Water-related changes and vulnerabilities in the Xe Bang Fai Basin
Workshop Report
ENVGOV[1] project

Lao Women Union Hall, Thakhek, Lao PDR, 22.-23.10.2015

[1] Environmental vulnerability, social resilience, and multi-scale governance (ENVGOV), is a research project funded by Helsinki University Center for Environment (HENVI), University of Helsinki, Finland.

Contents

1. Key objectives and methods of the workshop

The 2014 report of the Intergovernmental Panel on Climate Change (IPCC) states that the loss of life and economic assets from flooding represent a major climate-related risk in the future. Furthermore, environmental risks and vulnerabilities related to rapid land-uses changes require strategies for environmental governance and social resilience. In the ENVGOV project environmental vulnerability and social resilience are analysed in the context of land-use changes and through the water-related vulnerabilities through floods, droughts, water contamination and other kinds of risks[2]. The workshop in Thakhek was organized in collaboration with the National University of Laos for the purposes of getting various stakeholder perspectives and fostering dialogue on these issues in the context of Xe Bang Fai Basin.

The three main objectives of the workshop were to discuss past and future water- and livelihood-related changes. Important for the workshop was also to create space for co-creation of knowledge and synergic learning between different stakeholders through:

- Increased understanding of the past water and livelihood-related changes in the past (30 years)
- Identification of the main issues likely to cause water and livelihood-related changes in the future (30 years)
- Creation of plausible future scenarios of water-related changes
- Formulation of strategies for reducing environmental-risk exposure and social vulnerability.

The participatory methods used in the workshop were based on a modified version of methodology developed by Ravikumar et al. (2014). During the workshops, most of the work was carried out in small groups, the size of the groups varied depending of the task (5-6 people). In the first tasks, groups were roughly separated into stakeholder groups (e.g. CSOs or environmental administration). In the latter tasks, groups were mixed so that each group had members from different stakeholder groups. In the beginning of the workshop, participants identified trends and events related to water related changes what had happened in the study area in the previous 30 years. Then a timeline of past events and trends was constructed. In the following parts of the workshop, participants discussed about potential future drivers of water related changes, outlined possible changes based on four distinct scenarios, and discussed how environmental risks and vulnerabilities could be reduced to achieve the scenario that was viewed as most desirable by the participants.

This report presents the outcomes of the workshop discussions in the most original form possible. The tables and charts from the group discussions are thus not edited. The point is to share the co-created knowledge with all participants and to foster further discussions on the future pathways in Xe Bang Fai area.

2. Context: Xe Bang Fai Basin

Xe Bang Fai River is a major Mekong tributary and the main river running through the Khammouane province. Its basin hosts more than 250,000 inhabitants which mainly rely on agricultural livelihoods, and it has been estimated that around 120,000 people are directly or indirectly linked to the Xe Bang Fai for at least part of their livelihood security. The Xe Bang Fai basin is not only one of the flood hotspots in Laos, but also in the

[2] The research focuses on the similarities and differences in water governance in three different areas: River Grijalva in Mexico, Xe Bang Fai River in Laos, Vantaanjoki River in Finland.

whole of Lower Mekong Basin; for example, the Mekong River Commission has elected Xe Bang Fai as one of the 4 sites of its Climate Change adaptation pilot programme. At the same time, Khammouane hosts

3. Workshop Program

FIRST DAY:	
TIME	ACTIVITY
8:00-8:30	Participant registration
08:30-09:00	Opening remarks, workshop objectives and agenda, participant introductions
09:00-10:00	"Trip to the past": Construct a timeline of key events that have affected water-related changes in the reference area in the past 30 years. (Use the map of the reference area; obs. the area of the drivers can be much larger than the reference area). The following questions are important to consider: (1) What have been the main water-related changes in the past 30 years? (2) What has caused these changes? (3) Who are exposed to these water-related changes and how? (4) From those exposed who are the most/less vulnerable and why?
10:00-10:15	Coffee break
10:15-11.30	Factors of change (I) Identify in stakeholder groups, 5 factors of change that are likely to influence water-related changes in the reference area in the next 30 years and the states that they may take on risk exposure and vulnerability (increasing/decreasing/remaining constant).
11:30-12:00	Factors of change (II) Select from the list consolidated five factors of change that are the 1) most important (in the sense of how large the impact will be) and five that are the 2) most uncertain (most difficult to predict). The selection is made by voting.
12:00-13:30	Lunch
13:30-14:00	Presentation of future scenarios of water-related changes Facilitators combine the different future states of the identified factors to present distinct future scenarios.
14:00-15:30	Discussion in mixed groups of future scenarios Each group works on one of the scenarios and develops a narrative that explains how the area will reach this condition, using the states of factors of change presented for their scenario. The following questions are important to consider: 1) What key events will have to occur to bring about the world described in the scenario? 2) What policies will be implemented and when? 3) What changes will have to occur and when? 4) Why will these changes occur? 5) What consequences will they have? Each group draws the water-related changes and their impacts on risk exposure and vulnerability that would exist under this scenario on a map.
15:30-15:45	Break
15:45-16:45	**Present scenario narratives and maps** Each group presents their future scenario narrative and map
16:45-17:00	**Survey** Participants vote for which scenario they think is the most desirable, and which is the most probable. They also provide feedback on their role in water governance.
SECOND DAY	
08:15-08:45	Recap of day one, and day two agenda
08:45-10.15	**Identification of the key activities and steps to reach a desirable future scenario**

	Back casting (I): How do we reduce **risk exposure**? Please, consider the following issues: 1) What are the main 4 strategies that should be carried out? 2) How would these strategies be realized? 3) By whom? 4) What are the main 4 barriers to carry out these strategies? 5) How to overcome these barriers?
10.15-10.30	Coffee break
10.30-12.00	Back casting (II): How do we reduce **vulnerability**? Please, consider the following issues: 1) What strategies need to be carried out? 2) How would this strategy be realized? 3) By whom? 4) What are the main 4 barriers? 5) How to overcome the barriers?
12.00-13.00	Lunch
13.00-13.30	Workshop evaluation
13.30-14.00	Closing remarks, group photo and certifications

4. "Trip to the past" – Timeline of past 20 years

A timeline of key events (and processes) that have affected water-related changes in Xe Bang Fai, in past 20 years was constructed. The first table presents all the points raised by participants, the figures that follow the table present the main points in summarized form.

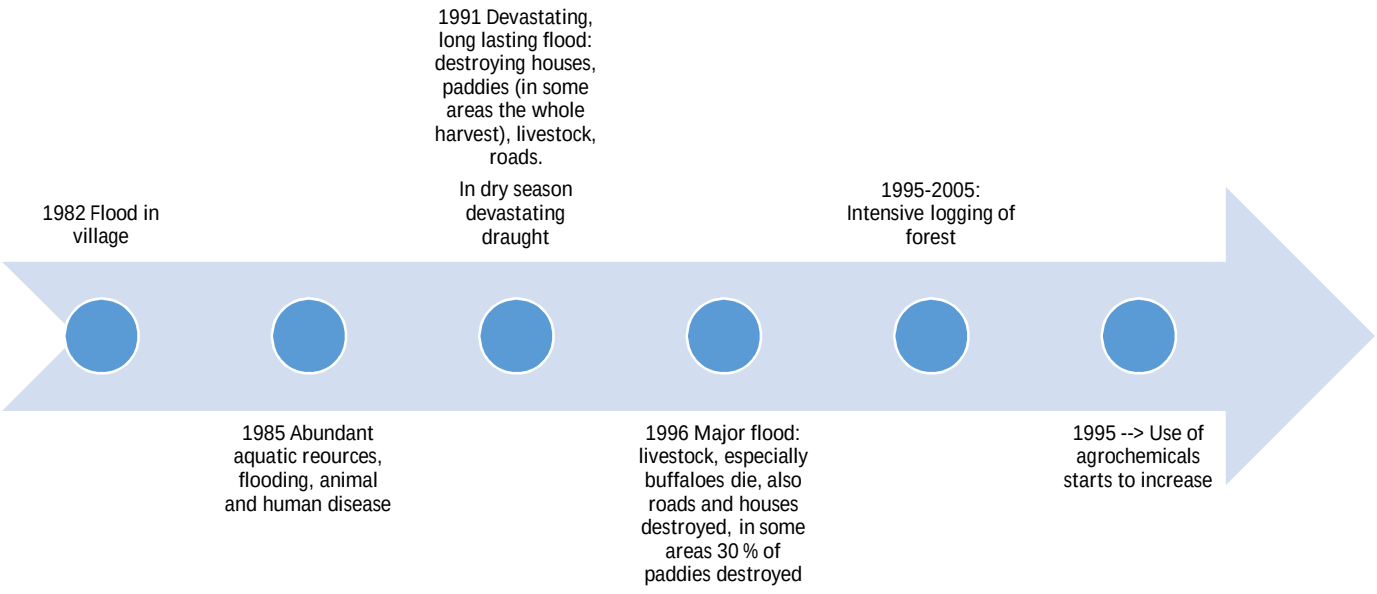
Year	Group	Statement
1982	2	There is a flood in the village
1985	1 Yellow	Number of aquatic abundant
	3	Animal disease
	3	Human disease
	2	flooding
1991	4	Flooding, destroy house, paddy fields, livestock
1991	1	The water from the mountain drunk instead of water from the well (gravity water)
1991	2	Flooding, destroy crops, livestock and the road is damaged, trees fall down, house destroyed in the storms.
1991	2	Som village flooded, rice crop was totally destroyed
	2	Droughts during this time but no year remembered. All the rice destroyed
1991	2	Flooding, storms, trees fall down, flooding destroys many things
1990	2	Drought, villagers cannot grow rice, only possible for some
1991	2	Village paddy fields and garden were destroyed and production decreased, food scarcity, livestock damaged
1990	2	No one can remember the year, there is a drought and paddy fields destroyed
1991	1	flooding, but period of flooding longer than previous times, around two weeks

1991	1	After flooding, a livestock disease
1996	2	Effect from flooding, livestock, especially water buffalo die
1996	2	Som village was flooded, paddy fields destroyed
1996	2	Destroy house and paddy fields and livestock
1996	2	Flooding destroys the roads and livestock is affect, houses are destroyed
1996	2	About 30% paddy fields, livestock are destroyed
1995-2005	4	Logging of forest
1996	2	Big flooding and transportation very difficult
1995?	5	Increase in the use of agrochemicals.
2011	2	Flooding, rice and livestock damaged
2002	?	NT2 dam was constructed
2011	2	Storm "Nokten" causes flooding, livestock damaged, trees fall down, people's living very difficult, food scarcity,
2000-15	4	Removal people from the dam site
2005	3	Animal disease
2005	3	Droughts and pests
2005-2010	4	Moving around of people from the dam site
2002-2010	4	Collection of NTFP increases
2007- to now	2	Aquatic animals decrease
2011	2	Nokten storm and flood, after flood there is drought, water is not clean, harvesting of rice cannot be done, economy gets bad
2011	1	Flooding, livestock and rice damaged,
2007-to now	2	Fisheries is difficult because the number of fish has decreased
2010	4	Agricultural land decreased
2011	5	Flooding
2000-	5	Increase in the use of NTFP
2011	3	Flooding
2011	2	Some villages relocate because of storm and livestock and roads damaged, villagers have to travel by boat.
2010-2015	4	Climate change, the rainfall is decreasing, the water supply for agricultural production is not sufficient
2010	4	Xebang fai river is not so clean as before
2010-	4	Aquatic animal difficult to find
2010-2015	?	Standard of living is high
2011	2	Som village was flood, destroy livestock and rice
2011	2	Nokten storm affected the roads, livestock rice cultivation
2011	2	Flooding, the rice production is not good
2010-	2	Aquatic animals are scarce
2010	5	NT2
2010	4	The level of water in the river increases
	5	Because of NT2 there is more access to the area, there is more logging
	5	Logging in Mahaxay district
2015	2	There is less rain, rice production decreases
2015	5	Changes in water levels are unpredictable

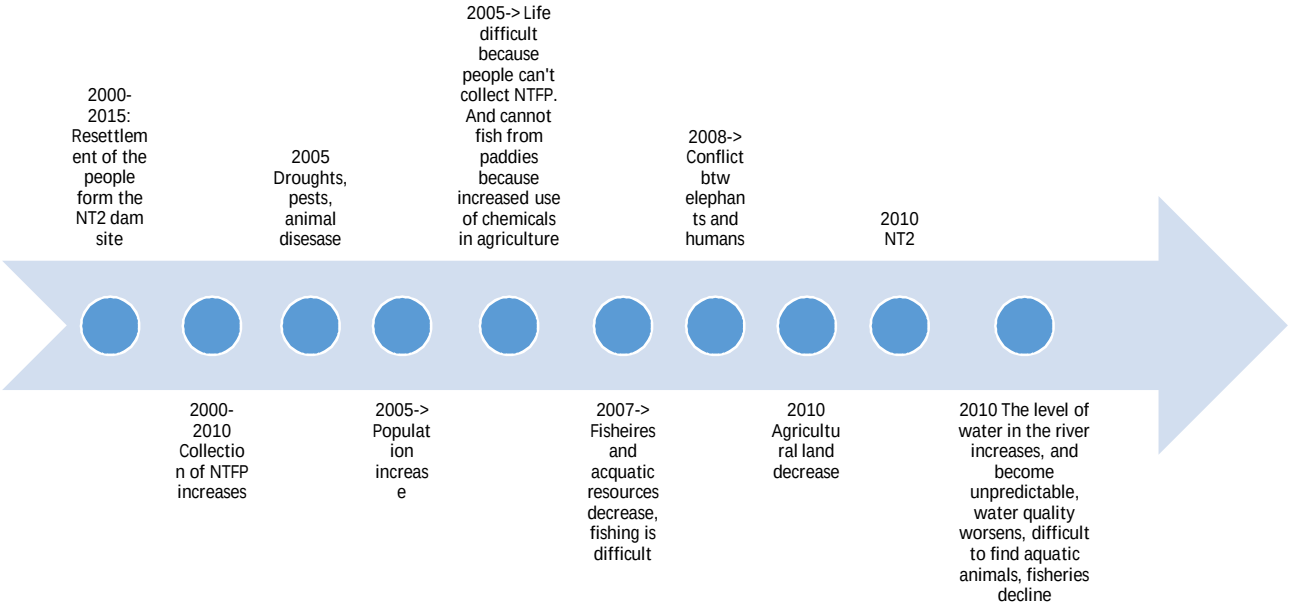
2015	3	Human disease
20115	5	Less water for fish ponds
2015	5	Fish ponds too dry, in fish conservations zones
2015	5	Unpredictable water level
2015	2	Drought destroys agricultural crops
2008-2015	4	Conflict between elephants and humans
2015	5	Water quality changes because of flooding
2015	5	Loss in fish catch
2015	5	Fisheries decline
2010-15	1	Much more water because of storms
2010-15	4	Soil erosion along the river bank
2015	4	During dry season there is water scarcity, especially drinking water
2005-15	Green	Population increase
2010-15	4	Fish decrease because modern fishing equipment
2015	2	Water quality is not good because of chemicals are being used in agriculture
2015	2	Aquatic animals decrease
2006-15	2	Life for people is very difficult because can't collect NTFP and cannot catch fish because many people use chemical compounds form agriculture
2015	2	Water quality of river is not good nowadays, when people taking bath, some people get itching
2015	2	There is a drought and some agricultural crops is destroyed and fishing is hard and cannot catch fish.

Table 1 Historical timeline of water related changes in Xe Bang Fai

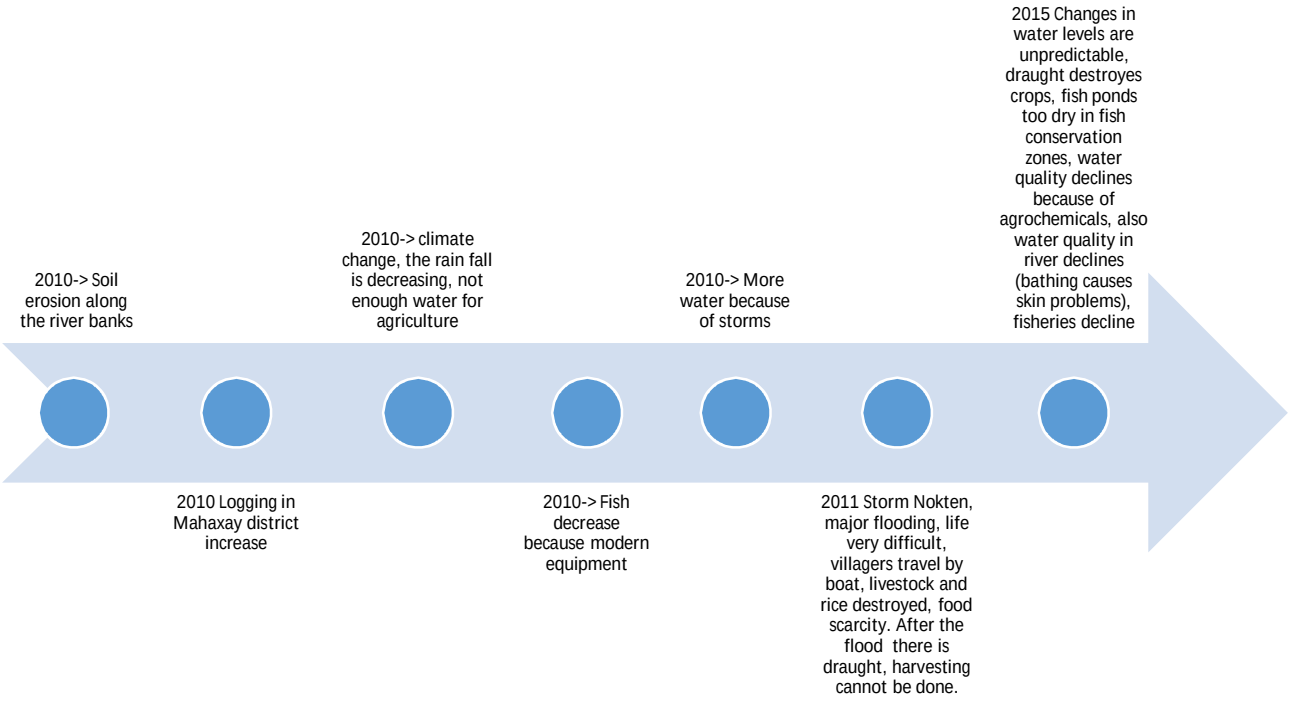
Timeline for 1985-2000:



Timeline for 2000-2010:



Timeline for 2010-2015:



5. Drivers of Change

Each group identified five key factors of change and discussed what kinds of changes these drivers are likely to cause in terms of risks and vulnerabilities.

Group 1

Drivers of change	Effect: increase/no changes/ decrease risks and vulnerability
Climate change	The patterns of rain become irregular
Flooding destroys agricultural growth	Agricultural production decreases Food will be insufficient
Disease outbreak	Human, animals and crops will be damaged increasingly
Population increases	Agricultural land is not sufficient
Extension of agricultural land	Wildlife and non-timber production decrease

Group 2

Drivers of change	Effect: increase/no changes/ decrease risks and vulnerability
Flooding	There is management plan that can reduce the risk from flooding and from drought Because of heavy logging it may affect villagers' living
Infrastructure / road	Ban Som village lie in strategic plan of the province, in the future there will be good road
Irrigation	There will be water reservoir for irrigation system, therefore people can produce rice in two seasons
Government policy	Promote the development (Ban Som small village to be bigger village and town) Population will increase
Risk of natural disaster	Nowadays there is mining for salt and limestone in the future agricultural land will decrease, sufficient to produce rice

Group 3

Drivers of change	Effect: increase/no changes/ decrease risks and vulnerability
Forest cover decrease	Droughts and flooding
Infrastructure development	Water quantities change, water quality change, aquatic animals and wildlife are affected
Land clearance for agriculture	Forest cover decrease groundwater storage decrease water quantity decrease
Mining	Water quality and quantity decrease
Population increase	Use of water increase, water quantity decrease, water pollution

Group 4

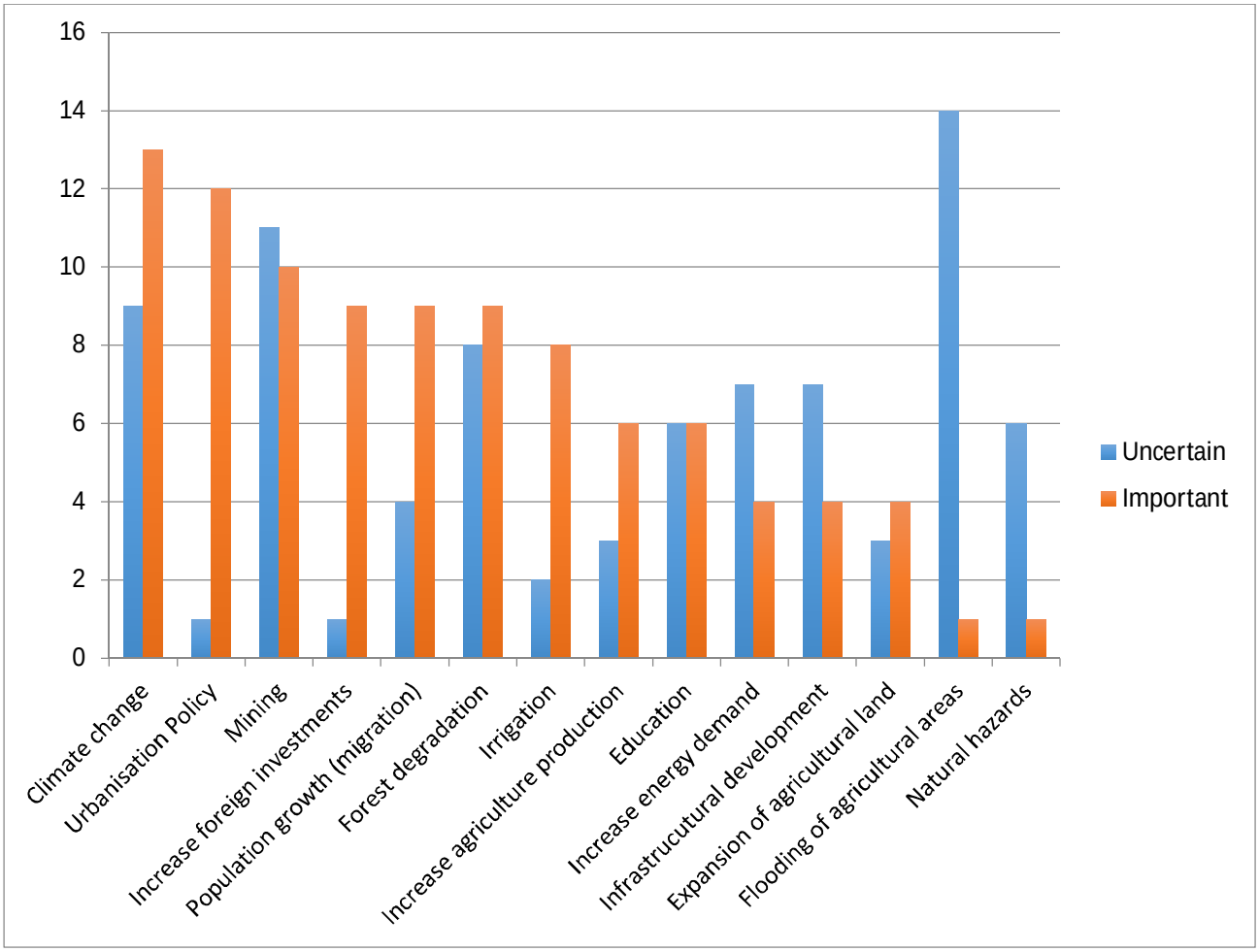
Drivers of change	Effect: increase/no changes/ decrease risks and vulnerability
Policy of government on foreign investment promotion Land assets, Laos as Asian battery	The economy of the nation may be better The land for agriculture for decrease Soil quality and water quality decrease
The electricity need from neighbouring countries increase	Flooding, water ecology is damaged
Import of labour from abroad for foreign investment increase	Unemployment for Lao people, wage very low of Lao labour, people are poor, cost of living increase
Population increase from migration and also internal factor	Living standard is very difficult because of high competition, The use of natural resources increase
The change of economy to industry from agriculture, use of chemicals (e.g. rubber)	Water and soil are polluted Disease problems for villagers and livestock

Group 5

Drivers of change	Effect: increase/no changes/ decrease risks and vulnerability
Climate change	Increased flooding affects productivity Drought causes food security problems Increased use of fertilizer
Plantations Land concessions	Deforestation Use of water resources
Mining	Bad water quality, deforestation, job opportunities
Dams	Could improve livelihoods of farmers In theory regulated water flow Increased resettlements Increased infrastructure
Education	Increase awareness about risk, more information means less vulnerability

6. Most important drivers of change: Voting result

Each participant voted for the 5 most important and 5 most uncertain drivers of change. The results of the voting are presented in the Table below.



7. Future scenarios

During the lunch break the facilitators constructed distinct scenarios derived from the most important factors of change identified and ranked previously by the participants. The goal was to generate scenarios with some plausibility, with divergence in terms of water quantity, water quality, land use, and governance components.

Drivers	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Climate change	Participatory, locally appropriate adaptation	Some adaptation	Large infrastructure adaptation	No adaptation
Urbanisation policy	Slow or moderate rate of rate urbanization, attractive rural livelihoods	Relatively high rate of urbanization with some planning	High rate with centralised planning	High rate of urbanisation with no planning
Mining	No or slight increase with compensation, safeguards and sharing of benefits considered	Moderate or high increase with some oversight and inconsistent regulation	Major increase with relocation in some areas with compensation	Dramatic increase, with no safeguards or sharing of benefits
Foreign investment especially in agriculture	No or increase in foreign investment	Moderate or high increase	High increase with state level incentives for investment	Dramatic increase with no regulation, increase of landless rural population
Forest degradation	Sustainable forest management, livelihoods and ecology taken into account	Continued degradation of forest resources	Increase in forestry, maximizing profits	Massive deforestation
Changes in agriculture	Increased harvest with sustainable methods	Current levels of harvest and use of agrochemicals	High increase in agricultural productivity with high use of agrochemicals	High increase in agricultural production with uncontrolled use of agrochemicals

8. Scenario narratives and mapping

The participants worked in mixed groups, each group working on one of the proposed scenarios given above. With the help of a facilitator, each group developed a scenario narrative. This narrative describes how the given scenario is reached in 30 years of time focusing on the factors of change ranked earlier as the most important ones.

Group 1, Scenario 1: "Environment is not damaged, development is slow and government policy is unchanged"

Other name candidates included:

- Development Planning for Sustainability
- Management and Development Planning for sustainable natural resource
- Future Plan of Development Management
- Slight development based on adaptation

Climate change: Participatory locally appropriate adaptation

- We can prepare oursleves and get ready for natural hazard and natural disaster
- Setting up early warning system in the vulnerable areas
- Effective communications and public information systems to inform the public of the imminent danger
- Internal and external coopertation to rescue the victims
- Use of sustainable seeds and adapted species in the different location of agriculture areas
- Promoting science and technolgoy for exchanging with communities related to climate change, e.g. locals can sometimes notice early if natural disaster will happen soo or if there is some strange phenomenon of nature

Urbanisation: Slow or moderate rate of urbanisation, attractive rural livelihoods

- Infrastructure will be planned and designed well beforehand
- Cities will expnad to suburban and rural areas
- Locals have easier access to services
- Livelihoods will improve bettre than previously

Mining:

- No or slight increase with compensation, safegurds and sharing of benefits considered

Investment: No or slight increase in foreign investment

- Government takes local investors to be the first priority and promote more chances for them
- After concessions for foreign investments run out of their contracts, government or locals take over those businesses
- Build up the strength of local investment

Forest degradation:

- Forest areas are expnaded in the arease of degraded forest
- Promoting natural development in sustainable way
- Adding more law & legislation of sustainable natural resource

Change in Agriculture:

- Using technology for keeping effective seed for a long time
- Increasing productivuty
- Growing in many season and suitable in different areas
- Sufficient amount of seeds
- Plants resist and adapt will to changes in (or new) environment

Group 2, Scenario 2

People have a better understanding on how to adapt their self with climate change (flood), e.g. planting rice in dry season especially in the irrigation area.

Government provides additional job training such as correcting non timber forest, handicraft, weaving, livestock, etc.

Support new technology and equipment by Government e.g. seed which is more flexible and adapt to flood and drought.

Government is greatly promoting to enhance and recover sympathetic of planting, and launches the training for local people on agricultures.

Establish the Siren center for any natural hazard is one of priority especially in weakness area (flood, monsoon).

For a long term Government should have a visibly strategy to prevent forest degradation and water resource.

People can access the information, and prepared for urbanizations, furthermore have a better understanding of national social economic development plan in different level of authorities.

Has an efficiency policy and meet of effected people demanding in term of compensation

Group 3, Scenario 3: "Infrastructure Development Is Better Managed by the State"

Other name candidates included "Agriculture Development Area" as Savannakhet and Khammouane are committed to be a Food Security Area.

Adaptation in form of infrastructure development:

- There is compensation and relocation in suitable area if some are heavily affected, if only little affected, then the compensation in cash could be considered. Land compensation.

Urbanisation is met with centralized planning:

- Information flow
- Networking and coordination between state and village authority
- Consultation in advance (3 years in advance)

Mining: relocation with compensation

- Compensation with strict enforcement, also regulation strictly enforced
- Vocational training
- Follow up of the environmental agreement
- Need fully implement the agreement and Law enforcement

Foreign investment is increasing:

- Regulation is enforced accordingly
- Concession period have to be involve in the process
- Compensation or need to find land elsewhere to replace land losses
- Build infrastructure to compensate the affected area

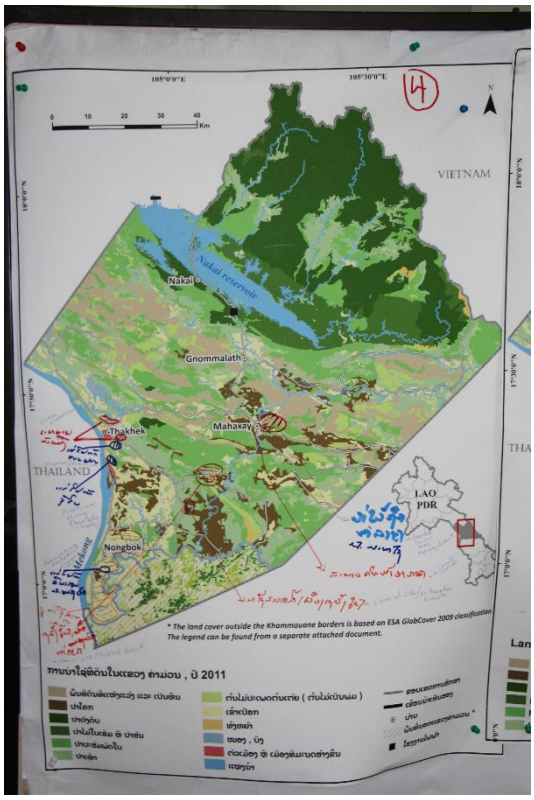
Forest degradation is increasing because profit maximization in forestry:

- Forest harvesting actors should pay more attention in forest activities
- Planting, involvement of villagers, local authority in forestry work
- Forest maintenance

In agriculture high increase in the use of agrochemicals:

- There should be strict control of the use of different chemical types
- Organic farming should be promoted
- Need to follow the global trend in organic promotion
- Enforce the regulation to prevent the import of chemicals
- More coordination needed among stakeholder agencies
- Khammouane and Savannakhet are envisioned as a kind of Agriculture Development Area or a Food Security Area

Group 4, Scenario 4: "Strong Law Enforcement"



Climate change with less adaptation:

This is due to people do not have knowledge and experience about this issue and therefore there should be clear incentive policy to publicize for awareness raising and at the same time, there should be support from projects. By doing this, people will have knowledge on climate change and after having knowledge, people can have approach for adaptation and then they will be resilient when climate change occurs.

Policy on urbanization:

The urbanization has occurred without planning. As a result, it extends to other land use such as agricultural land and forestland. It is necessary to have law enforcement with urbanization planning to reduce/minimize encroachment to other land uses.

Mining:

Mining operation is increasing rapidly, but the implementation of environmental protection measures is lax. The resources to support governmental staff to work for this are inadequate and unclear role and responsibility to judge. The compensation from mining to local people is not reasonable.

Change in agricultural production is by applying agrochemical to get high yield:

This affects to ecology, air, soil, livestock and human. To tackle with this, there should be regulation to control the use of chemical compounds, which are banned by WHO. For example: the chemical compound of herbicide used in rubber plantation is not known.

Foreign investment:

There are many foreign investments growing rapidly, but at the same time; law enforcement on investment is not strict creating many gaps. As a result, local people lost their agricultural land.

Forest degradation:

Forest degradation is caused by over-logging, land use change and infrastructure development. Law enforcement must put into practice strictly. If possible, the other developments, which damage the forest, should be reduced.

Group 5, Scenario 4: Scenario narrative for the "worst case scenario"

Climate change: no adaptation

- No planning for food stocks, flood prevention, adaptation to agricultural production, villagers are not involved in planning
- Too big of a problem to adapt fast enough
- Top-down planning from centralized government
- Plans are there but not implemented because of
    - Lack of technical expertise
    - Lack of funding
    - Lack of political motivation

Urbanisation policy: High rate of urbanisation with no plan

- Too fast urbanisation and cannot adapt fast enough
- Lack of funding
- Lack of coordination
- Lack of regulation & implementation & laws
- Corruption
- Lack of income opportunities in rural areas à people move to urban areas
- Lack of education in rural areas à people move

Mining: Dramatic increase with no safeguards and sharing of benefits

- Lack of land use planning à "first come, first served" à no vision for future plans
- Driven by profit, concessions to companies not based on their social & environmental policies
- No corporate social responsibility
- Local communities are not involved
- No alternative sources of clean water downstream

Foreign investment (agriculture): Dramatic increase with no regulation, increase of landless rural population:

- Top-down policies giving land concessions without planning
- No proper documentation of land ownership/property rights
- When farmers receive land titles à sell to companies à become landless à not compensated enough

- No property rights à land taken away anyways
- People heavily relying on land rather than livelihood diversification
- Labour force from neighbouring countries

Forest degradation: Massive deforestation

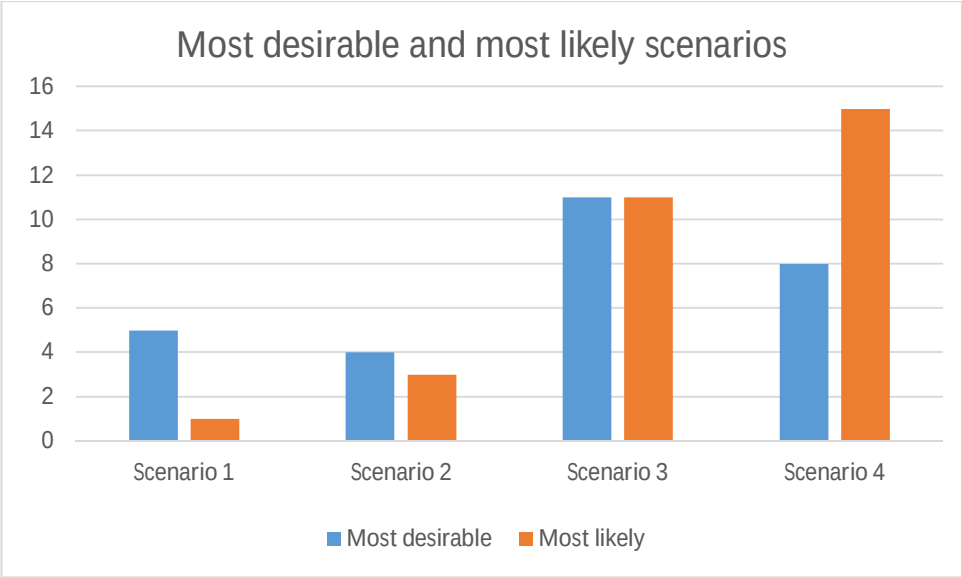
- No management plans for forest harvesting
- Lack of implementation
- Higher food security à higher vulnerability of locals
- Higher food insecurity à higher vulnerability of locals
- More pressure on other resources
- More fishing
- More land used for agriculture
- Take high value food and wildlife
- More land slides, changes in Underground water supply
- Changes in soil mineral à soil degradation à impacts agriculture
- Impacts biodiversity
- No long-term vision for how to sustainably use land
- Short-term actions driven by profit
- Did not consider risks à lack of awareness
- Increased infrastructure allows for easier access to forests à illegal logging & corruption

Changes in agriculture: Increase in agriculture production with uncontrolled use of agrochemicals

- Millers get fertilizers from companies who pass it on to farmers
- Lack of education on organic fertilizer use
- Soil degradation + quality decreased, quantity increased

9. Voting most preferable and likely future scenarios

After each group had presented their scenario, the participants voted for the scenarios 1) they thought is the most desirable one, and 2) which is the most probable or likely one. According to the majority Scenario 3 was the most desirable scenario and scenario 4 was the most likely one. The table below presents the voting results.



10. Backcasting I: How to reduce risk exposure

Participants worked in mixed groups, each one working on the scenario 3, which was voted as the most desirable one in the previous day. But the constraints of the scenario were not taken strictly in this backcasting activity. Rather, it was possible to incorporate other desirable aspects of a preferred future.

The participant were asked to reflect on what would need to be done to reduce risk exposure. Which strategies should be implemented? How they should be implemented? By whom? Which constraints could affect the implementation of the strategies? How to manage these constraints or challenges? By whom?

Group 1

STRATEGIES	What needs to be done?	How?	By whom?
Strategy 1	Sustainable Development and Management Plan	EIAs, feasibility studies, Law Enforcement and regulation, Multi-scale governance	Advisors (Internal and external), MONRE. MoAF, Local authorities, Ministry of Public Work and Transport, Urbanisation organisation, MoPI
Strategy 2	Compensation (win-win)	1) Public information that make locals understand the project benefit and compensation 2) Agreement letter between multi-authorities	Locals (victims), local authorities, central authorities, project
Strategy 3	Reducing forest degradation	1) Reduce degradation and restore forests 2) public awareness 3) Regulation 4) Reforestation management	Ministry of Agriculture and forestry, MONRE, local authorities
Strategy 4	Management of Chemicals in Agriculture	Monitoring and inspection of chemical use 2) Import regulation 3) Public awareness	MoAF, Ministry of Industry and Commerce (MoIC), MONRE
BARRIERS:	Main barriers?	How to overcome barriers?	Whose responsibility?
Barrier 1	Actual implementation achieved is not exactly good	Clear roles and duties before starting the implementation 2) Sufficient staff, equipment and budgets	Government and advisors
Barrier 2	Lack of official documents	Minutes of Meeting before agreement 2) Various parts participate in the decision-making	Victims, project stakeholders, Government, Third Party
Barrier 3	Man, material and money management	1) Allocate budget in each task 2) Training and upgrading staff knowledge for adjusting in the appropriate adaptation 4) Buy technology material	Government
Barrier 4	Man and material management	Procurement processes should be made transparent 2) Training or upgrading staff knowledge	Government

Group 2

STRATEGIES	What needs to be done	How?	By whom?
Strategy 1	Reduce of fertilizers use Effected of fertilizer to people and livestock	Reducing of fertilizers use, and substitute by organic fertilizers Introduce on how to use fertilizer (stimulated), water resource management.	Government Private entrepreneurs
Strategy 2	Master plan	Participatory planning by including village, district, and province	Government Province District Village
Strategy 3	Adequate compensation	Compensate the agriculture land to effected people, and make sure that it is appropriate for cultivation.	Government (related division) Investors
Strategy 4	Increasing of waste from investment and concession	Have a good system on waste management Environmental impact assessment, and monitoring Stringent on implementation of regulations	Investors Government
BARRIERS	Main barriers	How to over comes barriers?	**Whose responsibility?**
Barriers 1	Fertilizer use	Support by Government, investors, NGO, and INGO Capacity building, and technical training e.g. Organic farm	Ministry of agriculture and forest Ministry of health
Barriers 2	Centralization	Centralization and Cautious funding plan visibly Timeline and elaborate activities	Government
Barriers 3	Land compensation	Infrastructure (road, electricity) Irrigation	Investors Government
Barriers 4	Investment and pollution	Monitoring, inspection, and punishment	Government Entrepreneurs

Group 3

STRATEGIES:	What needs to be done?		
Strategy 1	State / government have to work on strategy to promote cooperation with foreign and domestic investors to make a good governance on infrastructure development		
Strategy 2	The cooperation among stakeholders should be more tight and in lines with all agencies		
Strategy 3	Networking and coordination from central to local should be implemented accordingly and continue by all state agencies and investors		
Strategy4	Capacity building should be made for all stakeholders to be ready to implement the planned activities		
BARRIERS:	Main barriers?	How to overcome barriers?	Whose responsibility?
Barrier 1	Human Resources	There is a need for short term and long term training	State agencies with assistance from international organisation
Barrier 2	The unclear roles of line agencies/sectors	Need to have a better mechanism to clarify the responsibilities of each sector	State agencies
Barrier 3	Budget and human resources	1) Government has to allocate budget to fit with the situation of each sector as well as to seek for funding sources 2) Long term and short term training to overcome the human resources barriers	1) Government 2) state institutes with assistance from international organisation

Group 4

Accompanying notes: We have to first list the risks that may be occurred. In case of infrastructure development such as road should be considered for the risk as it involves to national debt, easily access to natural resource. Stone mining as in case of Ban Som, creates a lot of problem. Small stones destroyed paddy field. The risk in this scenario includes: 1) Lack of manpower and budget 2) Natural resource destruction 3) Customary right and local livelihood change 4) Land use right loss

STRATEGIES	What needs to be done?	How?	By whom?
Strategy 1	Improve financial mechanism in sustainable way	Improve Govt staff salary based on cost of living	Ministry of Finance
Strategy 2	Sustainable land use Management	Land survey	Land Management Department
Strategy 3	Sustainable Forest management	Increase protection measures	MAF and MoNRE
Strategy 4	Support organic agricultural production	Campaign, training and demonstration plot establishment	State, Local government and project
BARRIERS	Main barriers?	How to overcome barriers?	Whose responsibility?
Barrier 1	Management system do not work well	Provide incentive to the staff who work	Concerned ministries
Barrier 2	Lack of capacity of staff	Capacity building of staff for specific knowledge. Look for budget support	Government
Barrier 3	Insufficient staff and lax law enforcement	Provide more staff with effective law enforcement	MAF and local government
Barrier 4	Poor cooperation from villagers	Campaign, demonstration to compare between use of chemical and non-use of chemical in agricultural production	State, Local government and project

Group 5

	What needs to be done	How?	By whom?
Strategy 1	Good Planning structure based on flood risk analysis	1) Cooperation btw district authorities, village heads and international organisations, 2) Realistic and detailed plane, 3) ensure proper funding	National University of Laos, MRC, Specialised experts, local communities, local authorities, Govt of Laos
Strategy 2	Enforcement of policies and regulation	1) Set up a system to ensure accountability 2) Clarification of responsibilities and consequences 3) Need the willpower to enforce it and the demand to enforce	GOL (Govt of Laos), Local communities, local authorities
Strategy 3	Adequate communication between and within ministries, provincial authorities and village heads	1) Joint meetings to merge ideas, come to an understanding on goals and streamlined vision 2) Clarification of responsibilities	GOL, Ministries, Provincial authorities, District authorities and Village heads
Strategy 4	A proper plan on how to give land concessions	1) Include adequate safeguards 2) A system for benefit sharing 3) Streamline with land use plans, district and provincial plans 4) Include an environmental impact assessment	GOL, Provincial authorities, district authorities, independent expert group for feasibility studies
	Main barriers	How to overcome barriers?	Whose responsibility?
Barrier 1	1) Flood plan not implemented 2)Lack of funding, capacity, motivation 3) Plan not holistic, participatory 4) Too many plans	1) Include all stakeholders 2) Streamline and complement existing plans 3) Build capacity for flooding experts	GOL
Barrier 2	Corruption	Set up an accountability mechanism	*(Empty)*

11 Backcasting II: How to reduce vulnerability

The same groups continued to work with the same scenario as in the Back casting (I). The participants were asked to reflect on what would need to be done to reduce vulnerability. Which strategies should be implemented? How they should be implemented? By whom? Which constraints could affect the implementation of the strategies? How to manage these constraints or challenges? By whom?

Group 1

STRATEGIES	What needs to be done?	How?	By whom?
Strategy 1	More detailed plans (each task more detailed)	Multi-participants to make decision 2) Make a plan based on locals more than others	Top down, Central and local authorities
Strategy 2	Build up local comprehension	Academic training for locals 2) Attractive public information and manual 3) Multi-public information	Respective academic level
Strategy 3	Trust	Public agreements and transparency	Local authorities, respective authorities
Strategy 4	Assessment	1) Locals participate in all activities 2) Report and summary (of advantages and disadvantages)	Respective sectors with locals
BARRIERS:	Main barriers?	How to overcome barriers?	Whose responsibility?
Barrier 1	Time management	Appropriate implementation in the realistic areas, it might rely on lunar calendar (traditional events and holidays)	Respective organisation
Barrier 2	Implementation process	Force and effective cooperation, deep detail	
Barrier 3	Benefit sharing is unfair	To inform multilevels	Respective sectors with locals
Barrier 4	Public blame (shy)	Holding discussions, understanding public blame for improving	

Group 2

STRATEGIES	What needs to be done	How?	By whom?
Strategy 1	Reduce of fertilizer use by create curriculum, hand book, provide a training	Replace of fertilizers by using organic, arrange training, create curriculum, hand book, and public the information	Ministry of Agriculture and Forest Ministry of Health care
Strategy 2	Contribute in drafting of plan	Encourage people to participate, and be confidence to share the idea	
Strategy 3	Compensation which match to effected people's demanding	Support the necessary things Provide training for additional jobs	

Group 3

STRATEGIES:	What needs to be done?	How?
Strategy 1	Transparency	1) There needs to be a mechanism on transparency (technical inspection, agreement assessment and legislation...) 2) Law enforcement and justice 3) Villagers involvement and consent on the investment
Strategy 2	Addressing weak coordination in investment	1) Improve the roles and clear function of sectors 2) Involvement of villagers in coordination
Strategy 3	Addressing the lack of information to support planning processes	Build capacity for stakeholders (government staff, investors and villagers)
Strategy 4	Human resources and budget	1) Awareness raising in investment for villagers and investors 2) Allocate appropriate budget and villagers' involvement
BARRIERS:	Main barriers?	How to overcome barriers?
Barrier 1	Lack of knowledge on investment for villagers	1) Educate villagers on investment and environment impact from investment 2) Building learning process for villagers
Barrier 2	Unclear roles of sectors related to investment	Improve and make clear coordination role, monitoring and reporting system
Barrier 3	Legislation of one sector does not support other sectors	1) Improve legislation to support each other on sectors 2) Social awareness raising on the legislation related to investment
Barrier 4	Human resources and budget	Monitoring and reporting system need to be built up with clear function

Group 4

STRATEGIES	What needs to be done?	How?	By whom?
Strategy 1	Control budget flow	1) Report regularly and report on time 2) Regular monitoring 3) Database installed to concerned Govt organisations	Concerned ministries from central to local
Strategy 2	Reduce deforestation	Systematic forest management 2) Reduce annual logging quota 3) Reduce conversion of forest land area for other purposes	Government
Strategy 3	Reduce impact to local livelihood	Land and forest allocation 2) Land concession should be well developed to reduce negative impact to local people's livelihoods 3) Develop permanent occupation to local people	Government (central to local)
BARRIERS	Main barriers?	How to overcome barriers?	Whose responsibility?
Barrier 1	Financial control system is not effective	Increase responsibility of Govt authorities	Govt

Barrier 2	Lack of people's participation	Improve Government policy on logging for sustainability of forest	Govt
Barrier 3	Lack of budget for development of permanent occupation of local people	Short-term and long-term planning 2) Allocate budget	Ministry of Agriculture and Forestry (MAF)

Group 5

STRATEGIES	What needs to be done?	How?	By whom?
Strategy 1	Food security ensured	Support diversified sources of food, Access to land, Irrigation, Access to markets and infrastructure	Village heads and community leaders, GOL, Provincial and district authorities
Strategy 2	Compensation and social safeguards for large infrastructure (dams, mining etc.)	Access to info for most marginalised Risk assessment of affected households Baseline surveys Participatory consultation	GOL, companies, local communities
Strategy 3	Access to quality healthcare	Education system for medics and doctors Secure funding Higher salary Clinics in rural areas	GOL
BARRIERS	Main barriers	How to overcome barriers?	Whose responsibility?
Barrier 1	Lack of knowledge of nutrition Lack of safety nets Lack of access to resources	Increase access to knowledge Increased market access Land rights	GOL
Barrier 2	No enforcement of social safeguards	Streamlined safeguards for all mining, hydro etc. projects Accountability mechanism	GOL, Judiciary system
Barrier 3	No demand for better health care, as the marginalised don't demand and rich go to Thailand	Awareness raising Simple nutrition and wash principles Inclusion of spiritual leaders --> motivation	GOL, Monks

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Picture 1: Group photo with workshop participants

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