4%	19	32.3%	1.4%	20	100.0%	1.1%	62
	Bought	21.2%	25.0%	352	17.9%	21.4%	298	28.9%	34.2%	480	32.0%	37.7%	531	100.0%	29.6%	1.661
	Own preserve	33.3%	0.1%	1	0.0%	0.0%	0	66.7%	0.1%	2	0.0%	0.0%	0	100.0%	0.1%	3
	From neighbor or relative	10.5%	0.1%	2	31.6%	0.4%	6	47.4%	0.6%	9	10.5%	0.1%	2	100.0%	0.3%	19
	Don't know	0.0%	0.0%	0	0.0%	0.0%	0	100.0%	0.1%	1	0.0%	0.0%	0	100.0%	0.0%	1
	All	18.6%	31.7%	446	26.0%	44.7%	623	30.6%	52.2%	733	24.9%	42.3%	596	100.0%	42.7%	2.398
1 time a week	Own fresh catch	11.9%	0.9%	13	60.6%	4.7%	66	23.9%	1.9%	26	3.7%	0.3%	4	100.0%	1.9%	109
	Own aquaculture produce	0.0%	0.0%	0	80.0%	0.3%	4	20.0%	0.1%	1	0.0%	0.0%	0	100.0%	0.1%	5
	Bought	10.1%	2.2%	31	49.3%	10.8%	151	31.7%	6.9%	97	8.8%	1.9%	27	100.0%	5.4%	306
	From neighbor or relative	0.0%	0.0%	0	42.9%	0.2%	3	28.6%	0.1%	2	28.6%	0.1%	2	100.0%	0.1%	7
	All	10.3%	3.1%	44	52.5%	16.1%	224	29.5%	9.0%	126	7.7%	2.3%	33	100.0%	7.6%	427

2 times a mont	Own fresh catch	2.8%	0.1%	2	74.6%	3.8%	53	18.3%	0.9%	13	4.2%	0.2%	3	100.0%	1.3%	71
	Own aquaculture produce	12.5%	0.1%	1	87.5%	0.5%	7	0.0%	0.0%	0	0.0%	0.0%	0	100.0%	0.1%	8
	Bought	4.4%	0.5%	7	54.4%	6.2%	86	36.1%	4.1%	57	5.1%	0.6%	8	100.0%	2.8%	158
	Own preserve	0.0%	0.0%	0	50.0%	0.1%	1	50.0%	0.1%	1	0.0%	0.0%	0	100.0%	0.0%	2
	From neighbor or relative	0.0%	0.0%	0	100.0%	0.1%	2	0.0%	0.0%	0	0.0%	0.0%	0	100.0%	0.0%	2
	All	4.1%	0.7%	10	61.8%	10.7%	149	29.5%	5.1%	71	4.6%	0.8%	11	100.0%	4.3%	241
Varies a lot over the year	Own fresh catch	3.3%	0.2%	3	73.6%	4.8%	67	8.8%	0.6%	8	14.3%	0.9%	13	100.0%	1.6%	91
	Own aquaculture produce	0.0%	0.0%	0	69.2%	0.6%	9	7.7%	0.1%	1	23.1%	0.2%	3	100.0%	0.2%	13
	Bought	3.1%	0.4%	5	60.7%	7.1%	99	6.7%	0.8%	11	29.4%	3.4%	48	100.0%	2.9%	163
	From neighbor or relative	20.0%	0.1%	1	60.0%	0.2%	3	20.0%	0.1%	1	0.0%	0.0%	0	100.0%	0.1%	5
	Don't know	0.0%	0.0%	0	0.0%	0.0%	0	40.0%	0.1%	2	60.0%	0.2%	3	100.0%	0.1%	5
	All	3.2%	0.6%	9	64.3%	12.8%	178	8.3%	1.6%	23	24.2%	4.8%	67	100.0%	4.9%	277
Never		12,2%	0.4%	6	0.0%	0.0%	0	8.2%	0.3%	4	79.6%	2.8%	39	100.0%	0.9%	49
Don't know		0,0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%	0	100.0%	4.5%	64	100.0%	1.1%	64
All	All	25.1%	100.0%	1,408	24.8%	100.0%	1,395	25.0%	100.0%	1,404	25.1%	100.0%	1,408	100.0%	100.0%	5,615

Table 13 Fish consumption in previous 24 hours and source of fish

		% HHs	% HHs eating fish from					
		Had a meal with fish in the last 24 hours	Own fresh catch	Own aqua-culture produce	Bought	Own preserve	Get from neighbor or relative	Don't know
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	100.0%	50.6%	0.0%	49.1%	0.3%	0.0%	0.0%
	Zone 4 B - Subzone Cambodia - 3S	100.0%	43.8%	0.0%	56.3%	0.0%	0.0%	0.0%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	69.1%	29.1%	1.5%	68.3%	0.0%	0.5%	0.5%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	85.8%	11.3%	0.0%	88.4%	0.0%	0.0%	0.3%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	90.3%	22.3%	0.0%	73.0%	0.9%	3.5%	0.3%
	All	***87.7%***	***29.9%***	***0.2%***	***68.3%***	***0.3%***	***1.0%***	***0.2%***
Lao PDR	Zone 2 A - Mainstream - Lao	35.4%	40.2%	5.2%	51.4%	0.4%	2.8%	0.0%
	Zone 3 A - Subzone Lao - Mainstream	70.3%	65.3%	0.6%	30.7%	0.4%	3.0%	0.0%
	All	***52.8%***	***56.9%***	***2.2%***	***37.6%***	***0.4%***	***3.0%***	***0.0%***
Thailand	Zone 2 B - Subzone Upper Thailand	62.1%	19.3%	2.3%	75.7%	0.0%	2.8%	0.0%
	Zone 2 C - Subzone Lower Thailand	69.3%	27.3%	2.1%	67.8%	0.4%	2.5%	0.0%
	Zone 3 B - Subzone Thailand - Mainstream	72.4%	29.9%	2.4%	63.7%	0.4%	3.2%	0.4%
	Zone 3 C - Subzone Thailand - Songkhram	80.1%	47.7%	0.7%	46.2%	1.8%	3.6%	0.0%
	All	***71.0%***	***31.9%***	***1.8%***	***62.4%***	***0.7%***	***3.0%***	***0.1%***

Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	86.2%	20.6%	3.3%	60.1%	0.0%	0.3%	15.7%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	90.3%	13.8%	2.7%	67.6%	0.0%	1.4%	14.5%
	All	***88.3%***	***17.1%***	***3.0%***	***64.0%***	***0.0%***	***0.9%***	***15.0%***
All	**All**	**75.0%**	**31.4%**	**1.8%**	**60.2%**	**0.3%**	**1.8%**	**4.5%**

Table 14 Amount of fish consumed in latest meal that included fish, and in the latest meal in the previous 24 hours

		Kg of fish cooked for the latest meal	Kg fish per person in meal in 24 hours
Country	**Sub-Zone**	**Mean***	**Mean**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	0.66	0.2
	Zone 4 B - Subzone Cambodia - 3S	0.64	0.21
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	0.86	0.22
	Zone 5 A - Subzone Cambodia - Tonle Sap river	0.8	0.22
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	0.74	0.18
	All	**0.76**	**0.2**
Lao PDR	Zone 2 A - Mainstream - Lao	0.84	0.16
	Zone 3 A - Subzone Lao - Mainstream	0.82	0.14
	All	**0.83**	**0.15**
Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	0.55	0.17
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	0.52	0.41
	All	**0.54**	**0.29**
All	***All***	***0.71***	
Thailand*	Zone 2 B - Subzone Upper Thailand	0.24*	0.25
	Zone 2 C - Subzone Lower Thailand	0.20*	0.25
	Zone 3 B - Subzone Thailand - Mainstream	0.16*	0.23
	Zone 3 C - Subzone Thailand - Songkhram	0.17*	0.25
	All	***0.19****	***0.25***

All			***0.23***

* For Thailand, the Kg of fish cooked for latest meal that included fish, was Kg per person. For the other countries it was total Kg cooked.

Table 15 Frequency of households buying fish

How often does your household buy fish?		**Every day**	**2 -3 times a week**	**1 time a week**	**2 times a month**	**Varies a lot over the year**	**Never**
Country	Sub-Zone	% of sample					
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	54.8%	16.2%	5.7%	2.6%	0.3%	20.5%
	Zone 4 B - Subzone Cambodia - 3S	53.1%	10.9%	7.8%	1.6%	1.6%	25.0%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	29.9%	54.9%	5.2%	2.8%	4.5%	2.8%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	53.7%	39.5%	3.1%	2.0%	0.0%	1.7%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	46.6%	29.8%	6.0%	4.8%	0.3%	12.5%
	All	***47.3%***	***33.1%***	***5.1%***	***3.0%***	***1.1%***	***10.4%***
Lao PDR	Zone 2 A - Mainstream - Lao	1.7%	22.9%	21.2%	20.2%	16.3%	17.5%
	Zone 3 A - Subzone Lao - Mainstream	3.0%	28.6%	23.0%	22.0%	12.5%	10.9%
	All	***2.3%***	***25.7%***	***22.1%***	***21.1%***	***14.4%***	***14.2%***

Thailand	Zone 2 B - Subzone Upper Thailand	6.6%	44.4%	20.2%	16.5%	8.0%	4.3%
	Zone 2 C - Subzone Lower Thailand	7.7%	35.8%	21.0%	20.5%	8.0%	7.1%
	Zone 3 B - Subzone Thailand - Mainstream	12.5%	43.8%	22.4%	11.6%	6.8%	2.8%
	Zone 3 C - Subzone Thailand - Songkhram	12.5%	38.4%	11.6%	17.9%	9.7%	9.9%
	All	***9.8%***	***40.6%***	***18.8%***	***16.6%***	***8.1%***	***6.0%***
Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	29.4%	42.2%	6.5%	3.0%	8.1%	3.7%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	32.4%	47.3%	6.1%	1.7%	4.1%	6.3%
	All	***30.9%***	***44.7%***	***6.3%***	***2.3%***	***6.1%***	***5.0%***
All	**All**	**22.6%**	**36.0%**	**13.1%**	**10.8%**	**7.4%**	**8.9%**

Table 16 Disposal of OAA/Ps collected – multiple responses

	Frequency of responses	Freshly cook and eat	Process and eat later	Share with neighbors	Sell	Process and sell	Other	Total Responses	Total Cases	Total Cases Responding
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	95.4%	0.7%	0.0%	1.4%	0.7%	1.8%	283	352	270
	Zone 4 B - Subzone Cambodia - 3S	96.7%	0.0%	0.0%	1.7%	0.0%	1.7%	60	64	58
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	81.3%	6.3%	2.1%	10.1%	0.0%	0.3%	288	288	234
	Zone 5 A - Subzone Cambodia - Tonle Sap river	79.0%	8.5%	2.2%	6.7%	0.9%	2.7%	224	352	177
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	70.7%	7.6%	3.5%	16.9%	1.0%	0.3%	314	352	222
	All	***82.2%***	***5.4%***	***1.9%***	***8.7%***	***0.6%***	***1.2%***	1169	1408	961
Lao PDR	Zone 2 A - Mainstream - Lao	77.9%	12.1%	7.1%	2.9%	0.0%	0.0%	553	704	431
	Zone 3 A - Subzone Lao - Mainstream	61.5%	23.8%	6.0%	8.7%	0.0%	0.0%	803	704	494
	All	***68.2%***	***19.0%***	***6.4%***	***6.3%***	***0.0%***	***0.0%***	***1356***	***1408***	***925***
Thailand	Zone 2 B - Subzone Upper Thailand	82.6%	3.2%	7.8%	6.4%	0.0%	0.0%	219	352	181
	Zone 2 C - Subzone Lower Thailand	73.9%	1.0%	20.4%	3.7%	0.3%	0.7%	299	352	221
	Zone 3 B - Subzone Thailand - Mainstream	77.6%	0.8%	16.8%	4.8%	0.0%	0.0%	250	352	194
	Zone 3 C - Subzone Thailand - Songkhram	74.6%	1.8%	9.6%	13.6%	0.4%	0.0%	272	352	203
	All	***76.8%***	***1.6%***	***14.0%***	***7.1%***	***0.2%***	***0.2%***	***1040***	***1408***	***799***
Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	85.9%	2.2%	0.6%	4.7%	0.8%	5.8%	362	704	311
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	82.5%	1.3%	3.8%	5.3%	0.3%	7.0%	400	704	330
	All	***84.1%***	***1.7%***	***2.2%***	***5.0%***	***0.5%***	***6.4%***	***762***	***1408***	***641***
All		**76.9%**	**8.1%**	**6.3%**	**6.9%**	**0.3%**	**1.5%**	**4327**	**5632**	**3326**

Table 17 Amounts of OAA/Ps consumed per person in the latest meal that included OAA/Ps

Country	Sub-Zone	Kg of Other Aquatic ANIMALS cooked per person for the latest meal Mean	Kg of Other Aquatic PLANTS cooked per person for the latest meal Mean	Kg total OAA/Ps cooked per person for latest meal Mean
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	0.12	0.16	0.28
	Zone 4 B - Subzone Cambodia - 3S	0.14	0.15	0.29
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	0.29	0.23	0.52
	Zone 5 A - Subzone Cambodia - Tonle Sap river	0.22	0.20	0.42
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	0.26	0.08	0.34
	All	***0.22***	***0.16***	***0.38***
Lao PDR	Zone 2 A - Mainstream - Lao	0.14	0.14	0.28
	Zone 3 A - Subzone Lao - Mainstream	0.12	0.12	0.24
	All	***0.13***	***0.13***	***0.26***
Thailand	Zone 2 B - Subzone Upper Thailand	0.23	0.17	0.40
	Zone 2 C - Subzone Lower Thailand	0.21	0.13	0.34
	Zone 3 B - Subzone Thailand - Mainstream	0.19	0.16	0.35
	Zone 3 C - Subzone Thailand - Songkhram	0.16	0.13	0.29
	All	***0.20***	***0.15***	***0.35***

Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	0.18	0.16	0.34
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	0.18	0.18	0.36
	All	***0.18***	***0.17***	***0.35***
All	**All**	**0.18**	**0.15**	**0.33**

Table 18 Meals with OAA/Ps in 24 hours before interview and source

		% sample HHs	% HHs had OAA/Ps from					
		Had meal with OAAP in previous24 hours	Own fresh collection	Own aquaculture produce	Bought	Own preserve	Got from neighbor or relative	Don't know
Cambo-dia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	47.2%	68.7%	0.0%	30.7%	0.0%	0.6%	0.0%
	Zone 4 B - Subzone Cambodia - 3S	48.4%	64.5%	0.0%	35.5%	0.0%	0.0%	0.0%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	62.8%	69.6%	0.6%	29.3%	0.0%	0.6%	0.0%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	24.7%	44.8%	1.1%	54.0%	0.0%	0.0%	0.0%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	12.5%	45.5%	0.0%	54.5%	0.0%	0.0%	0.0%
	All	***36.2%***	***62.7%***	***0.4%***	***36.5%***	***0.0%***	***0.4%***	***0.0%***
Lao PDR	Zone 2 A - Mainstream - Lao	15.9%	60.7%	14.3%	23.2%	0.9%	0.9%	0.0%
	Zone 3 A - Subzone Lao - Mainstream	51.8%	73.2%	1.4%	22.7%	0.0%	2.7%	0.0%
	All	***33.9%***	***70.2%***	***4.4%***	***22.9%***	***0.2%***	***2.3%***	***0.0%***
Thailand	Zone 2 B - Subzone Upper Thailand	25.9%	47.7%	0.0%	48.8%	1.2%	2.3%	0.0%
	Zone 2 C - Subzone Lower Thailand	28.3%	63.8%	1.1%	31.9%	0.0%	3.2%	0.0%
	Zone 3 B - Subzone Thailand - Mainstream	31.2%	73.3%	0.0%	25.7%	0.0%	1.0%	0.0%
	Zone 3 C - Subzone Thailand - Songkhram	21.1%	67.1%	2.7%	28.8%	0.0%	1.4%	0.0%
	All	***26.6%***	***63.4%***	***0.8%***	***33.5%***	***0.3%***	***2.0%***	***0.0%***

Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	57.5%	0.0%	5.3%	38.4%	0.0%	0.4%	56.0%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	79.0%	0.1%	7.5%	59.5%	0.0%	0.4%	32.4%
	All	***68.3%***	***0.1%***	***6.4%***	***48.9%***	***0.0%***	***0.4%***	***44.2%***
All	**All**	**41.3%**	**32.0%**	**4.2%**	**40.1%**	**0.1%**	**0.9%**	**22.6%**

Table 19 Households that cultivated crops in the previous 12 months

		Households that cultivated crops in the previous 12 months	
Country	**Sub-Zone**	**N**	**% of sample**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	307	87.2%
	Zone 4 B - Subzone Cambodia - 3S	60	93.8%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	260	90.3%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	295	83.8%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	240	68.2%
	All	***1,162***	***82.5%***
Lao PDR	Zone 2 A - Mainstream - Lao	583	82.8%
	Zone 3 A - Subzone Lao - Mainstream	572	81.3%
	All	***1,155***	***82.0%***
Thailand	Zone 2 B - Subzone Upper Thailand	303	86.1%
	Zone 2 C - Subzone Lower Thailand	311	88.6%
	Zone 3 B - Subzone Thailand - Mainstream	307	87.5%
	Zone 3 C - Subzone Thailand - Songkhram	340	96.6%
	All	***1,261***	***89.7%***

Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	382	54.3%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	458	65.1%
	All	***840***	***59.7%***
All	**All**	**4,418**	**78.5%**

Table 20 Main water sources for agriculture

Main water source for agriculture Per cent of observations		Rain-fed	Irrigation water from Mekong	Pumped water from other surface water	Pumped water from Mekong	Other	Irrigation form other surface water	Pumped water from well
Country	**Sub-Zone**	**Row %**	**Row %**	**Row %**	**Row %**	**Row %**	**Row %**	**Row %**
Cambodia	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	54.9%	3.8%	16.4%	3.8%	3.6%	11.3%	6.2%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	76.9%	0.8%	9.7%	3.2%	1.1%	7.0%	1.3%
	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	85.9%	0.0%	0.0%	9.2%	3.2%	1.4%	0.3%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	67.6%	0.0%	14.6%	2.7%	1.2%	8.6%	5.4%
	Zone 4 B - Subzone Cambodia - 3S	89.4%	0.0%	0.0%	0.0%	9.1%	0.0%	1.5%
	All	***71.8%***	***1.2%***	***9.8%***	***4.5%***	***2.6%***	***6.9%***	***3.2%***
Lao PDR	Zone 3 A - Subzone Lao - Mainstream	71.3%	2.2%	3.6%	7.6%	8.8%	3.3%	3.1%
	Zone 2 A - Mainstream - Lao	70.8%	0.0%	16.5%	0.6%	0.0%	11.7%	0.4%
	All	***71.1%***	***1.1%***	***9.9%***	***4.2%***	***4.4%***	***7.5%***	***1.8%***

Thailand	Zone 2 C - Subzone Lower Thailand	57.5%	1.6%	20.1%	4.3%	13.2%	0.9%	2.5%
	Zone 3 C - Subzone Thailand - Songkhram	73.6%	0.0%	15.9%	0.0%	4.9%	4.9%	0.7%
	Zone 2 B - Subzone Upper Thailand	39.5%	0.8%	24.5%	0.0%	8.5%	17.3%	9.5%
	Zone 3 B - Subzone Thailand - Mainstream	72.3%	4.0%	12.8%	2.3%	5.5%	2.0%	1.0%
	All	***61.0%***	***1.5%***	***18.3%***	***1.7%***	***8.1%***	***6.1%***	***3.3%***
Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	0.5%	64.2%	3.7%	24.2%	7.4%	0.0%	0.0%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	6.0%	39.5%	1.8%	41.6%	11.2%	0.0%	0.0%
	All	***3.3%***	***51.6%***	***2.7%***	***33.1%***	***9.3%***	***0.0%***	***0.0%***
	All	**54.2%**	**11.8%**	**10.8%**	**9.5%**	**6.0%**	**5.4%**	**2.2%**

Table 21 Households that cultivated riverbank or island gardens and fields in the previous 12 months

		Have riverbank garden/field		Ha of riverbank field	% of riverbank produce sold
Country	**Sub-Zone**	**Nos HHs**	**% of sample HHs**	**Mean**	**Mean**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	125	35.5%	0.33	69.3%
	Zone 4 B - Subzone Cambodia - 3S	10	15.6%	1.00	100.0%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	12	4.2%	0.47	84.3%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	27	7.7%	0.46	86.6%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	26	7.4%	0.11	29.0%
	All	***200***	***14.2%***	***0.36***	***68.8%***
Lao PDR	Zone 2 A - Mainstream - Lao	152	21.6%	0.32	29.6%
	Zone 3 A - Subzone Lao - Mainstream	145	20.6%	0.44	48.1%
	All	***297***	***21.1%***	***0.38***	***38.6%***
Thailand	Zone 2 B - Subzone Upper Thailand	21	6.0%	0.56	35.3%
	Zone 2 C - Subzone Lower Thailand	27	7.8%	0.47	46.0%
	Zone 3 B - Subzone Thailand - Mainstream	21	6.0%	0.34	49.6%
	Zone 3 C - Subzone Thailand - Songkhram	1	0.3%	0.01	1.9%
	All	***70***	***5.0%***	***0.37***	***35.6%***
Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	49	7.0%	0.31	61.1%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	72	10.2%	0.49	88.8%
	All	***121***	***8.6%***	***0.42***	***77.5%***
All	**All**	**688**	**12.2%**	**0.38**	**53.7%**

Chapter 4 Shock Events

Table 22 Villages that have ever experienced flooding and loss of assets in previous 3 years

		Villages that have been flooded sometime in the past		Villages experienced any losses or damages from any floods in the previous 3 years	
Country	**Sub-Zone**	**A. Number of villages**	**% Of sample villages**	**B. Number of villages**	**B % of A: villages that had been flooded**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	21	95.45%	21	100.00%
	Zone 4 B - Subzone Cambodia - 3S	3	75.00%	3	100.00%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	13	72.22%	13	100.00%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	15	68.18%	15	100.00%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	19	86.36%	18	94.74%
	All	***71***	***80.68%***	***70***	***98.59%***
Lao PDR	Zone 2 A - Mainstream - Lao	29	65.91%	4	13.79%
	Zone 3 A - Subzone Lao - Mainstream	26	59.09%	4	15.38%
	All	***55***	***62.50%***	***8***	***14.55%***
Thailand	Zone 2 C - Subzone Lower Thailand	16	72.73%	9	56.25%
	Zone 2 B - Subzone Upper Thailand	21	95.45%	19	90.48%
	Zone 3 C - Subzone Thailand - Songkhram	22	100.00%	18	81.82%
	Zone 3 B - Subzone Thailand - Mainstream	17	77.27%	14	82.35%
	All	***76***	***86.36%***	***60***	***78.95%***

Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	31	70.45%	16	36.36%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	10	22.73%	3	6.82%
	All	***41***	***46.59%***	***19***	***21.59%***
All	**All**	**243**	**69.03%**	**157**	**54.14%**

Source: Village Profile

Table 23 Villages with households that experienced losses and % of HHs in previous 3 years due to flooding

		Villages with households that experienced losses or damages from any floods in the previous 3 years		**% HHs that experienced damages from flooding in previous 3 years**
Country	**Sub-Zone**	**N**	**Row %**	**Mean % of HHs**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	20	90.91%	39.33%
	Zone 4 B - Subzone Cambodia - 3S	3	75.00%	49.73%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	12	66.67%	52.60%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	15	68.18%	49.15%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	18	81.82%	58.78%
	All	***68***	***77.27%***	***49.45%***
Lao PDR	Zone 2 A - Mainstream - Lao	1	2.27%	.
	Zone 3 A - Subzone Lao - Mainstream	0	0.00%	.
	All	***1***	***1.14%***	**.**

Thailand	Zone 2 C - Subzone Lower Thailand	9	40.91%	24.74%
	Zone 2 B - Subzone Upper Thailand	19	86.36%	22.83%
	Zone 3 C - Subzone Thailand - Songkhram	18	81.82%	45.17%
	Zone 3 B - Subzone Thailand - Mainstream	14	63.64%	26.64%
	All	***60***	***68.18%***	***30.71%***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	8	18.18%	30.16%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	3	6.82%	34.10%
	All	***11***	***12.50%***	***32.13%***
All	**All**	**140**	**39.77%**	**38.96%**

Source: Village Profile

Table 24 Flooding in the previous 3 years and loss of assets and damages from flooding – HH survey

		Households that experienced flooding in the previous 3 years		Household that experienced flooding in the previous 3 years AND lost assets or experienced damage	
Country	**Sub-Zone**	**A. Number HHs**	**% of sample**	**B. Number HHs**	**B. % of A.**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	309	87.8%	295	95.5%
	Zone 4 B - Subzone Cambodia - 3S	48	75.0%	46	95.8%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	195	67.7%	148	75.9%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	216	61.4%	170	78.7%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	237	67.3%	192	81.0%
	All	***1,005***	***71.4%***	***851***	***84.7%***
Lao PDR	Zone 2 A - Mainstream - Lao	129	18.3%	79	61.2%
	Zone 3 A - Subzone Lao - Mainstream	300	42.6%	225	75.0%
	All	***429***	***30.5%***	***304***	***70.9%***
Thailand	Zone 2 B - Subzone Upper Thailand	160	45.5%	112	70.0%
	Zone 2 C - Subzone Lower Thailand	83	23.6%	70	84.3%
	Zone 3 B - Subzone Thailand - Mainstream	125	35.5%	91	72.8%
	Zone 3 C - Subzone Thailand - Songkhram	193	54.8%	171	88.6%
	All	***561***	***39.8%***	***444***	***79.1%***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	187	26.6%	151	80.7%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	33	4.7%	30	90.9%
	All	***220***	***15.6%***	***181***	***82.3%***
All	**All**	**2,215**	**39.3%**	**1,780**	**80.4%**

Table 25 Villages that experienced flooding in the previous 12 months

		Villages that experienced flooding in the previous 12 months	
Country	**Sub-Zone**	**N**	**Row %**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	20	90.91%
	Zone 4 B - Subzone Cambodia - 3S	3	75.00%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	12	66.67%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	7	31.82%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	12	54.55%
	All	***54***	***61.36%***
Lao PDR	Zone 2 A - Mainstream - Lao	4	9.09%
	Zone 3 A - Subzone Lao - Mainstream	4	9.09%
	All	***8***	***9.09%***
Thailand	Zone 2 C - Subzone Lower Thailand	5	22.73%
	Zone 2 B - Subzone Upper Thailand	17	77.27%
	Zone 3 C - Subzone Thailand - Songkhram	15	68.18%
	Zone 3 B - Subzone Thailand - Mainstream	5	22.73%
	All	***42***	***47.73%***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	9	20.45%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	3	6.82%
	All	***12***	***13.64%***
All	**All**	**116**	**32.95%**

Table 26 Flooding in the previous 12 months and loss of assets and damages from flooding – HH survey

		Households that experienced flooding the previous 12 months		Households that experienced flooding in the previous 12 months and lost assets or experienced damages	
Country	**Sub-Zone**	**A. Number HHs**	**% of sample**	**B. Number HHs**	**% of A.**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	284	80.7%	282	99.3%
	Zone 4 B - Subzone Cambodia - 3S	48	75.0%	46	95.8%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	179	62.2%	143	79.9%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	135	38.4%	117	86.7%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	185	52.6%	163	88.1%
	All	***831***	***59.0%***	***751***	***90.4%***
Lao PDR	Zone 2 A - Mainstream - Lao	100	14.2%	74	74.0%
	Zone 3 A - Subzone Lao - Mainstream	212	30.1%	193	91.0%
	All	***312***	***22.2%***	***267***	***85.6%***
Thailand	Zone 2 B - Subzone Upper Thailand	132	37.5%	91	69.5%
	Zone 2 C - Subzone Lower Thailand	35	9.9%	31	88.6%
	Zone 3 B - Subzone Thailand - Mainstream	77	21.9%	56	72.7%
	Zone 3 C - Subzone Thailand - Songkhram	142	40.3%	127	89.4%
	All	***386***	***27.4%***	***305***	***79.2%***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	134	19.0%	134	100.0%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	24	3.4%	24	100.0%
	All	***158***	***11.2%***	***158***	***100.0%***
All	**All**	**1,687**	**30.0%**	**1,481**	**87.8%**

Table 27 Sources of flooding and average days of flooding in previous 12 months – HH survey

		River overflowed		Lake overflowed		Canal overflowed		Rain water could not drain away		Other		Don't know		All cases	Total days of flooding
Country	**Sub-Zone**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**Mean**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	351	56.9%	10	1.6%	159	25.8%	42	6.8%	7	1.1%	48	7.8%	617	17.6
	Zone 4 B - Subzone Cambodia - 3S	76	72.4%	1	1.0%	16	15.2%	5	4.8%	1	1.0%	6	5.7%	105	13.7
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	305	56.8%	76	14.2%	39	7.3%	96	17.9%	11	2.0%	10	1.9%	537	46.2
	Zone 5 A - Subzone Cambodia - Tonle Sap river	139	33.0%	38	9.0%	85	20.2%	116	27.6%	23	5.5%	20	4.8%	421	40.2
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	125	26.0%	35	7.3%	42	8.8%	101	21.0%	83	17.3%	94	19.6%	480	33.1
	All	***996***	***46.1%***	***160***	***7.4%***	***341***	***15.8%***	***360***	***16.7%***	***125***	***5.8%***	***178***	***8.2%***	***2,160***	***30.7***
Lao PDR	Zone 2 A - Mainstream - Lao	114	60.3%	34	18.0%	28	14.8%	8	4.2%	4	2.1%	1	0.5%	189	2.0
	Zone 3 A - Subzone Lao - Mainstream	301	56.2%	53	9.9%	33	6.2%	92	17.2%	57	10.6%	0	0.0%	536	14.6
	All	***415***	***57.2%***	***87***	***12.0%***	***61***	***8.4%***	***100***	***13.8%***	***61***	***8.4%***	***1***	***0.1%***	***725***	***10.6***
Thailand	Zone 2 B - Subzone Upper Thailand	184	62.8%	1	0.3%	16	5.5%	59	20.1%	24	8.2%	9	3.1%	293	10.9
	Zone 2 C - Subzone Lower Thailand	45	62.5%	0	0.0%	5	6.9%	17	23.6%	3	4.2%	2	2.8%	72	4.4
	Zone 3 B - Subzone Thailand - Mainstream	101	60.1%	0	0.0%	6	3.6%	53	31.5%	6	3.6%	2	1.2%	168	14.2
	Zone 3 C - Subzone Thailand - Songkhram	253	78.8%	0	0.0%	3	0.9%	60	18.7%	4	1.2%	1	0.3%	321	43.1
	All	***583***	***68.3%***	***1***	***0.1%***	***30***	***3.5%***	***189***	***22.1%***	***37***	***4.3%***	***14***	***1.6%***	***854***	***22.7***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	174	18.6%	151	16.1%	134	14.3%	136	14.5%	209	22.3%	134	14.3%	938	45.5
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	32	19.0%	28	16.7%	25	14.9%	24	14.3%	35	20.8%	24	14.3%	168	21.1
	All	***206***	***18.6%***	***179***	***16.2%***	***159***	***14.4%***	***160***	***14.5%***	***244***	***22.1%***	***158***	***14.3%***	***1,106***	***41.8***
All	**All**	**2,200**	**45.4%**	**427**	**8.8%**	**591**	**12.2%**	**809**	**16.7%**	**467**	**9.6%**	**351**	**7.2%**	**4,845**	**26.2**

Table 28 Source of most serious flooding event in the previous 12 months – HH survey

Country	Sub-Zone	Normal rains/ monsoon	Extended monsoon	Extreme weather/ typhoon	Hydro-power reservoir release	Other	Don't know
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	24.6%	2.5%	42.6%	13.7%	0.4%	16.2%
	Zone 4 B - Subzone Cambodia - 3S	58.3%	2.1%	16.7%	10.4%	0.0%	12.5%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	91.1%	2.2%	1.1%	0.6%	0.0%	5.0%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	25.9%	1.5%	43.0%	4.4%	11.9%	13.3%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	23.2%	6.5%	17.8%	0.0%	21.6%	30.8%
	All	***40.8%***	***3.1%***	***26.7%***	***6.1%***	***6.9%***	***16.4%***
Lao PDR	Zone 2 A - Mainstream - Lao	76.7%	4.4%	13.3%	1.1%	3.3%	1.1%
	Zone 3 A - Subzone Lao - Mainstream	88.4%	1.9%	0.5%	0.5%	8.7%	0.0%
	All	***84.8%***	***2.7%***	***4.4%***	***0.7%***	***7.1%***	***0.3%***
Thailand	Zone 2 B - Subzone Upper Thailand	88.5%	0.8%	1.5%	0.0%	5.4%	3.8%
	Zone 2 C - Subzone Lower Thailand	91.4%	0.0%	0.0%	2.9%	5.7%	0.0%
	Zone 3 B - Subzone Thailand - Mainstream	98.7%	0.0%	0.0%	0.0%	0.0%	1.3%
	Zone 3 C - Subzone Thailand - Songkhram	98.6%	0.0%	0.7%	0.0%	0.0%	0.7%
	All	***94.5%***	***0.3%***	***0.8%***	***0.3%***	***2.4%***	***1.8%***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	29.9%	12.7%	0.0%	1.5%	56.0%	0.0%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	33.3%	16.7%	4.2%	0.0%	45.8%	0.0%
	All	***30.4%***	***13.3%***	***0.6%***	***1.3%***	***54.4%***	***0.0%***
All	**All**	**60.0%**	**3.4%**	**14.3%**	**3.4%**	**10.4%**	**8.6%**

Table 29 Paddy land and rice losses from flooding in the previous 12 months – HH survey

Country	Sub-Zone	Number HHs lost/damaged paddy in the previous 12 months due to flooding	% of HHs that experienced flooding	Total hectares lost or damaged in sampled households	Mean hectares lost or damaged	Mean per cent of total paddy land area lost or damaged	Mean per cent of usual total rice production lost	Median value of lost rice per HH US$	Mean value of lost rice per HH US$
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	243	85.6%	270.0	1.1	66.2%	66.8%	300.0	404.1
	Zone 4 B - Subzone Cambodia - 3S	42	87.5%	43.9	1.0	66.3%	66.3%	300.0	373.2
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	71	39.7%	52.9	0.7	58.1%	57.1%	275.0	343.5
	Zone 5 A - Subzone Cambodia - Tonle Sap river	77	57.0%	66.9	0.9	57.3%	55.9%	210.0	441.2
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	115	62.2%	270.9	2.4	74.8%	69.4%	300.0	780.8
	All	***548***	***65.9%***	***704.4***	***1.3***	***65.7%***	***64.5%***	***300.0***	***478.1***
Lao PDR	Zone 2 A - Mainstream - Lao	38	38.0%	14.3	0.4	34.8%	35.0%	242.2	327.0
	Zone 3 A - Subzone Lao - Mainstream	179	84.4%	155.4	0.9	49.4%	49.4%	375.0	482.0
	All	***217***	***69.6%***	***169.7***	***0.8***	***46.9%***	***46.9%***	***357.1***	***454.9***

Thailand	Zone 2 B - Subzone Upper Thailand	65	48.9%	55.8	0.8	40.5%	41.8%	625.0	1028.5
	Zone 2 C - Subzone Lower Thailand	20	57.1%	18.7	1.0	38.7%	40.8%	375.0	668.8
	Zone 3 B - Subzone Thailand - Mainstream	47	61.0%	52.1	1.1	57.9%	51.4%	421.9	554.7
	Zone 3 C - Subzone Thailand - Songkhram	124	87.9%	358.3	2.8	64.6%	64.1%	646.9	1149.2
	All	***256***	***66.3%***	***484.9***	***1.9***	***55.3%***	***54.4%***	***625.0***	***975.1***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	4	3.0%	1.1	0.3	52.5%	57.5%	119.0	216.7
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	4	16.7%	3.1	0.8	73.0%	57.5%	428.6	756.0
	All	***8***	***5.1%***	***4.2***	***0.5***	***62.8%***	***57.5%***	***285.7***	***486.3***
All	**All**	**1029**	**61.0%**	**1363.3**	**1.3**	**59.1%**	**58.2%**	**375.0**	**597.7**

Table 30 Riverbank and island land and production losses due to flooding in the he previous 12 months – HH survey

		HHs that lost riverbank/island fields and gardens in the previous 12 months due to flooding		Riverbank/island hectares of land lost		Percent of total riverbank/ island cultivated land lost	Per cent of usual production from riverbank/ island lost	Value of riverbank and island losses	
Country	**Sub-Zone**	**Num-ber**	**% of HHs perienced flooding**	**Total of affected HHs' land**	**Mean Ha per affected HH**	**Mean per affected HH**	**Mean per affected HH**	**Median US$**	**Mean US$**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	99	34.9%	47.1	0.5	84.2%	83.6%	75.0	169.8
	Zone 4 B - Subzone Cambodia - 3S	10	20.8%	8.7	0.9	95.0%	95.0%	262.5	630.0
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	9	5.0%	3.4	0.4	94.4%	94.4%	375.0	519.4
	Zone 5 A - Subzone Cambodia - Tonle Sap river	13	9.6%	7.2	0.6	77.7%	76.2%	250.0	782.7
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	3	1.6%	0.2	0.1	96.7%	96.7%	37.5	187.5
	All	***134***	***16.1%***	***66.6***	***0.5***	***85.3%***	***84.7%***	***87.5***	***287.5***
Lao PDR	Zone 2 A - Mainstream - Lao	11	11.0%	2.0	0.2	86.4%	67.7%	250.0	310.2
	Zone 3 A - Subzone Lao - Mainstream	15	7.1%	2.6	0.2	67.2%	70.4%	112.5	112.5
	All	***26***	***8.3%***	***4.7***	***0.2***	***75.3%***	***69.3%***	***125.0***	***196.2***
Thailand	Zone 2 B - Subzone Upper Thailand	3	2.3%	8.4	2.8	36.7%	36.7%	1250.0	947.9
	Zone 2 C - Subzone Lower Thailand	3	8.6%	1.9	0.6	70.0%	66.7%	1562.5	1802.1
	Zone 3 B - Subzone Thailand - Mainstream	1	1.3%	0.3	0.3	33.3%	40.0%	781.3	781.3
	Zone 3 C - Subzone Thailand - Songkhram	0	0.0%	.	.	.	.	.	.
	All	***7***	***1.8%***	***10.6***	***1.5***	***50.5%***	***50.0%***	***1250.0***	***1290.2***

Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	2	1.5%	0.2	0.1	51.5%	65.0%	71.4	71.4
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	2	8.3%	1.9	1.0	100.0%	23.0%	547.6	547.6
	All	***4***	***2.5%***	***2.1***	***0.5***	***75.8%***	***44.0%***	***214.3***	***309.5***
All	**All**	**171**	**10.1%**	**83.9**	**0.5**	**82.2%**	**80.0%**	**100.0**	**315.2**

Table 31 Aquaculture production losses due to flooding in the previous 12 months – HH survey

Country	**Sub-Zone**	**Households that experienced aquaculture temporarily destroyed due to flooding**		**Total Kg of production lost**	**Mean Kg of production lost**	**Mean per cent of annual production lost**	**Mean value of production lost per HHs – US$**
		Number of HHs	**% of flood-affected HHs**				
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	3	1.1%	23	8	27.3%	1,263.3
	Zone 4 B - Subzone Cambodia - 3S	1	2.1%	10	10	20.0%	25.0
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	9	5.0%	4,910	546	39.4%	590.3
	Zone 5 A - Subzone Cambodia - Tonle Sap river	1	0.7%	1,000	1,000	50.0%	1,250.0
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	0	0.0%	.	.	.	.
	All	***14***	***1.7%***	***5,943***	***425***	***36.2%***	***741.3***

Lao PDR	Zone 2 A - Mainstream - Lao	2	2.0%	350	175	100.0%	312.5
	Zone 3 A - Subzone Lao - Mainstream	7	3.3%	530	76	24.7%	187.9
	All	***9***	***2.9%***	***880***	***98***	***41.4%***	***215.6***
Thailand	Zone 2 B - Subzone Upper Thailand	3	2.3%	50	25	66.7%	203.1
	Zone 2 C - Subzone Lower Thailand	1	3.0%	60	60	30.0%	93.8
	Zone 3 B - Subzone Thailand - Mainstream	1	1.3%	30	30	10.0%	156.3
	Zone 3 C - Subzone Thailand - Songkhram	0	0.0%	.	.	.	.
	All	***5***	***1.4%***	***140***	***35***	***48.0%***	***164.1***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	10	7.5%	459	46	57.8%	147.4
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	1	4.2%	45	45	60.0%	166.7
	All	***11***	***7.0%***	***504***	***46***	***58.0%***	***149.2***
All	**All**	**39**	**2.3%**	**7,467**	**197**	**45.1%**	**384.6**

Table 32 Number and per cent of households that lost property due to flooding in the previous 12 months

		HHs that lost property		US$ - value of lost property
Country	**Sub-Zone**	**Number of HH**	**% of affected HHs**	**Mean per HH**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	7	2.46%	89.3
	Zone 4 B - Subzone Cambodia - 3S	2	4.17%	425.0
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	9	5.03%	80.0
	Zone 5 A - Subzone Cambodia - Tonle Sap river	20	14.81%	154.3
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	39	21.08%	210.8
	All	***77***	***9.27%***	***175.4***
Lao PDR	Zone 2 A - Mainstream - Lao	10	10.20%	705.0
	Zone 3 A - Subzone Lao - Mainstream	3	1.42%	132.5
	All	***13***	***4.19%***	***541.4***
Thailand	Zone 2 B - Subzone Upper Thailand	40	31.01%	866.1
	Zone 2 C - Subzone Lower Thailand	8	22.86%	1140.6
	Zone 3 B - Subzone Thailand - Mainstream	7	9.21%	442.4
	Zone 3 C - Subzone Thailand - Songkhram	1	0.79%	62.5
	All	***56***	***15.26%***	***838.0***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	19	14.18%	***405.8***
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	2	8.33%	285.7
	All	***21***	***13.29%***	***394.3***
All	**All**	**167**	**10.02%**	**454.1**

Table 33 Number and per cent of households that lost working days due to flooding in the previous 12 months

Country	Sub-Zone	HHs that lost working days in previous 12 months due to flooding	% of flood affected HHs	Mean number of working days lost
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	262	92.3%	17
	Zone 4 B - Subzone Cambodia - 3S	47	97.9%	13
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	138	77.1%	32
	Zone 5 A - Subzone Cambodia - Tonle Sap river	53	39.3%	23
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	142	76.8%	32
	All	***642***	***77.3%***	***24***
Lao PDR	Zone 2 A - Mainstream - Lao	12	12.5%	4
	Zone 3 A - Subzone Lao - Mainstream	26	12.4%	8
	All	***38***	***12.5%***	***6***
Thailand	Zone 2 B - Subzone Upper Thailand	30	23.8%	15
	Zone 2 C - Subzone Lower Thailand	12	34.3%	8
	Zone 3 B - Subzone Thailand - Mainstream	11	14.9%	14
	Zone 3 C - Subzone Thailand - Songkhram	0	0.0%	.
	All	***53***	***14.6%***	***14***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	31	23.1%	50
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	3	12.5%	28
	All	***34***	***21.5%***	***48***
All	**All**	**767**	**46.3%**	**23**

Table 34 Days without access to clean drinking water and sanitation due to flooding in the previous 12 months

		Days without clean drinking water			Days without access to sanitation		
Country	**Sub-Zone**	**Number of HHs affected**	**% of flood affected HHs**	**Mean days**	**Number of HHs affected**	**% of flood affected Hhs**	**Mean days**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	61	21.5%	17	41	14.4%	18
	Zone 4 B - Subzone Cambodia - 3S	6	12.5%	14	6	12.5%	14
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	36	20.1%	55	84	46.9%	56
	Zone 5 A - Subzone Cambodia - Tonle Sap river	16	11.9%	49	30	22.2%	43
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	26	14.1%	37	94	50.8%	35
	All	***145***	***17.4%***	***33***	***255***	***30.7%***	***39***
Lao PDR	Zone 2 A - Mainstream - Lao	4	4.2%	1	5	5.2%	3
	Zone 3 A - Subzone Lao - Mainstream	0	0.0%	5	1	0.5%	7
	All	***4***	***1.3%***	***2***	***6***	***2.0%***	***4***
Thailand	Zone 2 B - Subzone Upper Thailand	7	5.4%	12	5	3.8%	9
	Zone 2 C - Subzone Lower Thailand	1	2.9%	.	1	2.9%	4
	Zone 3 B - Subzone Thailand - Mainstream	0	0.0%	.	2	2.6%	2
	Zone 3 C - Subzone Thailand - Songkhram	0	0.0%	.	0	0.0%	.
	All	***8***	***2.2%***	***12***	***8***	***2.2%***	***7***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	14	10.4%	43	23	19.0%	29
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	4	16.7%	31	10	10.1%	13
	All	***18***	***11.4%***	***40***	***33***	***15.0%***	***24***
All	**All**	**175**	**10.5%**	**32**	**302**	**17.5%**	**36**

Table 35 Injuries and loss of life due to flooding in the previous 12 months

		HHs with members who were injured due to flooding		Number of persons were injured
Country	**Sub-Zone**	**Number of HHs**	**% of flood affected Hhs**	**Sum**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	0	0.0%	.
	Zone 4 B - Subzone Cambodia - 3S	0	0.0%	.
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	2	1.1%	2
	Zone 5 A - Subzone Cambodia - Tonle Sap river	1	0.7%	1
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	2	1.1%	3
	All	***5***	***0.6%***	***6***
Lao PDR	Zone 2 A - Mainstream - Lao	1	1.0%	1
	Zone 3 A - Subzone Lao - Mainstream	0	0.0%	.
	All	***1***	***0.3%***	***1***
Thailand	Zone 2 B - Subzone Upper Thailand	2	1.5%	3
	Zone 2 C - Subzone Lower Thailand	0	0.0%	.
	Zone 3 B - Subzone Thailand - Mainstream	1	1.3%	1
	Zone 3 C - Subzone Thailand - Songkhram	0	0.0%	.
	All	***3***	***0.8%***	***4***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	1	0.7%	1
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	0	0.0%	.
	All	***1***	***0.6%***	***1***
All	**All**	**10**	**0.6%**	**12**

Chapter 4.2 Drought

Table 36 Households that experienced drought in the previous 3 years

		HHs experienced drought in the previous 3 years		HHs lost assets due to drought previous 3 years	
Country	**Sub-Zone**	**A. Number of HHs**	**B. % of sample HH**	**C. Number of HHs**	**D. % of drought affected HHs (A)**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	337	95.7%	324	96.1%
	Zone 4 B - Subzone Cambodia - 3S	49	76.6%	46	93.9%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	144	50.0%	103	71.5%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	279	79.3%	203	72.8%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	225	63.9%	179	79.6%
	All	***1,034***	***73.4%***	***855***	***82.7%***
Lao PDR	Zone 2 A - Mainstream - Lao	168	23.9%	84	50.0%
	Zone 3 A - Subzone Lao - Mainstream	160	22.7%	86	53.8%
	All	***328***	***23.3%***	***170***	***51.8%***
Thailand	Zone 2 B - Subzone Upper Thailand	182	51.7%	124	68.1%
	Zone 2 C - Subzone Lower Thailand	177	50.3%	118	67.8%
	Zone 3 B - Subzone Thailand - Mainstream	143	40.6%	112	78.3%
	Zone 3 C - Subzone Thailand - Songkhram	152	43.2%	121	80.7%
	All	***654***	***46.4%***	***475***	***73.2%***

Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	41	5.8%	24	58.5%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	40	5.7%	35	87.5%
	All	***81***	***5.8%***	***59***	***72.8%***
All	**All**	**2,097**	**37.2%**	**1,559**	**74.5%**

Table 37 Households that experienced drought in the previous 12 months

		HHs experienced drought previous 12 months		HHs lost assets due to drought previous 12 months	
Country	**Sub-Zone**	**A. Number of HHs**	**B. % of sample**	**C. Number of HHs**	**D. % of drought affected HHs (A)**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	320	90.9%	311	97.2%
	Zone 4 B - Subzone Cambodia - 3S	43	67.2%	41	95.3%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	102	35.4%	79	77.5%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	200	56.8%	163	81.5%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	170	48.3%	156	91.8%
	All	***835***	***59.3%***	***750***	***89.8%***
Lao PDR	Zone 2 A - Mainstream - Lao	167	23.7%	124	74.3%
	Zone 3 A - Subzone Lao - Mainstream	101	14.3%	93	92.1%
	All	***268***	***19.0%***	***217***	***81.0%***
Thailand	Zone 2 B - Subzone Upper Thailand	158	45.0%	100	63.3%
	Zone 2 C - Subzone Lower Thailand	136	38.6%	75	56.0%
	Zone 3 B - Subzone Thailand - Mainstream	77	21.9%	56	72.7%
	Zone 3 C - Subzone Thailand - Songkhram	80	22.7%	58	72.5%
	All	***451***	***32.1%***	***289***	***64.4%***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	29	4.1%	2	6.9%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	35	5.0%	22	62.9%
	All	***64***	***4.5%***	***24***	***37.5%***
All	**All**	**1,618**	**28.7%**	**1,280**	**79.2%**

Table 38 Drought affected households that lost paddy land and rice production in previous 12 months

Country	Sub-Zone	Number of drought affected HHs that lost rice land	% of drought affected HHs	Mean hectares lost	Mean % of land area affected	Mean % of usual production lost
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	193	60.3%	1	51	51
	Zone 4 B - Subzone Cambodia - 3S	22	51.2%	1	50	50
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	46	45.1%	3	61	54
	Zone 5 A - Subzone Cambodia - Tonle Sap river	122	61.0%	1	63	62
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	129	75.9%	1	62	62
	All	***512***	***61.3%***	***1***	***57***	***57***
Lao PDR	Zone 2 A - Mainstream - Lao	123	73.7%	1	36	37
	Zone 3 A - Subzone Lao - Mainstream	93	92.1%	1	34	34
	All	***216***	***80.6%***	***1***	***35***	***35***
Thailand	Zone 2 B - Subzone Upper Thailand	55	34.8%	3	54	51
	Zone 2 C - Subzone Lower Thailand	29	21.3%	2	49	50
	Zone 3 B - Subzone Thailand - Mainstream	53	68.8%	1	36	34
	Zone 3 C - Subzone Thailand - Songkhram	59	73.8%	1	29	30
	All	***196***	***43.5%***	***2***	***41***	***40***

Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	1	0.6%	1	80	30
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	5	4.1%	1	63	61
	All	***6***	***2.1%***	***1***	***66***	***56***
All	**All**	**930**	**50.5%**	**1**	**51**	**50**

Table 39 Value of losses due to drought in the previous 12 months

		Loss of livestock and poultry			Loss of property			Loss of rice			All	
Country	**Sub-Zone**	**Nos HHs**	**% of HHs having xperienced drought**	**Mean Value of loss - US$**	**Nos HHs**	**% of HHs having experienced drought**	**Mean Value of loss – US$**	**Nos HHs**	**% of HHs having experienced drought**	**Mean Value of loss**	**Nos HHs**	**Mean Value of loss – US$**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	303	69.5%	442	2	0.2%	198	193	30.3%	303	498	388
	Zone 4 B - Subzone Cambodia - 3S	41	75.5%	471	0	.	.	22	24.5%	285	63	406
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	59	39.0%	225	1	0.1%	50	46	60.8%	451	106	322
	Zone 5 A - Subzone Cambodia - Tonle Sap river	128	30.6%	152	10	2.5%	160	122	66.9%	349	260	245
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	91	35.7%	374	5	1.2%	220	129	63.2%	467	225	424
	All	***622***	***53.5%***	***354***	***18***	***0.8%***	***175***	***512***	***45.8%***	***368***	***1,152***	***357***
Lao PDR	Zone 2 A - Mainstream - Lao	3	7.2%	662	0	.	.	70	92.8%	365	73	377
	Zone 3 A - Subzone Lao - Mainstream	0	.	.	1	0.5%	100	50	99.5%	388	51	382
	All	***3***	***4.2%***	***662***	***1***	***0.2%***	***100***	***120***	***95.6%***	***374***	***124***	***379***

Thailand	Zone 2 B - Subzone Upper Thailand	7	0.7%	112	51	40.6%	867	53	58.6%	1,203	111	980
	Zone 2 C - Subzone Lower Thailand	2	0.7%	172	37	53.7%	692	26	45.5%	835	65	733
	Zone 3 B - Subzone Thailand - Mainstream	1	0.2%	63	4	3.6%	249	52	96.2%	515	57	488
	Zone 3 C - Subzone Thailand - Songkhram	0	.	.	0	.	.	59	100.0%	450	59	450
	All	***10***	***0.6%***	***119***	***92***	***33.6%***	***770***	***190***	***65.9%***	***731***	***292***	***722***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	3	33.3%	159	1	10.0%	143	1	56.7%	810	5	286
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	1	0.8%	143	17	82.8%	908	5	16.4%	611	23	810
	All	***4***	***3.1%***	***155***	***18***	***77.6%***	***865***	***6***	***19.3%***	***644***	***28***	***717***
All	**All**	**639**	**32.5%**	**350**	**129**	**13.0%**	**695**	**828**	**54.5%**	**454**	**1,596**	**432**

Table 40 Extreme weather events experienced, and assets lost by households in the previous 12 months

		HHs experienced extreme weather events in previous 12 months		HHs lost assets due to extreme weather events	
Country	**Sub-Zone**	**Number**	**% of sample**	**Number**	**% of affected HHs**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	310	88.1%	263	84.8%
	Zone 4 B - Subzone Cambodia - 3S	42	65.6%	40	95.2%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	100	34.7%	49	49.0%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	259	73.6%	113	43.6%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	317	90.1%	138	43.5%
	All	***1,028***	***73.0%***	***603***	***58.7%***
Lao PDR	Zone 2 A - Mainstream - Lao	79	11.3%	37	46.8%
	Zone 3 A - Subzone Lao - Mainstream	110	15.9%	54	50.0%
	All	***189***	***13.6%***	***91***	***48.7%***
Thailand	Zone 2 B - Subzone Upper Thailand	281	79.8%	167	60.1%
	Zone 2 C - Subzone Lower Thailand	209	59.4%	97	46.6%
	Zone 3 B - Subzone Thailand - Mainstream	164	46.6%	55	34.0%
	Zone 3 C - Subzone Thailand - Songkhram	77	21.9%	23	30.3%
	All	***731***	***51.9%***	***342***	***47.2%***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	410	58.2%	44	6.3%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	560	79.5%	68	9.7%
	All	***970***	***68.9%***	***112***	***8.0%***
All	**All**	**2,918**	**52.0%**	**1,148**	**34.3%**

Table 41 Types of extreme weather events experienced by % of households reporting (observations)

		Typhoon	Hail storm	Flash flood	Heavy rain	Local strong winds	Lightning	Other
Cam-bodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	1.1%	0.0%	0.4%	0.2%	29.1%	8.4%	60.8%
	Zone 4 B - Subzone Cambodia - 3S	6.3%	0.0%	0.0%	0.0%	8.3%	6.3%	79.2%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	8.5%	2.6%	3.4%	0.9%	53.0%	7.7%	23.9%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	0.7%	0.2%	10.1%	12.1%	36.5%	23.8%	16.5%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	0.2%	0.5%	8.8%	6.4%	37.3%	12.0%	34.9%
	All	***1.3%***	***0.4%***	***6.4%***	***6.0%***	***35.1%***	***14.4%***	***36.3%***
Lao PDR	Zone 2 A - Mainstream - Lao	32.6%	4.5%	2.2%	21.3%	32.6%	1.1%	5.6%
	Zone 3 A - Subzone Lao - Mainstream	26.0%	14.2%	0.8%	22.0%	34.6%	0.0%	2.4%
	All	***28.7%***	***10.2%***	***1.4%***	***21.8%***	***33.8%***	***0.5%***	***3.7%***
Thailand	Zone 2 B - Subzone Upper Thailand	3.0%	24.6%	1.7%	17.2%	26.5%	5.5%	21.6%
	Zone 2 C - Subzone Lower Thailand	1.5%	15.3%	0.3%	23.0%	32.7%	4.6%	22.7%
	Zone 3 B - Subzone Thailand - Mainstream	0.3%	14.9%	2.2%	25.4%	27.2%	5.3%	24.8%
	Zone 3 C - Subzone Thailand - Songkhram	1.0%	31.4%	0.0%	45.1%	14.7%	5.9%	2.0%
	All	***1.8%***	***20.1%***	***1.3%***	***23.0%***	***27.6%***	***5.2%***	***21.2%***

Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	0.3%	0.0%	0.0%	39.8%	34.4%	22.4%	3.0%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	0.4%	0.1%	0.2%	31.7%	32.9%	25.1%	9.7%
	All	***0.4%***	***0.0%***	***0.1%***	***34.8%***	***33.5%***	***24.1%***	***7.1%***
All	**All**	**2.0%**	**5.1%**	**2.3%**	**22.9%**	**32.6%**	**16.0%**	**19.0%**

Chapter 6 Vulnerability, resilience and coping strategies

Table 42 Indicators of social vulnerability

				Marital status of Household Head					Highest education of any Household member					
		Dependency ratio	Number of household members	Married	Single	Widowed	Divorced	Separated	No formal education	Primary	Secondary	High school	Vocational	University
Country	**Sub-Zone**	**Mean**		**Row %**										

Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	0.9	4.9	84.4%	0.9%	13.6%	0.9%	0.3%	2.0%	54.3%	30.4%	11.6%	0.6%	1.1%
	Zone 4 B - Subzone Cambodia - 3S	0.7	5.0	89.1%	1.6%	9.4%	0.0%	0.0%	4.7%	81.3%	10.9%	1.6%	0.0%	1.6%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	0.8	5.0	85.8%	1.4%	11.8%	1.0%	0.0%	1.7%	37.2%	34.4%	21.5%	0.0%	5.2%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	0.8	4.9	81.0%	1.7%	17.3%	0.0%	0.0%	1.7%	41.8%	25.6%	22.2%	0.9%	8.0%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	0.9	5.1	81.3%	0.9%	16.5%	0.6%	0.9%	3.4%	46.9%	31.3%	13.9%	1.1%	3.4%
	All	***0.8***	***5.0***	***83.2%***	***1.2%***	***14.7%***	***0.6%***	***0.3%***	***2.3%***	***47.0%***	***29.3%***	***16.4%***	***0.6%***	***4.3%***
Lao PDR	Zone 2 A - Mainstream - Lao	0.9	5.4	91.6%	0.3%	6.7%	1.3%	0.1%	1.3%	26.1%	22.3%	26.8%	11.1%	12.4%
	Zone 3 A - Subzone Lao - Mainstream	0.7	5.9	87.6%	0.7%	9.4%	2.0%	0.3%	0.9%	13.8%	28.7%	27.3%	15.1%	14.3%
	All	***0.8***	***5.7***	***89.6%***	***0.5%***	***8.0%***	***1.6%***	***0.2%***	***1.1%***	***20.0%***	***25.5%***	***27.1%***	***13.1%***	***13.4%***
Thailand	Zone 2 B - Subzone Upper Thailand	0.6	3.9	79.5%	3.1%	14.2%	1.7%	1.4%	2.0%	21.6%	13.9%	24.7%	8.5%	29.3%
	Zone 2 C - Subzone Lower Thailand	0.6	4.3	78.7%	1.4%	17.0%	2.8%	0.0%	0.9%	30.4%	18.5%	24.4%	8.8%	17.0%
	Zone 3 B - Subzone Thailand - Mainstream	0.7	4.8	75.3%	2.0%	20.2%	2.3%	0.3%	0.3%	21.6%	21.3%	24.7%	13.1%	19.0%
	Zone 3 C - Subzone Thailand - Songkhram	0.7	4.6	77.0%	4.0%	17.3%	1.7%	0.0%	0.3%	22.2%	18.8%	31.8%	8.2%	18.8%
	All	***0.6***	***4.4***	***77.6%***	***2.6%***	***17.2%***	***2.1%***	***0.4%***	***0.9%***	***23.9%***	***18.1%***	***26.4%***	***9.7%***	***21.0%***

Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	0.6	4.8	83.8%	1.7%	13.2%	1.0%	0.3%	3.0%	11.1%	31.0%	33.7%	6.1%	15.2%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	0.6	4.5	83.7%	0.9%	14.3%	0.6%	0.6%	1.3%	8.1%	29.0%	35.7%	9.4%	16.6%
	All	***0.6***	***4.6***	***83.7%***	***1.3%***	***13.8%***	***0.8%***	***0.4%***	***2.1%***	***9.6%***	***30.0%***	***34.7%***	***7.7%***	***15.9%***
All	**All**	**0.7**	**4.9**	**83.6%**	**1.4%**	**13.4%**	**1.3%**	**0.3%**	**1.6%**	**25.1%**	**25.7%**	**26.1%**	**7.8%**	**13.6%**

Table 43 Availability and quality of village services

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	Services					
Zone 2 - Mainstream - Lao	Agricultural produce storage					
	Agriculture extension	5%	39%	23%	16%	
	Aquaculture		9%		11%	
	Communication: Internet	9%	59%	11%	2%	
	Communication: Telephone	7%	61%	16%	2%	2%
	Conservation	9%	8	5%		
	Electricity: Generator		5%	5%		
	Electricity: Grid	5%	50%	23%	2%	
	Feeder road	7%	27%	14%		
	Fish processing facilities		9%	66%		
	Ice factory		23%	2%		
	Market: Aquaculture product		2%	2%		
	Market: Selling fish		2%	16%		
	Market: Vegetable		5%	14%		
	Pier			2%		

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	**Services**					
Zone 2 B - Subzone Upper Thailand	Agricultural produce storage		23%	14%		
	Agriculture extension		68%	18%		
	Aquaculture		32%	9%		
	Communication: Internet		59%	23%	14%	5%
	Communication: Telephone	18%	45%	27%	9%	
	Conservation		82%	9%		
	Electricity: Generator		5%	5%	5%	
	Electricity: Grid	9%	64%	27%		
	Feeder road	5%	45%	41%	9%	
	Fish processing facilities					
	Ice factory					
	Market: Aquaculture product		18%	23%		
	Market: Selling fish		18%	23%		
	Market: Vegetable		18%	23%		
	Pier		9%			

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	**Services**					
Zone 2 C - Subzone Lower Thailand	Agricultural produce storage			9%		
	Agriculture extension		82%	18%		
	Aquaculture		41%	9%		
	Communication: Internet		59%	23%	9%	9%
	Communication: Telephone		55%	41%		5%
	Conservation		68%	9%		
	Electricity: Generator					
	Electricity: Grid	5%	23%	59%	9%	5%
	Feeder road		18%	59%	14%	9%
	Fish processing facilities					
	Ice factory			5%		
	Market: Aquaculture product		18%	9%		
	Market: Selling fish		18%	9%		
	Market: Vegetable		18%	9%		
	Pier		9%	23%		

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	Services					
Zone 3 A - Subzone Lao - Mainstream	Agricultural produce storage		9%			
	Agriculture extension	2%	64%	5%		
	Aquaculture		14%			
	Communication: Internet		27%	11%	5%	
	Communication: Telephone		93%	7%		
	Conservation		66%			
	Electricity: Generator		80%	18%	2%	
	Electricity: Grid		20%	2%		
	Feeder road		48%	2%		
	Fish processing facilities		2%			
	Ice factory		20%	5%	2%	
	Market: Aquaculture product		5%	5%		
	Market: Selling fish		11%	5%		
	Market: Vegetable		11%	5%		
	Pier		5%	9%	2%	

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	**Services**					
Zone 3 B - Subzone Thailand - Mainstream	Agricultural produce storage		5%	14%		
	Agriculture extension		68%	14%		
	Aquaculture		18%	5%		
	Communication: Internet		36%	55%	9%	
	Communication: Telephone	9%	45%	32%	14%	
	Conservation	9%	32%	9%		
	Electricity: Generator		5%	5%		
	Electricity: Grid	9%	23%	68%		
	Feeder road		14%	50%	14%	23%
	Fish processing facilities					
	Ice factory					
	Market: Aquaculture product		5%	14%		
	Market: Selling fish		5%	14%		
	Market: Vegetable		5%	14%		
	Pier		9%	5%	5%	

		Status				
		Very good	Good	Neutral	Bad	Very Bad
Sub-zone	Services	% of villages				
Zone 3 C - Subzone Thailand - Songkhram	Agricultural produce storage	5%	9%	14%	9%	
	Agriculture extension	5%	36%	32%	5%	
	Aquaculture		14%			
	Communication: Internet	5%	41%	36%	5%	
	Communication: Telephone	18%	55%	23%	5%	
	Conservation	18%	36%	18%		
	Electricity: Generator	5%	5%			
	Electricity: Grid	5%	41%	50%	5%	
	Feeder road	14%	5%	64%	9%	9%
	Fish processing facilities			5%		
	Ice factory					
	Market: Aquaculture product					
	Market: Selling fish		5%	9%		
	Market: Vegetable		5%	5%		
	Pier	5%	14%	14%	9%	5%

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	Services					
Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	Agricultural produce storage					
	Agriculture extension		27%	50%	14%	
	Aquaculture		9%	14%	27%	
	Communication: Internet					
	Communication: Telephone			5%		
	Conservation		23%	23%	41%	
	Electricity: Generator				5%	
	Electricity: Grid			14%		
	Feeder road		5%	36%	50%	
	Fish processing facilities			9%		
	Ice factory					
	Market: Aquaculture product					
	Market: Selling fish			5%		
	Market: Vegetable			5%		
	Pier					

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	**Services**					
Zone 4 B - Subzone Cambodia - 3S	Agricultural produce storage					
	Agriculture extension		25%		25%	
	Aquaculture		25%	50%		
	Communication: Internet					
	Communication: Telephone					
	Conservation		25%		25%	25%
	Electricity: Generator					
	Electricity: Grid					
	Feeder road				75%	
	Fish processing facilities					
	Ice factory					
	Market: Aquaculture product					
	Market: Selling fish					
	Market: Vegetable					
	Pier					

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	Services					
Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	Agricultural produce storage					
	Agriculture extension		11%	17%		
	Aquaculture		11%	11%	6%	
	Communication: Internet					6%
	Communication: Telephone	11%	50%	22%		
	Conservation			11%	6%	
	Electricity: Generator		6%	11%	11%	
	Electricity: Grid		11%	22%	6%	17%
	Feeder road		6%	28%	22%	6%
	Fish processing facilities					
	Ice factory					6%
	Market: Aquaculture product			6%		
	Market: Selling fish					6%
	Market: Vegetable			6%		
	Pier			11%		

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	**Services**					
Zone 5 A - Subzone Cambodia - Tonle Sap river	Agricultural produce storage		5%			
	Agriculture extension		27%	23%	9%	
	Aquaculture		18%	5%	5%	
	Communication: Internet				5%	5%
	Communication: Telephone	5%	23%	55%	5%	
	Conservation		9%	18%		
	Electricity: Generator			5%	45%	5%
	Electricity: Grid		32%	32%	14%	5%
	Feeder road		27%	27%	14%	18%
	Fish processing facilities					
	Ice factory					
	Market: Aquaculture product		5%			
	Market: Selling fish		5%	9%		
	Market: Vegetable		5%	14%		
	Pier			5%		

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	Services					
Zone 5 B - Subzone Cambodia - Tonle Sap lake	Agricultural produce storage		5%	14%		
	Agriculture extension		41%	27%	9%	5%
	Aquaculture		23%	5%	9%	5%
	Communication: Internet					
	Communication: Telephone	18%	36%	9%	18%	5%
	Conservation	5%	23%	14%	9%	5%
	Electricity: Generator		5%	14%	36%	5%
	Electricity: Grid		14%	14%	27%	9%
	Feeder road		9%	27%	41%	18%
	Fish processing facilities		5%	9%		
	Ice factory					
	Market: Aquaculture product				5%	
	Market: Selling fish			9%		
	Market: Vegetable					
	Pier			5%	5%	

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	Services					
Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	Agricultural produce storage	2%	9%	5%		
	Agriculture extension	18%	52%	20%		
	Aquaculture	11%	2	11%		
	Communication: Internet		36%	36%	7%	
	Communication: Telephone	57%	36%	7%		
	Conservation	2%	11%	14%		
	Electricity: Generator		7%	7%	5%	
	Electricity: Grid	41%	41%	18%		
	Feeder road	23%	48%	25%	5%	
	Fish processing facilities		2%	2%		
	Ice factory		9%	2%		
	Market: Aquaculture product		14%			
	Market: Selling fish		16%	9%	5%	
	Market: Vegetable		27%	9%	5%	
	Pier		16%	9%		

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	Services					
Zone 6 B - Subzone Vietnam - Mekong Delta - saline	Agricultural produce storage			2%		
	Agriculture extension	41%	34%	16%		
	Aquaculture	39%	32%	9%		
	Communication: Internet		59%	16%		
	Communication: Telephone	20%	73%	5%		
	Conservation	25%	23%	7%		
	Electricity: Generator		7%	7%		
	Electricity: Grid	23%	61%	14%		
	Feeder road	39%	27%	25%	5%	5%
	Fish processing facilities	2%	2%			
	Ice factory		11%			
	Market: Aquaculture product	5%	7%			
	Market: Selling fish	7%	16%	2%		
	Market: Vegetable	5%	14%	5%		
	Pier		23%	2%		

Table 44 Availability and quality of education and health services in villages

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	**Education and health services**					
Zone 2 - Mainstream - Lao	Health care training	9%	73%	14%	2%	
	Health center		16%	16%		
	Literacy training	7%	7	2		
	School Middle					
	School Secondary	5%	14%	2%		
	School Primary	9%	57%	14%	2%	2%
Zone 2 B - Subzone Upper Thailand	Health care training	23%	64%	14%		
	Health center		36%	5%	5%	
	Literacy training	5%	32%	9%		
	School Middle					
	School Secondary		5%	5%		
	School Primary	5%	36%	5%		

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	Education and health services					
Zone 2 C - Subzone Lower Thailand	Health care training		91%	9%		
	Health center		23%	5%		
	Literacy training		14%	14%		
	School Middle		9%	5%		
	School Secondary		18%	5%		
	School Primary		5	23%		
Zone 3 A - Subzone Lao - Mainstream	Health care training	2%	98%			
	Health center		39%	5%		
	Literacy training	2%	95%	2%		
	School Middle					
	School Secondary		36%	9%		2%
	School Primary		73%	14%	5%	
Zone 3 B - Subzone Thailand - Mainstream	Health care training	18%	68%	9%	5%	
	Health center	5%	9%	9%		
	Literacy training		14%			
	School Middle		5%			
	School Secondary		5%	5%		
	School Primary	5%	32%	18%		

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	**Education and health services**					
Zone 3 C - Subzone Thailand - Songkhram	Health care training	27%	64%	5%	5%	
	Health center	14%	27%			5%
	Literacy training	5%	14%	5%		
	School Middle					
	School Secondary	9%	9%			
	School Primary	14%	41%	9%		
Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	Health care training	9%	36%	45%	9%	
	Health center					
	Literacy training	5%		5%	5%	
	School Middle			5%		
	School Secondary			9%	5%	
	School Primary		5%	45%	23%	
Zone 4 B - Subzone Cambodia - 3S	Health care training			5	5	
	Health center					
	Literacy training			25%		
	School Middle					
	School Secondary			25%		
	School Primary		25%	5		

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	**Education and health services**					
Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	Health care training		17%	28%	6%	
	Health center			17%	6%	
	Literacy training		6%			
	School Middle			6%		
	School Secondary			11%		
	School Primary		17%	33%	6%	6%
Zone 5 A - Subzone Cambodia - Tonle Sap river	Health care training		45%	27%	5%	
	Health center		5%	9%	9%	5%
	Literacy training		9%		5%	
	School Middle		9%			
	School Secondary		23%	9%		5%
	School Primary		14%	27%	9%	5%
Zone 5 B - Subzone Cambodia - Tonle Sap lake	Health care training		64%	18%	9%	
	Health center			5%	14%	
	Literacy training		14%	9%	5%	
	School Middle					
	School Secondary			9%		
	School Primary		9%	41%		5%

		Status				
		Very good	Good	Neutral	Bad	Very Bad
		% of villages				
Sub-zone	**Education and health services**					
Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	Health care training	11%	55%	25%		
	Health center	11%	45%	25%	2%	
	Literacy training	9%	18%	9%		
	School Middle	2%	5%			
	School Secondary	5%	23%			
	School Primary	18%	32%	9%	2%	2%
Zone 6 B - Subzone Vietnam - Mekong Delta - saline	Health care training	45%	32%	14%		
	Health center	2	32%	5%		
	Literacy training	34%	9%	2%		
	School Middle					
	School Secondary	7%	9%			
	School Primary	41%	23%	5%		

Table 45 Work migration

COUNTRY	Sub-Zone	% of Villages with people working outside	Mean % of people working outside	Place of work			
				% Other village same district	% Other district/ province	% Country capital	% Another country
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	95.2%	5.5%	25.0%	55.0%	10.0%	10.0%
	Zone 4 B - Subzone Cambodia - 3S	50.0%	1.8%	50.0%	0.0%	0.0%	50.0%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	100.0%	17.5%	5.6%	22.2%	55.6%	16.7%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	100.0%	17.4%	36.4%	40.9%	13.6%	9.1%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	95.7%	13.2%	18.2%	13.6%	4.5%	63.6%
	All	***95.5%***	***13.1%***	***22.6%***	***32.1%***	***19.0%***	***26.2%***
Lao PDR	Zone 2 - Mainstream - Lao	63.6%	4.0%	17.9%	57.1%	7.1%	17.9%
	Zone 3 A - Subzone Lao - Mainstream	97.6%	5.5%	12.2%	9.8%	7.3%	70.7%
	All	***80.2%***	***4.9%***	***14.5%***	***29.0%***	***7.2%***	***49.3%***
Thailand	Zone 2 C - Subzone Lower Thailand	95.2%	6.5%	5.0%	15.0%	80.0%	0.0%
	Zone 2 B - Subzone Upper Thailand	100.0%	11.7%	0.0%	4.5%	95.5%	0.0%
	Zone 3 C - Subzone Thailand - Songkhram	100.0%	22.9%	0.0%	22.7%	77.3%	0.0%
	Zone 3 B - Subzone Thailand - Mainstream	100.0%	16.4%	0.0%	9.1%	86.4%	4.5%
	All	***98.9%***	***14.6%***	***1.2%***	***12.8%***	***84.9%***	***1.2%***

Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	100.0%	9.3%	65.9%	34.1%	0.0%	0.0%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	97.9%	10.3%	44.7%	44.7%	10.6%	0.0%
	All	***98.9%***	***9.8%***	***54.9%***	***39.6%***	***5.5%***	***0.0%***
All	**All**	**93.5%**	**10.9%**	**24.2%**	**28.5%**	**30.0%**	**17.3%**

Table 46 Households travelling outside their home village for fishing in other places

COUNTRY	Sub-Zone	Number of villages	% Villages with HHs travel for fishing	Mean % of HHs travel for fishing	Typical duration away fishing - months			
					Less than 1	1-3	3-6	More than 6
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	11	52.4%	7.3%	100.0%			
	Zone 4 B - Subzone Cambodia - 3S	1	50.0%	3.8%	100.0%			
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	2	11.1%	6.4%	50.0%	50.0%		
	Zone 5 A - Subzone Cambodia - Tonle Sap river	8	36.4%	8.7%	100.0%			
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	11	52.4%	22.3%	63.6%	18.2%	18.2%	
	All	***33***	***39.3%***	***12.5%***	***84.8%***	***9.1%***	***6.1%***	
Lao PDR	Zone 2 - Mainstream - Lao	5	11.4%	3.2%	80.0%	20.0%		
	Zone 3 A - Subzone Lao - Mainstream	8	18.2%	26.5%	100.0%			
	All	***13***	***14.8%***	***17.5%***	***92.3%***	***7.7%***		

Thailand	Zone 2 C - Subzone Lower Thailand	0		-				
	Zone 2 B - Subzone Upper Thailand	1	4.5%	18.3%	100.0%			
	Zone 3 C - Subzone Thailand - Songkhram	6	27.3%	17.0%	83.3%			16.7%
	Zone 3 B - Subzone Thailand - Mainstream	6	27.3%	6.0%	83.3%	16.7%		
	All	***13***	***14.9%***	***12.1%***	***84.6%***	***7.7%***		***7.7%***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	13	30.2%	3.1%	30.8%	30.8%	15.4%	23.1%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	20	45.5%	6.0%	75.0%	20.0%		5.0%
	All	***33***	***37.9%***	***4.9%***	***57.6%***	***24.2%***	***6.1%***	***12.1%***
All	**All**	**92**	**26.6%**	**10.4%**	**76.1%**	**14.1%**	**4.3%**	**5.4%**

Source: Village Profile

Table 47 Alternative livelihood options

Country	Sub-Zone	Never thought about it	Shift to livestock	Start business	Shift to employment locally	Shift to farming	Other	Migrate	Depend on help from others	Shift to fishing	Shift to aquaculture	Borrow money/food
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	99.7%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	70.7%	0.6%	3.7%	12.8%	0.6%	0.0%	10.5%	0.0%	0.9%	0.0%	0.3%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	73.9%	3.4%	2.3%	4.5%	2.8%	0.0%	12.2%	0.0%	0.9%	0.0%	0.0%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	34.4%	3.5%	1.4%	27.8%	4.5%	0.0%	17.4%	0.7%	1.7%	0.3%	8.3%
	Zone 4 B - Subzone Cambodia - 3S	98.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	0.0%	0.0%
	All	***72.6%***	***1.7%***	***1.8%***	***10.0%***	***1.8%***	***0.0%***	***9.2%***	***0.1%***	***0.9%***	***0.1%***	***1.8%***
Lao PDR	Zone 2 A - Mainstream - Lao	72.9%	10.1%	6.4%	2.0%	5.0%	2.3%	0.0%	0.4%	0.0%	1.0%	0.0%
	Zone 3 A - Subzone Lao - Mainstream	46.9%	15.3%	11.2%	3.0%	10.9%	7.7%	0.0%	2.1%	2.1%	0.7%	0.0%
	All	***59.9%***	***12.7%***	***8.8%***	***2.5%***	***8.0%***	***5.0%***	***0.0%***	***1.3%***	***1.1%***	***0.9%***	***0.0%***
Thailand	Zone 3 B - Subzone Thailand - Mainstream	66.0%	2.9%	9.1%	6.3%	5.1%	5.4%	0.0%	4.0%	0.3%	0.9%	0.0%
	Zone 2 B - Subzone Upper Thailand	57.9%	2.0%	8.0%	5.2%	8.0%	9.5%	2.3%	4.3%	1.1%	1.4%	0.3%
	Zone 2 C - Subzone Lower Thailand	67.6%	0.9%	8.0%	4.9%	9.5%	4.0%	0.3%	4.9%	0.0%	0.0%	0.0%
	Zone 3 C - Subzone Thailand - Songkhram	77.1%	1.7%	3.2%	5.2%	1.7%	3.4%	2.0%	3.7%	0.6%	1.4%	0.0%
	All	***67.1%***	***1.9%***	***7.1%***	***5.4%***	***6.1%***	***5.6%***	***1.1%***	***4.2%***	***0.5%***	***0.9%***	***0.1%***

Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	77.4%	7.7%	4.3%	3.4%	1.8%	1.3%	1.1%	2.3%	0.3%	0.3%	0.1%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	79.1%	8.4%	3.6%	2.3%	1.6%	1.6%	0.7%	1.7%	0.7%	0.3%	0.1%
	All	***78.3%***	***8.0%***	***3.9%***	***2.8%***	***1.7%***	***1.4%***	***0.9%***	***2.0%***	***0.5%***	***0.3%***	***0.1%***
All	**All**	**69.5%**	**6.1%**	**5.4%**	**5.2%**	**4.4%**	**3.0%**	**2.8%**	**1.9%**	**0.7%**	**0.5%**	**0.5%**

Table 48 Coping strategies for impacts from floods – percentage of responses

		Started fishing	Changed to farming from another activity	Changed to casual work in the village	Found work outside the village	Made goods to sell	Sold productive assets such as land, cattle, boat	Received help from family, relatives, friends	Received assistance from government	Received assistance from NGO or other organization	Borrowed money	Relied on non-timber forest products	Other	Total Responses	Total Cases
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	0.2%	0.0%	9.6%	8.1%	9.8%	23.0%	7.2%	0.6%	6.2%	31.5%	0.0%	3.8%	470	352
	Zone 4 B - Subzone Cambodia - 3S	0.0%	0.0%	11.9%	11.9%	6.0%	34.3%	3.0%	1.5%	3.0%	22.4%	1.5%	4.5%	67	64
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	7.7%	2.6%	20.6%	23.5%	0.3%	7.1%	9.0%	2.6%	1.3%	24.5%	0.0%	0.6%	310	288
	Zone 5 A - Subzone Cambodia - Tonle Sap river	6.6%	4.6%	11.6%	19.9%	2.5%	2.9%	1.7%	13.7%	15.8%	18.7%	0.0%	2.1%	241	352
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	14.1%	18.8%	5.9%	4.1%	1.6%	2.8%	5.0%	3.4%	7.5%	30.6%	0.0%	6.3%	320	352
	All	***6.1%***	***5.6%***	***11.6%***	***12.8%***	***4.4%***	***12.0%***	***6.0%***	***4.0%***	***6.9%***	***27.1%***	***0.1%***	***3.4%***	***1408***	***1408***

		Started fishing	Changed to farming from another activity	Changed to casual work in the village	Found work outside the village	Made goods to sell	Sold productive assets such as land, cattle, boat	Received help from family, relatives, friends	Received assistance from government	Received assistance from NGO or other organization	Borrowed money	Relied on non-timber forest products	Other	Total Responses	Total Cases
Lao PDR	Zone 2 A - Mainstream - Lao	9.5%	5.4%	6.8%	2.7%	1.4%	0.0%	13.5%	6.8%	2.7%	1.4%	12.2%	37.8%	74	704
	Zone 3 A - Subzone Lao - Mainstream	27.0%	20.0%	12.6%	6.5%	0.5%	0.0%	2.8%	0.0%	0.0%	0.5%	1.4%	28.8%	215	704
	All	***22.5%***	***16.3%***	***11.1%***	***5.5%***	***0.7%***	***0.0%***	***5.5%***	***1.7%***	***0.7%***	***0.7%***	***4.2%***	***31.1%***	***289***	***1408***
Thailand	Zone 2 B - Subzone Upper Thailand	3.6%	0.5%	4.1%	1.0%	1.0%	2.0%	6.6%	32.7%	5.6%	7.1%	3.1%	32.7%	196	352
	Zone 2 C - Subzone Lower Thailand	0.0%	2.1%	3.1%	1.0%	1.0%	1.0%	9.3%	28.9%	1.0%	2.1%	1.0%	49.5%	97	352
	Zone 3 B - Subzone Thailand - Mainstream	0.0%	2.8%	4.2%	3.5%	3.5%	0.0%	2.1%	35.9%	6.3%	2.1%	0.7%	38.7%	142	352
	Zone 3 C - Subzone Thailand - Songkhram	5.0%	0.5%	2.7%	0.9%	1.8%	0.0%	1.8%	48.4%	2.7%	0.5%	0.0%	35.7%	221	352
	All	***2.7%***	***1.2%***	***3.5%***	***1.5%***	***1.8%***	***0.8%***	***4.4%***	***38.1%***	***4.1%***	***3.0%***	***1.2%***	***37.5%***	***656***	***1408***
Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	7.4%	0.5%	3.0%	6.9%	3.0%	0.0%	4.4%	1.5%	1.0%	2.5%	0.0%	70.0%	203	704
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	99.7%	358	704
	All	***2.7%***	***0.2%***	***1.2%***	***2.5%***	***1.1%***	***0.0%***	***1.6%***	***0.5%***	***0.4%***	***0.9%***	***0.0%***	***88.9%***	***561***	***1408***
	All	**6.3%**	**4.6%**	**7.8%**	**7.5%**	**2.8%**	**6.0%**	**4.7%**	**10.8%**	**4.4%**	**14.0%**	**0.7%**	**30.3%**	**2914**	**5632**

Table 49 Coping strategies for impacts from drought

		Started fishing	Changed to farming from another activity	Changed to casual work in the village	Found work outside the village	Made goods to sell	Sold productive assets such as land, cattle, boat	Received help from family, relatives, friends	Received assistance from government	Received assistance from NGO or other organization	Borrowed money	Relied on non-timber forest products	Other	Total Responses	Total Cases
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	0.2%	0.2%	7.1%	8.6%	13.9%	20.8%	7.1%	0.4%	4.9%	32.4%	0.0%	4.5%	534	352
	Zone 4 B - Subzone Cambodia - 3S	0.0%	0.0%	8.5%	15.3%	5.1%	27.1%	3.4%	0.0%	5.1%	32.2%	3.4%	0.0%	59	64
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	0.5%	4.8%	19.4%	23.7%	0.5%	10.8%	9.1%	1.6%	1.1%	26.3%	0.0%	2.2%	186	288
	Zone 5 A - Subzone Cambodia - Tonle Sap river	1.2%	1.2%	9.3%	14.6%	0.3%	4.3%	5.3%	12.7%	19.5%	25.7%	0.0%	5.9%	323	352
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	5.3%	16.0%	8.7%	4.2%	1.5%	4.9%	3.4%	6.8%	9.5%	34.6%	0.4%	4.6%	263	352
	All	***1.5%***	***4.1%***	***9.7%***	***11.5%***	***6.1%***	***12.7%***	***6.1%***	***4.7%***	***8.7%***	***30.4%***	***0.2%***	***4.3%***	***1365***	***1408***
Lao PDR	Zone 2 A - Mainstream - Lao	5.0%	6.3%	16.3%	12.5%	1.3%	1.3%	3.8%	0.0%	0.0%	0.0%	20.0%	33.8%	80	704
	Zone 3 A - Subzone Lao - Mainstream	2.6%	18.3%	16.5%	5.2%	3.5%	0.9%	1.7%	1.7%	0.0%	0.0%	0.0%	49.6%	115	704
	All	***3.6%***	***13.3%***	***16.4%***	***8.2%***	***2.6%***	***1.0%***	***2.6%***	***1.0%***	***0.0%***	***0.0%***	***8.2%***	***43.1%***	***195***	***1408***

		Started fishing	Changed to farming from another activity	Changed to casual work in the village	Found work outside the village	Made goods to sell	Sold productive assets such as land, cattle, boat	Received help from family, relatives, friends	Received assistance from government	Received assistance from NGO or other organization	Borrowed money	Relied on non-timber forest products	Other	Total Responses	Total Cases
Thailand	Zone 2 B - Subzone Upper Thailand	0.9%	0.5%	1.9%	2.4%	1.4%	2.4%	4.3%	24.6%	6.6%	5.2%	3.8%	46.0%	211	352
	Zone 2 C - Subzone Lower Thailand	0.0%	5.3%	2.6%	0.0%	1.1%	0.0%	5.8%	15.3%	4.2%	1.1%	1.6%	63.2%	190	352
	Zone 3 B - Subzone Thailand - Mainstream	0.0%	2.5%	0.6%	0.6%	1.3%	0.6%	2.5%	42.0%	3.2%	1.3%	0.0%	45.2%	157	352
	Zone 3 C - Subzone Thailand - Songkhram	0.6%	1.2%	3.5%	2.9%	1.2%	0.0%	3.5%	40.4%	1.8%	0.0%	0.0%	45.0%	171	352
	All	***0.4%***	***2.3%***	***2.2%***	***1.5%***	***1.2%***	***0.8%***	***4.1%***	***29.6%***	***4.1%***	***2.1%***	***1.5%***	***50.1%***	***729***	***1408***
Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	5.5%	4.0%	4.7%	13.0%	3.6%	0.4%	2.4%	5.5%	2.4%	0.8%	0.0%	57.7%	253	704
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	0.9%	0.5%	3.0%	2.1%	0.7%	1.2%	3.2%	9.4%	0.2%	5.9%	0.0%	72.9%	564	704
	All	***2.3%***	***1.6%***	***3.5%***	***5.5%***	***1.6%***	***1.0%***	***2.9%***	***8.2%***	***0.9%***	***4.3%***	***0.0%***	***68.2%***	***817***	***1408***
	All	**1.6%**	**3.6%**	**6.7%**	**7.4%**	**3.5%**	**6.1%**	**4.6%**	**11.2%**	**5.0%**	**15.0%**	**1.0%**	**34.3%**	**3106**	**5632**

Table 50 Change of season for growing rice due to change in weather patterns

		HHs that changed season for growing rice		From wet season to dry season		From dry season to wet season	
Country	**Sub-Zone**	Number of HHs	**% of sample**	**Number of HHs**	**% of HHs that had changed**	**Number of HHs**	**% of HHs that had changed**

Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	6	1.7%	2	33.3%	4	66.7%
	Zone 4 B - Subzone Cambodia - 3S	0	0.0%	0	0.0%	0	0.0%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	13	4.5%	6	46.2%	7	53.8%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	39	11.1%	14	35.9%	25	64.1%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	22	6.3%	18	81.8%	4	18.2%
	All	***80***	***5.7%***	***40***	***50.0%***	***40***	***50.0%***
Lao PDR	Zone 2 A - Mainstream - Lao	28	4.0%	12	44.4%	15	55.6%
	Zone 3 A - Subzone Lao - Mainstream	32	4.6%	25	75.8%	8	24.2%
	All	***60***	***4.3%***	***37***	***61.7%***	***23***	***38.3%***
Thailand	Zone 2 B - Subzone Upper Thailand	33	9.5%	10	33.3%	20	66.7%
	Zone 2 C - Subzone Lower Thailand	25	7.2%	0	0.0%	26	100.0%
	Zone 3 B - Subzone Thailand - Mainstream	42	12.0%	5	12.2%	36	87.8%
	Zone 3 C - Subzone Thailand - Songkhram	22	6.3%	22	100.0%	0	0.0%
	All	***122***	***8.7%***	***37***	***31.1%***	***82***	***68.9%***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	9	1.3%	3	42.9%	4	57.1%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	11	1.6%	2	25.0%	6	75.0%
	All	***20***	***1.4%***	***5***	***33.3%***	***10***	***66.7%***
All	**All**	**282**	**5.0%**	**119**	**43.4%**	**155**	**56.6%**

Table 51 Change in timing of growing rice due to change in weather patterns

		HHs planting earlier		HHs planting later		No change	
Country	**Sub-Zone**	**Number of HHs**	**% of HHs that had changed practices**	**Number of HHs**	**% of HHs that had changed practices**	**Number of HHs**	**% of HHs that had changed practices**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	2	33.3%	2	33.3%	2	33.3%
	Zone 4 B - Subzone Cambodia - 3S	0	0.0%	0	0.0%	0	0.0%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	3	23.1%	9	69.2%	1	7.7%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	8	20.5%	21	53.8%	10	25.6%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	16	72.7%	5	22.7%	1	4.5%
	All	***29***	***36.3%***	***37***	***46.3%***	***14***	***17.5%***
Lao PDR	Zone 2 A - Mainstream - Lao	27	96.4%	1	3.6%	0	0.0%
	Zone 3 A - Subzone Lao - Mainstream	29	93.5%	1	3.2%	1	3.2%
	All	***56***	***94.9%***	***2***	***3.4%***	***1***	***1.7%***
Thailand	Zone 2 B - Subzone Upper Thailand	18	5.2%	38	11.0%	284	81.8%
	Zone 2 C - Subzone Lower Thailand	0	0.0%	30	8.6%	318	91.1%
	Zone 3 B - Subzone Thailand - Mainstream	17	4.9%	66	19.1%	261	75.7%
	Zone 3 C - Subzone Thailand - Songkhram	20	5.7%	150	43.0%	177	50.7%
	All	***55***	***4.0%***	***284***	***20.4%***	***1,040***	***74.8%***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	12	3.1%	12	3.1%	362	93.8%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	7	2.1%	9	2.7%	322	95.3%
	All	***19***	***2.6%***	***21***	***2.9%***	***684***	***94.5%***
All	**All**	**159**	**7.1%**	**344**	**15.3%**	**1,739**	**77.2%**

Table 52 Change of crop or crop variety due to floods, drought, increasing/ falling temperatures or other reasons

Have you changed crops?		Yes, due to floods		Yes, due to drought		Yes, due to increasing temperatures		Yes, due to falling temperatures		No, has not changed crops		Changed crops for other reasons		All
Country	**Sub-Zone**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**	**Row %**	**N**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	1	16.7%	2	33.3%	0	0.0%	0	0.0%	3	50.0%	0	0.0%	6
	Zone 4 B - Subzone Cambodia - 3S	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	3	17.6%	7	41.2%	0	0.0%	0	0.0%	6	35.3%	1	5.9%	17
	Zone 5 A - Subzone Cambodia - Tonle Sap river	3	4.5%	27	40.9%	0	0.0%	12	18.2%	22	33.3%	2	3.0%	66
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	15	33.3%	8	17.8%	6	13.3%	3	6.7%	6	13.3%	7	15.6%	45
	All	***22***	***16.4%***	***44***	***32.8%***	***6***	***4.5%***	***15***	***11.2%***	***37***	***27.6%***	***10***	***7.5%***	***134***
Lao PDR	Zone 2 A - Mainstream - Lao	6	22.2%	12	44.4%	0	0.0%	0	0.0%	2	7.4%	7	25.9%	27
	Zone 3 A - Subzone Lao - Mainstream	7	20.0%	12	34.3%	0	0.0%	0	0.0%	4	11.4%	12	34.3%	35
	All	***13***	***21.0%***	***24***	***38.7%***	***0***	***0.0%***	***0***	***0.0%***	***6***	***9.7%***	***19***	***30.6%***	***62***

Thailand	Zone 2 B - Subzone Upper Thailand	13	3.7%	22	6.2%	1	0.3%	1	0.3%	312	87.9%	6	1.7%	355
	Zone 2 C - Subzone Lower Thailand	0	0.0%	6	1.8%	2	0.6%	0	0.0%	327	97.0%	2	0.6%	337
	Zone 3 B - Subzone Thailand - Mainstream	4	1.2%	3	0.9%	0	0.0%	0	0.0%	312	95.4%	8	2.4%	327
	Zone 3 C - Subzone Thailand - Songkhram	5	1.5%	2	0.6%	0	0.0%	0	0.0%	314	92.6%	18	5.3%	339
	All	***22***	***1.6%***	***33***	***2.4%***	***3***	***0.2%***	***1***	***0.1%***	***1,265***	***93.2%***	***34***	***2.5%***	***1,358***
Viet Nam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	9	1.7%	0	0.0%	2	0.4%	1	0.2%	490	91.2%	35	6.5%	537
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	11	2.1%	4	0.8%	5	1.0%	0	0.0%	415	80.0%	84	16.2%	519
	All	***20***	***1.9%***	***4***	***0.4%***	***7***	***0.7%***	***1***	***0.1%***	***905***	***85.7%***	***119***	***11.3%***	***1,056***
All	**All**	**77**	**3.0%**	**105**	**4.0%**	**16**	**0.6%**	**17**	**0.7%**	**2,213**	**84.8%**	**182**	**7.0%**	**2,610**

Table 53 Flood warning availability

		No flood warning available		Flood warning available		Don't know	
Country	**Sub-Zone**	**Number of HHs**	**% of sample**	**Number of HHs**	**% of sample**	**Number of HHs**	**% of sample**
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	174	49.4%	176	50.0%	2	0.6%
	Zone 4 B - Subzone Cambodia - 3S	30	46.9%	34	53.1%	0	0.0%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	26	9.0%	242	84.0%	20	6.9%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	102	29.0%	208	59.1%	42	11.9%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	13	3.7%	260	73.9%	79	22.4%
	All	***345***	***24.5%***	***920***	***65.3%***	***143***	***10.2%***

Lao PDR	Zone 2 A - Mainstream - Lao	360	51.1%	257	36.5%	87	12.4%
	Zone 3 A - Subzone Lao - Mainstream	441	62.6%	189	26.8%	74	10.5%
	All	***801***	***56.9%***	***446***	***31.7%***	***161***	***11.4%***
Thailand	Zone 2 B - Subzone Upper Thailand	11	3.1%	340	96.6%	1	0.3%
	Zone 2 C - Subzone Lower Thailand	5	1.4%	347	98.6%	0	0.0%
	Zone 3 B - Subzone Thailand - Mainstream	11	3.1%	340	96.6%	1	0.3%
	Zone 3 C - Subzone Thailand - Songkhram	0	0.0%	351	99.7%	1	0.3%
	All	***27***	***1.9%***	***1,378***	***97.9%***	***3***	***0.2%***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	76	10.8%	491	69.7%	137	19.5%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	21	3.0%	656	93.2%	27	3.8%
	All	***97***	***6.9%***	***1,147***	***81.5%***	***164***	***11.6%***
All	**All**	**1,270**	**22.5%**	**3,891**	**69.1%**	**471**	**8.4%**

Table 54 Measures to prevent impacts from floods and droughts – percentage of responses

		Shelter and sanitation	Store food and drink	Improve transportation and communication	Get support from outside	Other	Do nothing-let it be	Don't know
Cambodia	Zone 4 A - Subzone Cambodia - Khone Falls to Kratie	33.6%	34.3%	17.2%	5.4%	0.1%	4.2%	5.1%
	Zone 4 B - Subzone Cambodia - 3S	34.5%	27.6%	24.1%	0.0%	0.0%	6.0%	7.8%
	Zone 4 C - Subzone Cambodia - Kratie to Vietnam border	34.3%	33.6%	12.1%	12.8%	1.0%	4.1%	2.1%
	Zone 5 A - Subzone Cambodia - Tonle Sap river	35.2%	23.2%	13.2%	12.9%	2.8%	8.1%	4.7%
	Zone 5 B - Subzone Cambodia - Tonle Sap lake	32.4%	35.9%	13.7%	9.2%	0.8%	4.0%	4.0%
	All	***33.9%***	***31.6%***	***14.5%***	***9.6%***	***1.1%***	***5.1%***	***4.1%***
Lao PDR	Zone 2 A - Mainstream - Lao	40.2%	12.6%	0.8%	0.0%	13.4%	29.9%	3.1%
	Zone 3 A - Subzone Lao - Mainstream	28.3%	21.9%	0.9%	0.9%	14.2%	26.2%	7.7%
	All	***34.6%***	***17.0%***	***0.8%***	***0.4%***	***13.8%***	***28.1%***	***5.3%***
Thailand	Zone 2 B - Subzone Upper Thailand	24.1%	26.7%	14.1%	23.7%	4.3%	5.7%	1.3%
	Zone 2 C - Subzone Lower Thailand	27.1%	30.2%	8.3%	28.2%	3.0%	3.0%	0.2%
	Zone 3 B - Subzone Thailand - Mainstream	23.9%	29.4%	9.1%	29.5%	2.7%	5.1%	0.3%
	Zone 3 C - Subzone Thailand - Songkhram	19.8%	25.3%	1.6%	36.0%	4.2%	11.7%	1.5%
	All	***24.1%***	***28.2%***	***8.5%***	***29.1%***	***3.5%***	***6.0%***	***0.8%***
Vietnam	Zone 6 A - Subzone Vietnam - Mekong Delta - freshwater	19.0%	30.4%	10.2%	7.2%	15.2%	16.4%	1.6%
	Zone 6 B - Subzone Vietnam - Mekong Delta - saline	28.6%	27.9%	12.5%	10.3%	3.6%	14.4%	2.7%
	All	***23.9%***	***29.1%***	***11.4%***	***8.8%***	***9.3%***	***15.4%***	***2.1%***

All	**All**	**27.6%**	**28.9%**	**10.8%**	**15.6%**	**5.0%**	**9.7%**	**2.4%**

Additional Tables

Table 55 Water resource dependent occupations--% of all working household members by country and Sub-zone

	Sub-zone	Fishing (only)-row%			Collecting OAA/Ps			Fish processing			Aquaculture			Navigation			Sand mining from river		
		Main	Second	All	Main	Second	All	Main	Second	All	Main	Second	All	Main	Second	All	Main	Second	All
Cambodia	Zone 4A-Khone Falls to Kratie	0.4%	14.2%	14.6%	0.0%	13.8%	13.8%	0.0%	0.0%	0.0%	0.0%	0.6%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
	Zone 4B-3S	0.0%	17.8%	17.8%	0.0%	17.6%	17.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Zone 4C-Kratie to Vietnam border	0.6%	11.5%	12.1%	0.1%	20.7%	20.9%	0.0%	0.0%	0.0%	0.0%	1.2%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Zone 5A- Tonle Sap river	0.3%	7.7%	8.0%	0.0%	14.0%	14.0%	0.0%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Zone 5B-Tonle Sap lake	6.6%	5.7%	12.3%	0.3%	10.9%	11.2%	0.1%	1.4%	1.5%	0.2%	1.5%	1.7%	0.0%	0.3%	0.3%	0.0%	0.0%	0.0%
	All	1.7%	10.6%	12.3%	0.1%	15.0%	15.1%	0.0%	0.4%	0.4%	0.1%	0.7%	0.8%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%
Lao PDR	Zone 2A-Mainstream - Lao	0.2%	12.9%	13.1%	0.1%	6.1%	6.2%	0.0%	0.0%	0.1%	0.0%	1.8%	1.8%	0.1%	0.1%	0.2%	0.0%	0.1%	0.1%
	Zone 3A-Lao - Mainstream	0.1%	14.6%	14.7%	0.0%	5.3%	5.3%	0.0%	0.0%	0.0%	0.1%	0.6%	0.7%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
	All	0.2%	13.9%	14.0%	0.0%	5.6%	5.7%	0.0%	0.0%	0.0%	0.0%	1.1%	1.2%	0.1%	0.1%	0.1%	0.0%	0.1%	0.1%
Thailand	Zone 2B-Upper Thailand	0.0%	6.3%	6.3%	0.0%	3.6%	3.6%	0.0%	0.0%	0.0%	0.0%	1.6%	1.6%	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%
	Zone 2C-Lower Thailand	0.2%	9.8%	10.0%	0.1%	7.3%	7.4%	0.0%	0.0%	0.0%	0.0%	2.7%	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Zone 3B-Mainstream	0.3%	9.7%	10.0%	0.0%	4.3%	4.3%	0.0%	0.0%	0.0%	0.0%	1.7%	1.7%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%
	Zone 3C-Songkhram	0.1%	10.3%	10.4%	0.0%	2.9%	2.9%	0.1%	0.2%	0.3%	0.0%	1.3%	1.3%	0.0%	0.4%	0.5%	0.0%	0.0%	0.0%
	All	0.1%	9.2%	9.4%	0.0%	4.5%	4.5%	0.0%	0.1%	0.1%	0.0%	1.8%	1.8%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%
Viet Nam	Zone 6A-Freshwater	0.6%	2.5%	3.1%	0.2%	3.8%	4.0%	0.1%	0.2%	0.2%	0.2%	1.4%	1.7%	0.3%	0.3%	0.5%	0.2%	0.0%	0.3%
	Zone 6B-Saline	2.1%	0.4%	2.5%	0.2%	0.3%	0.5%	0.0%	0.1%	0.1%	1.9%	2.1%	4.0%	0.1%	0.0%	0.1%	0.1%	0.1%	0.2%
	All	1.3%	1.5%	2.8%	0.2%	2.1%	2.3%	0.0%	0.1%	0.1%	1.0%	1.7%	2.8%	0.2%	0.1%	0.3%	0.2%	0.1%	0.2%
All		0.9%	9.4%	10.3%	0.1%	7.6%	7.7%	0.0%	0.1%	0.2%	0.2%	1.3%	1.5%	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%

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