Challenge Program on
Water and Food

ANNUAL REPORT
1 January 2007 to 31 December 2007

1 PROJECT PROFILE (this information will appear once only as a header sheet to your reports when they are electronic)

PROJECT NO.: 25	**PROJECT TITLE:** Companion modelling for resilient water management: Stakeholders' perceptions of water dynamics and collective learning at the catchment scale.
LEAD CPWF THEME: 2	**LEAD CPWF BENCHMARK BASIN(S): Mekong**
SECONDARY CPWF THEME(S): 4	**SECONDARY RIVER BASIN(S): Pho Chu, Gamri Chu & Kuri Chu rivers in Bhutan, Bhramapoutre**
MANAGING CENTER: CIAT	**PROJECT DURATION: 3 years**

2 LINKED QUARTERLY PROGRESS REPORT (MILESTONE PLAN)

(this section of the report should contain your milestone tables, embedded in an excel spreadsheet. One three monthly section per page. You are required to provide comments against your milestones in this report period).

This Annual Report is linked to:	**CPWF-PN25 Quarterly Report Format-d07.xls**

3 SUMMARY OF ACHIEVEMENTS OVER THE PAST TWELVE MONTHS

(a) Project Outputs: what your project has achieved, and the technical/scientific progress and rigour of your project (which is also necessary for assessment).
(b) CPWF Outputs: how your project relates to the outputs of one or more of the CPWF five research themes and one or more of the benchmark basins.
(c) Outcomes and Impact: what outcomes have been achieved over the year, and how they have impacted on your initial or end users – i.e. who has used your results and to what end? This is also about dissemination pathways.
(d) Enables you to comment on your experiences. This information feeds into the new log frame that has been requested for our medium term plan.

Glossary of terms (extracted from the CGIAR Medium Term Plan Guidelines):

Outputs: are the products of research with a defined time-line, contributing to reaching the [CPWF] goals by offering solutions to problems identified during the planning process.

Outcomes: are the external uses, adoptions, or influences of the [CPWF] output or outputs (e.g. by partners, stakeholders, clients) that lead to changes in knowledge, attitudes, policies, research capacities, agricultural practices, productivity, sustainability, or other factors required in order to achieve the intended impact.

Impacts: are the longer range social, environmental and economic benefits consistent with the [CPWF] goals, e.g. increased agricultural productivity through better water management, better nutrition, sustainable resource management.

3 (a) PROJECT OUTPUTS: Technical Elements

3.1 What are the project's main technical achievements (listed as outputs) over the past year?

Nature of project output/s	Details
New methodologies for better communication and coordination mechanisms - Manuals, papers - PhD dissertations	- The use and refinement of the Companion Modelling (ComMod) approach with local stakeholders continued at the project research eight sites in three different countries: Thailand (4 sites), Bhutan (3 sites) and Vietnam (1 site) with good results and no change in the work plan. - The two most advanced Ph.D. students working in Northern Thailand presented their agent-based model for water management at the ASIMMOD Conference in Chiang Mai, Thailand. Both of them have completed their field work and started to write their dissertations. They also contributed to a joint journal article titled "Comparison of empirical methods for building agent-based models in land use science"

	(Robinson et al. Journal of Land Use Science, 2, 31-55). - Four papers based on the project activities were presented by as many Ph.D. students in a single session of the ASIMMOD Conference in Chiang Mai, Thailand. - Two project case studies dealing with the mediation of irrigation water conflicts (Mae Salaep catchment in upper northern Thailand and the Lingmuteychu sub-watershed in West Central Bhutan) have been selected to be showcased in a forthcoming IUCN book titled "Negotiate".
Knowledge base at each site, based on indigenous and scientific knowledge	The project Ph.D. students organize one or two field workshops per year focusing on their research question and prototype models to be improve in the collaborative modelling ComMod process. Each time, pre-workshop specific surveys and post-workshop interviews of the participants are also carried-out. These field work activities alternate with data analysis / synthesis and modelling work in the lab. It is during this kind of research and participatory modelling processes that their knowledge base is gradually improved, particularly thanks to a better integration of the stakeholders' perceptions and knowledge with the research team ones.
Teaching & training modules	- This PN25 project is coupled with another project funded by European Union through its Asia IT&C initiative. E-learning modules are being developed under this project and, in particular, most of the PN25 ComMod case studies are now presented on the project website at http://www.ecole-commod.sc.chula.ac.th . More modules and cases will be added. - A more research oriented website dedicated to the PN25 project activities is also under construction at http://www.cpwf25.sc.chula.ac.th - The project was invited to teach the ComMod approach during the "Advanced Institute for Junior Researchers on Integrated Land Systems Modeling" organized by the Sapporo node of the Global Land Project at the University of Hokkaido, Japan (24 participants from all continents). - ComMod case studies from the project were used to illustrate lectures and talks on ComMod in various training events in both Europe and Asia.
3.2 How do these outputs contribute to your project goal (and possibly those of other CPWF projects (and non-CPWF funded) in the study area)?	The project objectives are threefold: - To offer a collaborative modelling methodology and its tools to enhance the capacity of expression of the different stakeholders' perceptions on local water management issues: the activities implemented at each of the project sites contribute directly to this objective. - To train a group of scientists and development officers engaged in the action-research process on this methodology and its tools: this group of young scientist & development officers is at work and, most of the time, they are now the ones leading the project activities at their sites. The teaching & training modules aim to facilitate further expansion of the size of this group. - To analyze concrete water and land management issues at the catchment level, and stakeholders' interactions that are specific to the respective water-related problems identified in each context: each case study originates and is rooted in such concrete water and land management problem. For example, in 2007, at the end of a ComMod process ending with the creation of a community-based institution regulating natural resource management at the catchment level, the stakeholders at the Lingmuteychu site in Bhutan were able to secure external funding and move to concrete collective action (rehabilitation of abandoned irrigation channel and rice terraces, preservation of the upper catchment, etc.).

Mise en forme : Puces et numéros

3 (b) CPWF OUTPUTS: relevance to CPWF thematic areas and basin priorities

3.3 How will the outputs identified above contribute to the CPWF output/s attached?	See the attached list of thematic outputs / basins / projects on which the CPWF logframe is based. Your project may be in more than one output. Please comment individually against each output where your project appears. Refer to differences in the basins in which you are active.
CPWF Outputs	**Project Contributions**
Methods of assessing diversity and dynamics of livelihood	- This project is using the same principles of the ComMod collaborative modelling approach at 8 different sites in 3 countries (3 in Bhutan & Northern Thailand with different socio-cultural groups, 1 in lower Northeast Thailand, and 1 in the Mekong delta, Southern Vietnam). While at each location the methodology must be adapted to the local context and problem to be examined, the ComMod processes always combine initial diagnostic surveys, interviews, role-playing games (RPG), and computer simulation models co-constructed with the concerned stakeholders. The construction of the RPGs and computer simulation models implies the documentation of the diversity of stakeholders' livelihoods and of their individual decision-making processes regarding he issue at stake. In 2007, a journal article was prepared with 2 project Ph.D. students to document explicitly the linkage between the analysis of the diversity of stakeholders' livelihoods and the launch of a ComMod process. The manuscript has been accepted for publication in 2008 in vol. 45 of Southeast Asian Studies Journal (Kyoto University, Japan).

	- A key task of this project is to provide a comparison of the models developed at the different sites. During the 2007 year, the initial framework conceived for the documentation of the models was further discussed, particularly during the end of the year technical workshop held in Thailand. But most of the computer models are still under construction with the project Ph.D. students and therefore cannot yet be documented under this framework before to allow their comparison.
Guidelines for multiple use water supply systems and water sharing	- Providing such guidelines is not a major objective of the project. However, in this project we are examining the problem of multiple uses of water and water sharing at different locations with the aim of providing guidelines on how to conceive and set up communication platforms among multiple users to facilitate the mediation of water use conflicts. - For example, at the Lingmuteychu site in Bhutan (where the national policy is supporting such dynamics), the creation of a community-based institution regulating natural resource management at the catchment level was decided and achieved at the end of the ComMod process, and the stakeholders were able to secure external funding to implement their concrete collective action plan. Their "Watershed Management Committee" (WMC) has been operating for one year with support from the local NRM research agency. A similar effort was attempted at the Mae Salaep site in Northern Thailand but it failed, mainly because of the lack of support from the local administrative and development organizations.
Water management and allocation negotiation tools	The ComMod approach used at each of the project sites supports the co-construction of an agreed upon representation of the water management issue at stake. The objective is, at least, to facilitate communication among the concerned stakeholders, to share (academic, expert, indigenous) knowledge and to improve each stakeholder understanding of others points of view. Most of the time, the specific methodology tailored to examine the local concrete problem at each site include a set of negotiation support tools. The respective effectiveness of these tools will also be assessed following a common methodology. This will not be easy as the type and features of the tools used in each specific case differ significantly based on the characteristics of the problem at stake, the local institutional context, etc.
Institutional arrangements enhancing basin level water productivity	- The objective of the ComMod facilitation of the negotiation among water users is to improve both the environmental state of the resource and users' livelihoods. Such improvements could require organizational change and / or simpler technological change. Technical change is not directly promoted in this project, while it encourages the improvement of stakeholders' interactions and institutional arrangements. PN25 is already providing different stories of negotiation processes leading (or not) to institutional arrangements. - For example, at the Lingmuteychu site in Bhutan (where the national policy is supporting community-based NRM), the creation of a "Watershed Management Committee" (WMC) regulating natural resource management at the catchment level was decided by the representatives of the seven staggered villages and achieved at the end of the ComMod process. Following the establishment of the WMC by-laws, the local stakeholders secured external funding from UNDP to implement their first collective action plan. The WMC has been operating for one year with support from the local NRM research agency, a partner in PN25 project. A similar effort was attempted at the Mae Salaep site in Northern Thailand but failed, mainly because of the lack of support from the local administrative and development organizations.
3.4 Are there other CPWF outputs that your project is contributing to?	Your project may provide new knowledge and information for other outputs on the attached list. List any here and comment against them. Do you see any areas where you could/should work more closely with another CPWF project? (this may not be applicable to your project)
Options for integrating forest and water management	At the most recently opened project sites (Nan in Northern Thailand and Radhi and Kengkhar in Eastern Bhutan) there is an attempt to link forest and water management: conservation of the upper catchment in Nan above the major Queen Sirikit reservoir, reforestation of hot spots in Bhutan to limit land degradation by landslides above rice terraces or water capture around springs in Eastern Bhutan).
Livestock and environmental decision support systems	At the recently open site of Doi Tiew in Nan province, the ComMod process is looking at the effects of livestock grazing on forest regeneration in an area where Hmong farmers' activities are being affected by the creation of a new National Park and reforestation activities of the upper catchment above the strategic Queen Sirikit reservoir.

3 (c) OUTCOMES AND IMPACT

Before attempting this section access these web pages for an overview of the basis of how we approach outcomes and impact. They are from the IDRC web page on 'Outcome Mapping'). http://web.idrc.ca/uploads/user-S/10960530301karaoke.swf http://web.idrc.ca/en/ev-64698-201-1-DO_TOPIC.html	
3.5 What are the 'outcomes' of your research to date?	What outcomes have been generated by the outputs (as listed in 3.1) that you project has yielded to date? Please be basin specific.
Output (from 3.1)	**Resultant outcomes**
Teaching & training modules	- Gradually, more e-learning modules and case studies are documented on the Ecole-commod website at the related http://www.ecole-commod.sc.chula.ac.th a brochure, a folder and a book mark were produced in late 2007 to disseminate information about their existence and to promote their use. - The PN25 project case studies were used to illustrate the ComMod collaborative modelling approach in various training events in Europe during 2007. - In August 2007, the project was invited to teach the ComMod approach during the "Advanced Institute for Junior Researchers on Integrated Land Systems Modeling" organized by the Sapporo node of the Global Land Project at the University of Hokkaido, Japan (24 participants from all continents). Two case studies from PN25 project were used to illustrate the lectures. Following this training event, the four main resource persons wrote a joint paper on "The role of vulnerability assessment in land change modelling" (to be submitted for publication in Land Use Policy in early 2008) supporting the use of ComMod. - A one week training course, organized in December 2007 in collaboration with the College of Natural Resources of the Royal University of Bhutan, trained more Bhutanese colleagues (researchers and extension workers) on the ComMod approach, its tools and adapted methodology to monitor and evaluate its effects. During this event, new case studies on using ComMod to examine major NRM issues in Bhutan were initiated, including the one on the management of spring water at the new Kengkhar site of this project.
New methodologies for better communication and coordination mechanisms	- A "Watershed Management Committee" (WMC) regulating natural resource management at the catchment level was set up by the representatives of the seven staggered villages of the Lingmuteychu catchment in West Central Bhutan at the end of the ComMod process, with the decisive support of the local NRM research agency and local extension workers. The WMC secured funding from UNDP and implemented a first collective action plan in 2007 (rehabilitation of irrigation channels and abandoned rice terraces, expansion of community forests in the upper catchment, etc.). - The failure of a similar attempt at the Mae Salaep site in Northern Thailand was mainly attributed to the lack of support from the local administrative and development organizations, and more generally a less supportive policy environment in Thailand compared to Bhutan. But the evaluation of this case study conducted in mid-2007 showed important changes in the behaviour of the local villagers who participated in the ComMod process: they are more confident, less passive actors and seek key information pro-actively, they also communicate in larger social networks, and are still willing to seek support from an external donor to implement the construction of small weirs on several streams and to use them to improve the local rules for accessing irrigation water for their plantations. - A book titled "negotiate" under preparation by IUCN has selected these two case studies as illustrations in the volume. It is being assembled with inputs from colleagues working in the M-power project whose activities in the Mekong basin are also supported by the CPWF.
A knowledge base at each site, based on indigenous and scientific knowledge	The RPGs and computer models developed on specific issues can also be used to build more generic tools to facilitate communication, coordination and conflict mediation: for example, the RPG used at the Lingmuteychu catchment in West Central Bhutan to support the creation of a "Watershed Management Committee" among seven villages was converted into a rather abstract multi-agent computer model in 2007 to be used to represent the importance of user communication and coordination in irrigation water management at the whole catchment level in other situations.
3.6 Who has used these outcomes? Provide evidence to justify your answer.	List the **intended users** of these outcomes and tell us how they have been involved in their development to date (if at all) and how they have used resulting technology/information. Refer not only to the various specific users, but also separately to the basin/s in which they operate. We are looking for 'behavioural change' amongst your users (some of whom may not be 'intended').
Outcomes	**Intended/unintended users and their involvement/uptake in individual basins.**
Training courses locally organized	- In countries where the policy and institutional context is not yet supportive enough, the strategy adopted by the project is to train several local lecturers-researchers at Ph.D. level on the collaborative modelling approach and its use for them to disseminate it later on in their teaching, training and research activities at regional universities.

	- End users will be the people involved in local improvement of natural resource management through collective action (local researchers, extension workers and other development workers in government agencies or NGOs).
Setup of local institution	- The most striking "behavioural change" observed so far is at the Lingmuteychu catchment in West Central Bhutan: initially the well-informed and water management specialist program director of the local research agency did not believed that the proposed collaborative modelling process could make a difference and now, following the establishment of the "Watershed Management Committee" at the Lingmuteychu site, its research organization is asking us to up-scale the use of this approach in the country (including on issues not related, even indirectly, to water management). This is mainly due to the very supportive policy context in Bhutan these days which is encouraging the establishment of community-based institutions to help mitigate local NRM problems. - Because this is not the case in the other two countries where the project is working, progress could be slower. In Northern Thailand for example, while the local development workers acknowledge the relevance and the positive effects of the proposed ComMod approach, they are not ready to duplicate such processes as they are not encouraged or stimulated to do so by their still very centralized and highly hierarchical institutions. - The strategy adopted by the project in these countries is to train local lecturers-researchers on the approach and its use for them to disseminate it later on in their teaching, training and research activities at regional universities.
Development / extension workers act more as facilitators rather than experts	This is a long term objective. It is expected once the case studies have demonstrated positive outcomes, and once the training courses led by the young scientists trained under this project would have been delivered in the national languages at local universities.
3.7 Beyond what you have told us so far, what dissemination / information sharing activities are you undertaking?	This question is meant to indicate what dissemination pathways you are developing with your peers and with your intended users. The answer also explains how you are going to strengthen (if necessary) your current experiences in 3.6 above. Two kinds of dissemination / information sharing activities could be distinguished: - The first ones are rather classical: a new PN25 website is under construction, scientific papers were prepared and published (see below in this report), members of the project attended conferences (a whole session was dedicated to applications of the ComMod approach presented by project participants at the ASIMMOD conference held in Chiang Mai in January 2007), new training events were organized in 2007 in Thailand and in Bhutan, and a brochure, a leaflet, and a folder were produced in late 2007 in both English and Thai languages. - The second one is more related to the methodology developed in the project: Participatory modelling workshops organized at the project sites are, in particular, aiming at facilitating information and knowledge exchange among stakeholders. Most of the time, they are also attended by external observers who are curious to discover the approach and to see its tools in action.

3.8 How would you describe your projects contribution so far to the CPWF mandate of producing international public goods?

Type of international public goods	Status
A methodology for knowledge exchange an negotiation among stakeholders	The relevance and flexibility of the ComMod methodology to facilitate the mediation of water management conflicts at the catchment scale can now be considered as verified. Early users would like to up-scale its use (like in Bhutan) or are introducing it in their teaching and training activities (like in Thailand), while there is a growing interest to learn more about it from new potential partners in the future (GLP-Japan, IUCN, etc.).
An emerging network of Asian ComMod users	In the final phase of the project, it will be important for the PN25 project to consolidate this emerging network of ComMod users beyond the completion of the on-going M.Sc. and Ph.D. theses.

3 (d) TECHNICAL AND/OR MANAGEMENT ISSUES

3.9. Any problems or constraints - deviations - in the past year?	- There was no major problem in the operation of the planned project activities in 2007. - A key characteristic of PN25 project is that, on request from the French donor, it had to be associated during 2006-2007 with another EU funded "Ecole-Commod Project" (focusing on training activities) under the Asia It&C initiative. The positive aspect was that the Ecole Commod Project allowed us to develop complementary activities. But a very negative one was the very heavy load of administrative and reporting work for the teams (CIRAD which is coordinating both projects, Chulalongkorn University, and the Ministry of Agriculture in Bhutan) who are engaged in both projects. Additionally, CIRAD is also correspondent of the French MAE supported Echel-Eau Project for the Mekong basin.

3.10 Any adjustments you would like to make in the coming year to make the project more efficient and effective?	- Following the last technical workshop held in Thailand in late 2007, we are requesting an extension of the project, at no cost for the CPWF, until 31 December 2009. A letter explaining the reasons for this request was sent to CPWF in March 2008 and a copy is sent again with this report. - Following the end of the other Ecole Commod Project in late 2007 (the availability of this complementary funding allowed us to use less funds from PN25 Project than initially planned in 2006 and 2007), and due to the late signing of several of the MOUs allowing PN25 Project partners to carry out their planned activities, the project team would like to implement the remaining ones over 2008 & 2009 years to be able to accompany all the on-going Ph.D. research projects and to have time and remaining financial resources to prepare joint publications in 2009.
3.11 Comment on your interactions with Theme Leaders	In 2007, the new project leader, Guy Trébuil, was able to interact with the leader of theme 2 during two CPWF workshops on the Mekong basin held respectively in Ho Chi Minh City, Vietnam ("Cross-theme and cross-scale integration – making research and networking work for positive change in the Mekong" workshop, 22-24 May 2007) and in Chiang Mai, Thailand ("Analyzing water poverty, 2nd workshop", 31 October-2 November 2007). Exchanges by e-mail also occurred and were fruitful.
3.12 Comment on your interaction with basin coordinators.	The interactions were quite close with Kim Geheb, who used to visit the project office at Chulalongkorn University in Bangkok, until the end of his assignment as basin coordinator.
3.13 Comment on your interactions with other CPWF and non CPWF projects in the basin.	- The participation of PN25 project leader in the two CPWF workshops held in the Mekong basin in 2007 was a good opportunity to interact with other project teams and to share information on our respective activities. - Through the Echel-eau project, we also maintain some specific relationships with two other projects in Mekong river basin which are also benefiting from this additional support. - Two PN25 Project case studies dealing with the mediation of irrigation water conflicts (Mae Salaep catchment in upper northern Thailand and the Lingmuteychu sub-watershed in West Central Bhutan) were selected in 2007 to be presented in a forthcoming book titled "Negotiate" edited by colleagues from the M-Power Project based in Chiang Mai.

4 CAPACITY BUILDING

Please tell us about your capacity building activities over the year. This information is useful for us as we take forward our capacity building program. There is a line for 'identified needs' so you can comment on capacity building activities that would be useful in your project and that would add value to the CPWF as a whole.

Category	Basin location	Activities and expected outcomes
Bachelors students		None.
Masters students	Mekong	One master student registered in the "Integrated farming" program of the Faculty of Agriculture at Ubon Ratchatani University. She works on the analysis of the various kinds of effects of the project collaborative modelling approach on the farmers-players at the Lam Dome Yai site in Lower Northeast Thailand managed by Warong Naivinit (see below).
PhD students	Mekong	- Le Canh Dung: a lecturer in agricultural economics at Cantho University in Southern Vietnam. He is registered in the Agro-technology program at the Faculty of Science of Chulalongkorn University in Bangkok. In 2007, he pursued his field activities, in collaboration with the IWMI-SEA program, on a case study focusing on the management of water quality in Bac Lieu Province of the Mekong River Delta. He presented a seminar on his research at Chulalongkorn University in November 2007. - Warong Naivinit: a lecturer at the Faculty of agriculture of Ubon Ratchatani University in Lower Northeast Thailand). He is registered in the Agro-technology program at the Faculty of Science of Chulalongkorn University in Bangkok & in the Human geography program at Paris X University. In 2007, he completed a series of field workshops at his research site in the Lam Dome Yai watershed of Lower Northeast Thailand and started the construction of his computer multi-agent model on the interaction between water/land and labour management. - Pongchai Dumrongrojwatthana: a junior lecturer in tropical ecology at the Faculty of Science, Chulalongkorn University. He is registered in the Agro-technology program at the Faculty of Science of Chulalongkorn University in Bangkok & in the Human geography program at Paris X University. In 2007, he focused on field data collection on the interaction between livestock grazing and forest regeneration at the Doi Tiew site in the upper catchment of Nan Province in North Thailand. - Panomsak Promburom: a researcher in decision support systems at the Multiple Cropping center of the Faculty of agriculture at Chiang Mai University. He is registered

		at Lyon I University in France. In 2007, he completed his field work on land and water management in the upper catchment of Mae Hae in Chiang Mai Province, Northern Thailand. - Cécile Barnaud: trained as an agricultural system analyst at AgroParisTech, France, she is registered in the Human geography program at Paris X University. In 2007, she completed her field work at two project sites (Mae Salaep and Nan) in Northern Thailand, started dissertation writing and published several papers on her findings (see below).
Post docs		None.
NGOs		None.
NARES		The PhD students listed above are members of NARES institutions in their respective countries.
Farmers		Usually, between one and two dozens of villagers take part in each of the project field workshops organized every year at the different sites.
Scientists		None.
Others (identify)		None.
Future needs		None.

5 PROJECT PROCEDURES FOR DATA COLLECTION/STORAGE AND SHARING

Please note that under the Project Agreement (standard clauses), that all data collected by your project is to be made freely available as an international public good. We are keen to ensure that data is shared as widely as possible both within the CPWF and to the wider community. If you want to discuss this issue please contact Dr Francis Gichuki on f.gichuki@cgiar.org.

(a) Technical elements	
5.1. Data collected: what is the extent of your data collection to date?	What type of data has been collected and how is it stored? Secondary data relevant to the issue at stake were collected at each site. Data from surveys and interviews are stored in electronic format / files, including the results of the Role-Playing Games used in field workshops at each of the project site. Computer simulation models are being built at most of the sites by using the CORMAS multi-agent simulation platform and are becoming available for some of the project case studies.
5.2 Can any of this information be usefully shared now?	- The models built under this project are designed to facilitate exchanges among local stakeholders about a given local water management problem and therefore are site specific. But an attempt is being made to produce more generic simulation tools to be shared with a wider audience when possible. - The construction of a first application of that kind was initiated in 2007 with the conversion of the "7 village game" used at the Lingmuteychu site in Bhutan into a rather abstract computer model to be used to illustrate the importance of stakeholders' communication and coordination mechanisms in the management and sharing of irrigation water among staggered users in a catchment.
5.3 Data analysed: what is the extent of your data analysis to date?	- Data analysis and integration in final models was completed at the oldest sites during 2007, while data collection and preliminary analysis is still going on at the more recent ones. - This project is based on the use of a modelling approach. Models (conceptual ones, computer models, or role-playing games) are used in conjunction with field research. New data and knowledge is gradually integrated into the models. - At this stage, most of the sites have at least a prototype model running which integrates key knowledge and data obtained from field work.
5.4 Information shared: what knowledge or information have you shared to date and who with?	The main objective of the ComMod approach and methodologies is to facilitate information and knowledge exchange among stakeholders. At each site a series of participatory modelling workshops are conducted with the different stakeholders to share information and knowledge on the specific problems at stake, on the diversity of points of view among local actors, and on possible scenarios for resource use in the future. From one workshop to the next, new knowledge is generated and is gradually integrated into the models used to facilitate the exchanges among stakeholders, and, at a later stage, to simulate possible future scenarios of their choice.
(b) Project Management element:	
5.6. What notable management and implementation lessons have you learned to date, and what would you do differently as a result?	- Project administration between CIRAD in Montpellier and the various partners in Asia is too slow and time consuming. - In particular, CIRAD accountant needs to make progress regarding project accounting procedures so that the project leader and site coordinators could focus on the project research activities. - To avoid a repeat of past time consuming tasks, the project leader will propose common templates to be used by each of the site coordinators in 2008 and 2009.

6 WRITTEN MATERIALS

Please provide a copy of the materials as an annex to this report in electronic format. Materials will be posted on the CPWF web site as appropriate with your agreement and when in final form.

Type/title	Related to which Output	Expected Date of Publication[1]	Name of journal or main user of materials	Author/s
PAPERS				
Papers for national seminar /conference / workshop				
Papers for international seminar/ conference /workshop: Using simple models to accommodate multiple interests in water management: A companion modeling approach	New methodologies for better communication and coordination mechanisms	2007	Proc. International Conf. on Asian Simulation and Modelling ASIMMOD, Chiang Mai, Thailand, 9th – 11th January 2007. p 248 – 255.	Barnaud, C., T. Promburom, G. Trébuil, and F. Bousquet
Papers for international seminar/ conference /workshop: Participatory simulation of competing aquacultural and agricultural land uses in Bac Lieu Province, Mekong Delta, Vietnam	New methodologies for better communication and coordination mechanisms	2007	Proc. International Conf. on Asian Simulation and Modelling ASIMMOD, Chiang Mai, Thailand, 9th – 11th January 2007. p 313 – 318.	Le Canh Dung, Christophe Le Page, and Chu Thai Hoanh
Papers for international seminar/ conference /workshop: Participatory modeling to validate and build multi-agent system model regarding rainfed lowland rice and labor management in Lower Northeast Thailand	New methodologies for better communication and coordination mechanisms	2007	Proc. International Conf. on Asian Simulation and Modelling ASIMMOD, Chiang Mai, Thailand, 9th – 11th January 2007. p 306 – 312.	Naivinit, W., C. Le Page, M. Thongnoi, G. Trébuil and N. Srisombat
Papers for international seminar/ conference /workshop: Companion modeling to facilitate adaptive forest management in Nam Haen sub-watershed, Nan Province, northern Thailand.	New methodologies for better communication and coordination mechanisms	2007	Proc. International Conf. on Asian Simulation and Modelling ASIMMOD, Chiang Mai, Thailand, 9th – 11th January 2007. p 327 – 333.	Dumrongrojwattana P., Barnaud C., Gajaseni N., and G. Trébuil
Papers for international seminar/ conference /workshop Improving farmers' adaptive capacity to manage water dynamics through participatory agent-based modelling and simulation in Northeast Thailand.	New methodologies for better communication and coordination mechanisms	2008	Communication to be presented at the "XIIIth World Water Congress 2008, 1-4 September 2008, Montpellier, France	Naivinit W., Le Page C., Thongnoi M. and G. Trébuil
Powerpoint presentations			All the above listed communications have associated ppt files	
PUBLICATIONS				
Journal article: An evolving simulation and gaming process to facilitate	New methodologies for better	2007	Simulation and Gaming Journal, 38: 398-420.	Barnaud C., Promburom T., Trébuil G., and F.

[1] This may not be applicable in all cases (i.e. for 'grey' publications such as a survey sheet).

adaptive watershed management in mountain northern Thailand.	communication and coordination mechanisms			Bousquet
Journal article: Comparison of empirical methods for building agent-based models in land use science.	New methodologies for better communication and coordination mechanisms	2007	Journal of Land Use Science, 2 / 1 : 31 – 55	Robinson DT, DG Brown, DC Parker, P Schreinemachers, MA Janssen, M Huigen, H Wittmer, N Gotts, P Promburom, E Irwin, T Berger, F Gatzweiler & C Barnaud
Journal article: Area Study Prior to Companion Modelling to Integrate Multiple Interests in Upper Watershed Management of Northern Thailand	New methodologies for better communication and coordination mechanisms	2008	Accepted for publication in Tonan Ajia Kenkyu - Southeast Asian Studies, Kyoto University, Japan	Barnaud C., Trébuil G., Dumrongrojwatthana P. and J. Marie
Working paper: Power relations and participatory water management: lessons from a companion modeling experiment in northern Thailand.	New methodologies for better communication and coordination mechanisms	2008?	Presented at the CPWF 1st forum in Vientiane, Laos in Nov. 2006. Revised & submitted to Journal of Agricultural Education & Extension	Barnaud, C., A. van Paassen, G. Trébuil, T. Promburom
Research paper:				
Policy paper / brief:				
Book/Monograph:				
Chapters in books / proceedings:				
Other:				
TRAINING MATERIALS				
Course materials: ppt slide shows with audio comments on PN25 case studies on the Ecole-Commod website	Teaching and training modules	2007	General public	Various team leaders from each of the project sites
Other:				
SURVEY MATERIALS				
Survey proforma:				
Analysis proforma:				
PROJECT INFORMATION MATERIALS				
Website: a prototype new project site is available at: http://www.cpwf25.sc.chula.ac.th	All outputs	Started in 2007	General public	C. Le Page & Anuttara Tianvorakoon
Posters: Participatory simulation of competing land use for rice and shrimp production in Bac Lieu Province, Mekong river delta, Vietnam	New methodologies for better communication and coordination mechanisms	2007	General public	Le Canh Dung, Christophe Le Page, Chu Thai Hoanh, Nantana Gajaseni, & Manachaya Uruyos
Brochures: Companion Modelling in Southeast & South Asia	All outputs	2007	General public, available in English and Thai languages	PN25 Project team
Newsletters:				
Other: Project folder and bookmark on Companion Modelling in SE & S Asia			General public	PN25 Project team
ANY OTHER WRITTEN MATERIALS THAT DO NOT FALL UNDER THE ABOVE CATEGORIES				

7 COMMUNICATIONS ACTIVITIES

Type	Where held	When held	Who aimed at	Outcome
PROJECT MANAGEMENT MEETINGS				
Meeting between the Thai and French partners	CIRAD, Baillarguet campus, Montpellier	29-30 March 2007	Better coordination between the teams	Better work plan for 2007
PN25 Technical Workshop	Sichang, Central Thailand	26-28 November 2007	Review of project achievements & definition of 2008 work plan	The project team is stronger & coordination is strengthened
NATIONAL SEMINARS / CONFERENCES / WORKSHOPS				
Annual meeting of ADD ComMod meeting on monitoring and evaluation of participatory process	Avignon, France	26 February – 2 March 2007	Prepare the evaluation of the effects of ComMod processes	Methodology and preparation of use at 2 PN25 project sites
REGIONAL SEMINARS / CONFERENCES / WORKSHOP S				
CPWF Cross-theme and cross-scale integration – making research and networking work for positive change in the Mekong" workshop	Ho Chi Minh City, Vietnam	22-24 May 2007	Exchange information between projects in the Mekong Basin and activity integration	Integration PN25 in CPWF activity in Mekong basin, meet with CP external reviewer
CPWF Basin Focal Project 2nd workshop on analyzing water poverty	Chiang Mai, Thailand	31 October-2 November 2007	Develop a method to determine impact of ag. water management on livelihoods	Meeting with CPWF managers, learned Bayesian networks
INTERNATIONAL SEMINARS / CONFERENCES / WORKSHOP S				
International Conference on Asian Simulation and Modelling ASIMMOD	Chiang Mai, Thailand	9th – 11th January 2007	Presentation of 4 papers by as many project Ph.D. students (see publis. list above)	A whole session of the conference allocated to the project papers
FARMER GROUP MEETINGS / WORKSHOPS / TRAINING SESSIONS / DEMONSTRATIONS				
2nd gaming workshop on competing water requirements between rice and shrimp productions	Bac Lieu Province, Mekong River Delta, Vietnam	16-19 July 2007	To understand the diversity of producers needs for water quality and decision-making rules for production	Understanding of farmers water quality needs and decision-making rules
Village workshops on the co-construction of the agent-based model	Lam Dome Yai watershed, Ubon Ratchathani, Northeast Thailand	24 April 2007 & 5-7 August 2007	Exchange information and knowledge among stakeholders to design decision-making algorithms and rule-based agents	Agreement on decision-making rules for rice pn. & migrations, modelling of water dynamics
Farmer / group interviews	Nam Haen site, Nan Province, Northern Thailand	4-9 June 2007	Evaluate ComMod effects on participating stakeholders	Evaluation report
Farmer / group interviews	Mae Salaep site, Chiang Rai Province, Northern Thailand	29 May–3 June 2007	Evaluate ComMod effects on participating stakeholders	Evaluation report
Farmer / group interviews	Lingmuteychu site, West Central Bhutan	26-28 June 2007	Evaluate ComMod effects on participating stakeholders	Evaluation report
Farmer / group interviews	Kengkhar site, Eastern Bhutan	August-September 2007	Diagnostic analysis to understand water use at this new site	Report on water availability and management at Kengkhar site
Participatory simulation workshop	Mae Hae site, Chiang Mai Province, Northern Thailand	September 2007	Presentation of the computerized water management gaming model	Feedback from villagers on this model and its use in the more holistic one

Demonstrations (as part of the one-week ComMod training course held in Bhutan)	Lingmuteychu site, West Central Bhutan	9 December 2007	Demonstration of the 7 villages water management agent-based model	Plan for a demonstration by village in early 2008
FIELD VISITS TO PROJECT PARTNERS				
Field trip	Doi Tiew site, Nan province, Northern Thailand	25-27 April 2007	Negotiate project work plan with local stakeholders	Agreement on work plan for 2007 wet season
Field trip	Bhutan	15-30 June 2007	Project monitoring & planning, site visits, meetings at CoRRB-MoAB in Thimphu	Selection of a the new Kengkhar site
OTHER KEY COMMUNICATIONS ACTIVITIES				
Global Land Project Summer Institute	Hokkaido University, Sapporo, Japan	13-17 August 2007	Presentation of the project methodology and outputs	Several trainees interested in collaborative modelling
Meeting with provincial decision makers	Nan Province Governor Office	18 December 2007	Briefing of local decision makers on project activities	Their support for future activities was secured
VIDEOS / DVD's / PLAYS / SONGS / ORAL MATERIALS PRODUCED / RADIO PRESENTATIONS / TELEVISION				
ppt slide shows with oral commentaries on PN25 case studies on the Ecole-Commod website	On the web	2007	Information of the general public	Illustrate e-learning modules on ComMod

What other communications activities did you undertake to keep in contact with your stakeholders over the year?

At each of the project sites, before and after the regular field workshops the research teams stay in touch with the stakeholders to prepare these key events with them before it happens, and to record their effects on the participants and the local context afterwards through specific surveys and interviews.

Please note also any plans for the future, and any constraints to communicating as much as you would wish (other than financial resources for international and regional travel - that is a given)
The farming community that you are working with? Policy makers, other decision makers and users of research that your project is aimed at? Your partners? Others – including the general public?

As in the previous year, the electronic communication with the Bhutanese sites is more difficult because of their remote geographic locations, but the quality of the work done by our Bhutanese colleagues compensate for that.
In 2007, the interactions with the local stakeholders at the oldest sites of Mae Salaep and Mae Hae in upper Northern Thailand decreased because the site leaders completed their field work and started to focus on data analysis, the construction of final models, and dissertation / article writing activities.
In 2007, we made use of the remaining support to the complementary Ecole Commod Project from the Asia IT&C initiative of the EU to post as many PN25 case studies as possible on its website for the information of the general public, academics, students, etc. Despite the completion of the Ecole Commod Project on 31 December 2007, we found a way to further continue to enrich this website dedicated to training and dissemination of information in 2008 thanks to extra support provided by the Echel Eau Project coordinated by Agropolis International in Montpellier.

What, if anything, do you think the CPWF (as a community) could do to reach a wider audience of scientists, policy makers, development agencies, extension workers, farming communities (others?) to increase the flow of information of your research results to users, or to increase the two way flow of information with your peers and users of your research? (this is not a compulsory question to answer but we want to get your views on how better to get the results of your research out and how better to link with your users without discriminating against any groups.)

- By facilitating the preparation and submission of journal articles for their publication, especially through the availability of science editors who could interact with the authors (especially doctorate students and junior scientists from developing countries).
- By organizing a very visible and attractive closing event in each key basin at the end of the phase one of CPWF to disseminate research results and create opportunities for researchers to meet national and regional decision-makers.

8 INTELLECTUAL PROPERTY ISSUES

Please note any significant IP issues that may have arisen in the reporting period.
Nothing to mention here. All the models, and even the CORMAS simulation platform used in this project are freely available.

9 HIGHLIGHTS OF YOUR WORK THIS YEAR

1. What elements of your work this year do you want to highlight for inclusion in scientific reports that are produced by the CPWF (particularly the synthesis reports that capture your work from perspectives of the new understanding you are contributing to research, the impact for the basins which you work in, and the implications for other basins.)

The demonstration of the relevance of the collaborative modelling approach proposed by this project at the Lingmuteychu site in West Central Bhutan where a "Watershed Management Committee" established at the end of the ComMod cycle managed to secure external funding to implement its first collective action plan (rehabilitation of irrigation channels and abandoned rice terraces, expansion of community forest areas in the upper catchment, etc.)

2. Other than the research being undertaken, are there any project management techniques – including partnerships that would not otherwise have happened, influence on the priority setting process within your institute, closer contact with a farming community, a different way of interacting with end users, access and management of funds, that you have used as a result of being contracted under the CPWF that would not have been possible under other programs? Positive / negative.

The fact of being contracted with CPWF provides legitimacy for the partners of this project. The methodology proposed is innovative. Being "validated" by CGIAR (through the CPWF) sends the message that this research is recognized as "applied research" in the area of people-centered renewable resource management.

(One page only for your responses please to the two sections. Note that we use this information for various reports to committees, for briefing donors, and other communications activities).

10 STATUS OF EXPENDITURES AND RECEIPTS TO DATE (US$)

10 (a) Expenditures

You are required to report expenditures against your summary budget. Please edit the spreadsheet below by adding your total agreed budget and allocating the funds received to date (see question 9 (b)) against the appropriate line item.

			COST IN US DOLLARS		
Budget Item Code			**Total Budget**	**Expenditures to date**	**Balance Available**
CONTRIBUTED FUNDS					
1		**MATCHING FUNDS**	260 339,00	213 775,48	46 563,52
RESOURCES REQUESTED FROM THE CHALLENGE PROGRAM ON WATER AND FOOD					
2		**PERSONNEL RENUMERATIONS, TRAVEL AND ACCOMMODATION**			
2,1		**PERSONNEL COSTS**			
2.1.1		**Project Leader**	20 000,00	6 667,00	13 333,00
2.1.2		**Principal investigators (International)**	68 100,00	-	68 100,00
2.1.3		**Principal investigators (National)**	104 800,00	45 935,33	58 864,67
2.1.4		**Consultants**	13 665,00	200,36	13 464,64
2.1.5		**Support Staff**	9 150,00	3 513,69	5 636,31
2,2		**TRAVEL AND ACCOMMODATION**			
2.2.1		**Project Leader**	45 500,00	14 363,90	31 136,10
2.2.2		**Principal investigators (International)**	19 425,00	19 832,64	(407,64)
2.2.3		**Principal investigators (National)**	33 000,00	5 503,66	27 496,34
2.2.4		**Consultants & Support staff**	2 475,00	-	2 475,00
2.2.5		**Other project participants**	-	-	-
3		**RESEARCH OPERATIONAL COSTS**			
3,1		**EQUIPMENTS**			
3.1.1		**Office equipment**	10 220,00	9 038,97	1 181,03
3.1.2		**Laboratory equipment**	-	-	-
3.1.3		**field equipment**	10 700,00	1 485,90	9 214,10
3.1.4		**Other equipment**	-	-	-
3,2		**COMMUNICATION COSTS AND CONSUMABLES**			
3.2.1		**Communication expenses**	720,00	92,33	627,67
3.2.2		**Office supplies**	15 900,00	3 956,38	11 943,62
3.2.3		**Laboratory supplies**	4 600,00	-	4 600,00
3.2.4		**Field research supplies**	20 000,00	2 178,00	17 822,00
3.2.5		**Other services (please specify)**	-	-	-
		TOTAL OF 2 & 3	378 255,00	112 768,16	265 486,84
					-
4		**MISCELLANEOUS**			-
4,1		**CONTIGENCY (3%)**	11 347,65	1 824,05	9 523,60
4,2		**OVERHEADS**	45 699,00	19 132,29	26 566,71
4,3		**Others (please specify)**			
		TOTAL REQUESTED FROM THE CPWF	**435 301,65**	**133 724,50**	**301 577,15**
GRAND TOTAL			**695 640,65**	**347 499,98**	**348 140,67**

10 (b) Receipts

1	Total project budget (a)	435 301,65 $	
2	1st payment received & date	32 858,00 $	30/11/2005
	2nd payment received & date	49 289,00 $	05/12/2006
	3rd payment received & date	149 022,00 $	06/09/2007
	(insert more payments as appropriate)		
3	Total funds received to date (b)	231 169,00 $	
4	Balance of budget remaining (a – b)		204 132,65 $

10 (c) Matching Funds

Name of Institute	Type of support	Is this as agreed, or are there deviations	Risk to project in the case of deviations
CIRAD, Montpellier, France	Research personnel	As agreed. No deviation.	

10 (d) General Overview

Comment on expenditures compared with project progress - is it on track?	(state any deviations, action taken, any risk to the project) As in 2006, the project expenditures were less important than planned in 2007. Like in the previous year, the main reason was the linkage established, at the request of the French donor, between this project and the complementary EU supported Asia IT&C Ecole Commod Project. As mentioned above, having a second project funded was a mandatory condition to get the funds from Echel-Eau. At the beginning of the PN25 Project, when the signature of the MOUs with the partners and the disbursement of the first payments were much delayed, we were fortunate to have access to funding from the Asia IT&C Ecole Commod Project to get field activities started at several sites. The Ecole Commod Asia IT&C Project was terminated on 31December 2007 and we anticipate much more expenditures under PN25 Project in 2008. Nevertheless, the project partners would like to plan the use of the remaining financial resources over the next 2 years (2008 & 2009), as stated in the request for project extension sent to CPWF management in march 2008, in order to be able to accompany all the project Ph.D. students until the completion of their dissertations and to have the possibility to deliver better quality products and joint publications.
Comment on time spent compared with project progress - is it on track?	(state any deviations, action taken, any risk to the project) Yes.

11. CPWF ASSESSMENTS *

Assessment *	Basin Coordinator				Theme Leader				Managing Center Administrator				Consolidated assessment	
	1	2	3	X	1	2	3	X	1	2	3	X		
Is the Project contributing quality outputs towards Basin and Theme priorities?														
Have you verified the progress and dissemination reported?														
Is the Project working according to its plan?														
Is the project sufficiently focused on CPWF objectives?														
Does the project demonstrate a new research approach in the spirit of CPWF?														
Are provisions for stakeholder and end user involvement adequate?														
Are provisions for addressing gender issues adequate?														
Are provisions for addressing environmental issues adequate?														

It is important that you provide feedback to the project leader on any actions suggested to resolve any inadequate assessments as well as observations and comments regarding progress to date and any technical, management or dissemination issues that you would like to provide. These should be provided to the project leader by the Managing Center. A separate page is provided for you to provide these comments.

* Assessment: (1) Good: a high standard of work; (2) Adequate: an acceptable standard of work, but improvements are possible; (3) Inadequate: this aspect of the project is not up to standard and must be improved; (X) Not known.

RECOMMENDATION TO CPWF SECRETARIAT: SATISFACTORY / UNSATISFACTORY / TERMINATE

Is there a need to change the plan of the project. If so, why and how?

Comments to Secretariat from Managing Center to support this recommendation (optional):

Feedback Comments from the Theme Leader to be provided to the Project Leader by the Managing Center

Feedback Comments from the Basin Coordinator to be provided to the Project Leader by the Managing Center

Note: the space available here for comments is not meant to be restrictive – use as much space as necessary

Predicted Outputs of the CPWF Phase 1		**Contributing projects**																				
Themes and priority areas	**Project outputs**									**Andes**	**Indo-Gang**	**Karkheh**	**Limpopo**	**Mekong**	**Nile**	**Sao Fran**	**Volta**	**Yellow**	**Other**
Crop water productivity improvement Theme																			
Plant breeding for water-efficient and stress-tolerant crops	First generation of aerobic rice germplasm	16									X			X				X	X
	Improved drought tolerant varieties of various crops	2	6												X		X		
	New salt-tolerant breeding lines and varieties	7									X			X	X				
Water-saving farm practices	Improved rice-based cropping systems	11	10											X					
	Technologies for improved crop-water-nutrient management	1	5	30								X					X		
	Crop production risk management strategies	6	37	8	12								X						
Need-based water supply	Tools and methods for quantifying water quality	15	38	51	10								x		x		x		
	Integrating multiple uses of water	28	35	8							x			x					
Policies and institutions	Strategies for enhanced adoption of drought-tolerant crops	1	2	5	37						X		X	X	X				
	Institutional and policy options for improved crop water productivity	1	5	12								X							
Water and people in catchments Theme																			
Examining water and poverty in upper catchments	Methods of assessing diversity and dynamics of livelihoods	24	20	25								X							
	Impacts of payment of environmental services on poverty	22								X									
	Options for enhancing forest and water-based livelihoods	23									X								
Identifying the basis for increasing the provision of adequate water	Guidelines for allocation of wetland resources	30											X						
	Options for integrated forest and water management	23	37	8	20	46						X	X						
Enabling change	Guidelines for multiple use water supply systems and water sharing	28	8	25	46					X	X		X	X	X				
	Improved agroforestry methods to enhance farmers' income	23	20										X		X		X		
Generating knowledge	Guidelines for multiple use water supply systems	28	37							x	x		x	x	x				
	Impact of QSMAS on farmer's income	15	20										x		x		x		
Aquatic ecosystems and fisheries Theme																			
Policy, institution and governance	Institutional mechanisms for integrating fish and crop production	35									X			X					X
	Policies for sustainable fisheries	34	36	52	10										x		x		
Valuation of ecosystem goods and servcies,	Strategies for improving wetland-based livelihoods	30											X						
	Trade-off analysis tools	30								x	x								
Improving water productivity of aquatic ecosystems	Methodologies for assessing water productivity in fisheries	35									X			X					X
	Strategies for management of reservoir fisheries	34	35	36	46						X					X	X		
	Methodologies for integrating fish and crop production	35	10								X			X					X
Integrated basin water management systems Theme																			
Integrated decision support tools and information	Livestock and environmental decision support systems	37	10	30	12										X				
	Water allocation and management negotiation tools	50	25											X					
	Reservoir planning and management tools, incl. fisheries	36	46							X	X		X			X	X		
Innovative technologies and management strategies	Strategies to reduce health risks associated with urban agriculture	38	51														X		
	Technologies and management practices for optimal water allocation	30	8	12	20	46							X		X		X		
Effective policies and institutional mechanisms	Institutional arrangements enhancing basin level water productivity	23	47	10	8	12	25	46		X			X			X		X	X
	Institutional models for basin level natural resources governance	17	40	47	50	42				X	X		X		X		X		
The global and national food and water system Theme																			
Globalization, trade and macroeconomic and sectoral policies	Production input and output pricing policies	1	5							X		X		X	X		X		X
	Environment, water and agricultural policies that enhance water productivity	35	37	52	20							X		X			X		
incentives, investment and financing	Investment opportunities in informal irrigation	38									X						X		
	Option for investments in inter-basin water transfers	48									X								
Transboundary water policy and institutions	Options for enhancing transboundary water governance	17	40	47	50	42				X	X		X		X		X		
	Options for transboundary cooperation	50												x					
Adapting to changes in the global water cycle	Adaption strategiest to global change	53									x		x		x				
	Policy analysis tool for adapting to global change	53											x		x				

Stakeholders' perceptions of water dynamics and collective learning at the. catchment scale (ComMod). The objectives of the project were: (1) develop. multi-agent simulation tools for facilitating collective assessment of water. management problems; (2) build capacity to apply those tools; and (3) partici-. patory construction of concrete propositions to increase water productivity. ComMod was implemented in three upper and three lower sites of the Mekong. Basin and in three upper catchments in Himalayan highlands in Bhutan. A. range of water management challenges were encountered in thos Integrated catchment management (ICM) is an approach to sustainable land and water management, recognizing flow-mediated connections through catchments and the need for interdisciplinary and community-based collaboration (Commonwealth of Australia, 2000; Falkenmark, 2004; Jakeman and Letcher, 2003; Kattel et al., 2016).Â The key features of the ICM approach are that it: (1) seeks to find the proper balance between humans and the impacts that their activities cause to ecosystems; (2) does not consider land, water, and biodiversity management as separate activities; (3) facilitates dialogue between scientists, stakeholders, and policy makers; (4) supports coordinated actions across levels of government and nongovernment organizations; and (5) regards. â˜' Multidisciplinary â˜' Annual meeting, electronic list, working groups, collective publications, special issues in journals, organisation of workshops, training courses, etc.Â - Individual and collective learning Only tackle possible thematic: land uses, water allocation, biodiversity, conflicts over uses (agriculture/livestock farming/forestry), tension between farming production and resource conservation, urban/rural, etcâ€¦. B1 - The Mandate, the initial question. Two types: - Collectively improve knowledge - Facilitate decision-making process Formulating the question, understandable by all stakeholders - Preliminary dialog - A clear question motivating all participantsâ€¦Â Learning theory Stakeholdersâ€™ perceptions of: - the problem - other stakeholders - possible solutions.