ICIMOD

Australian Government
AusAID

Koshi Basin Programme – Phase I

Project Design Document

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Contents

Figures and Tables

1. Introduction

Contemporary global and regional climate and other environmental and socio-economic changes pose immense challenges to water resources management in the Koshi river basin (shared between China, Nepal and India) due to its transboundary nature and high spatial and temporal variation of resource endowment, and upstream-downstream linkages (high degree of interrelationship among water uses and users). ICIMOD, with funding support from the Australian Agency for International Development (AusAID), organized a three-day Inception workshop to share the objectives, expected outcomes, strategic approach, and develop details of the activities and impact pathway and tentative work plan of the Koshi Basin Programme (KBP) currently being implemented in partnership with international, regional and national partners.

This report contains the proceedings of the inception workshop and provides refined visions, outputs, strategic approaches and outline of the activities based on the outcomes of the inception workshop.

1.1 Research and policy-oriented questions

The key research and policy-orientated questions for the KBP are:

1. How changes in climate, monsoon, glacial/snow melt and land use will affect the sediment and hydrological regime?
2. How water induced hazard frequency, magnitude and exposure will change due to climate, land use and other change drivers?
3. How to ensure water security, natural water storage and efficient water use for agricultural, domestic and other uses under current and projected climate variability, and given a range of uncertainty?
4. How vulnerable are the different communities and social groups, and what are their adaptive capacities to drivers of change?
5. What is the status of, and livelihood dependence on, ecosystem services?
6. What are the key requirements for existing water and ecosystem policies and institutional capacity to enable better integration of trans-boundary water management into country's overall development agendas?

1.2 Vision

The vision of KBP (*What should the basin be like*?) is

The water resources in the Koshi Basin are developed and managed in a regionally coordinated manner for the wellbeing of the people and considering the sustainability of ecosystem services.

1.3 Goal and Objectives

The goal of KBP (*What do we want to do*?) is

to contribute to inclusive poverty reduction in the Koshi Basin by evaluating the range of possible water related development pathways through evidence based decision making and basin-wide cooperation considering climate change, hazards and the provision of sustainable freshwater ecosystem services.

There are three objectives (*What can we achieve*?), which will be achieved through the implementation of five core components and two supporting components:

Objective 1: Development of **new policy relevant knowledge on how climatic and socio-economic drivers impact on ecosystem services and livelihoods of dependent populations.** The development of a sound knowledge base in the natural and social sciences is essential to support decision and policy makers in implementing evidence-based interventions (Components 1, 2 and 3).

Objective 2: Develop and test **actionable adaptation pilots and livelihood strategies considering their efficacy and acceptability by various socio-cultural and gender groups** to address increasing impacts on ecosystem services and socio-economic situation at local, national and regional scales; Adaptation and livelihood strategies must both be appropriate to particular geographic and socio-economic settings as well as being demonstrably worthwhile to target communities, especially from a gender lens (Component 4).

Objective 3: Contribute to developing an **enabling environment for policy and decision makers** to create **integrated**, innovative, equitable, inclusive and effective **responses** to protect and manage river basin ecosystems and to reduce poverty in the frame of integrated natural resources management and **improved basin-wide cooperation**. **Capacity building** at all levels is needed to support communities and institutions so that integrated responses, such as IWRM, can be developed effectively (Component 5).

Core components

- Component 1 – Basin-wide knowledge base of institutional, socio-economic and biophysical context (Knowledgebase)
- Component 2 – Climate and hydrological impacts of water availability and agriculture (Climate-Water-Agriculture-Hydropower)
- Component 3 – Water-related hazards (Water hazards)
- Component 4 – Adaptation & Livelihood Promotion (Adaptation and livelihood)
- Component 5 – Integrated responses through improved basin-wide cooperation and capacity building (Integrated responses)

Supporting components

- Component 6 – Knowledge management and outreach
- Component 7 – Programme management

Expected outcomes

Outcome 1. Improved access to and use of **a** basin-wide knowledge base on change drivers, their impact on freshwater ecosystem services and existing responses.
Outcome 2. Improved evidence based decision making for climate change impacts on water availability and agriculture through the use of downscaled climate and hydrological models by national agencies.
Outcome 3: Communities and implementing agencies have an improved understanding and adopt good practice for water-related hazard risk management.
Outcome 4: Communities and implementing agencies adopt inclusive and equitable adaptation strategies to address existing and future drivers of change.
Outcome 5: Improved basin-wide cooperation and enhanced capacity for policy and decision makers to implement sustainable management of freshwater ecosystems.

1.4 Analytical framework and approach

The KBP will approach river basin management through a mix of scientific, economic, social and ecological knowledge, and decision support to promote the sustainable use of transboundary water resources, and to clarify trade-offs relating to development. Particular emphasis will be placed on developing options for water management at the basin level by identifying 'win-win solutions' which could be supported by all basin countries.

1.4.1 Approach

The approach of KBP within the analytical framework will consist of a logical and practical set of processes to lead to practical outputs in the form of basin water development strategies, plans and activities, and improved communication and decision making. This will ensure that the decisions are based on a clear and logical flow of thoughts and actions. Four main phases of the approach are:

- *Visioning phase* - develop a shared understanding of how the stakeholders and partners would like the water resources development and management to be in the basin in the future.
- *Assessment phase* - intensive initial activity for systematic basin-wide assessment of available resources, infrastructure, demand and access considering livelihood status and trends, climatic uncertainty and system of water governance and gender aspects. Each of these system elements will have its own set of institutions, boundaries and other characteristics. The outcome of the assessment phase will create a shared common knowledge base that represents the shared understanding of stakeholders and that can be used as a basis to identify challenges that might exist on the causes, scale and severity of water-related problems and real opportunities for solving these problems.
- *Options phase* –will recognise that for any given scenario there may be different options (or combinations of options) that, in theory, will enable the vision to be achieved. Each of the options will have different levels of cost, risk and positive or negative tradeoffs associated with them. In general, assessing options against scenarios and visions using information from the assessment phase will employ specialist knowledge of modelling, evaluation and optimizing resources use. Relative merits of

various options will be assessed based on issues of: *Efficacy* (how well the actions would address basin-wide water management for livelihood promotion and adaptation, *Technical feasibility* (technical capacity of the countries to actually implement recommendations), and *Usefulness of development support* (how development support might assist in implementation).

- *Planning phase* – based on the assessed options, plans will be made in the order of priority and schedule. The level of detailing will focus on basin-level options and activities for implementation. A key challenge of producing viable, high quality plans will be to maintain the broader process of dialogue and attention to issues of social equity.

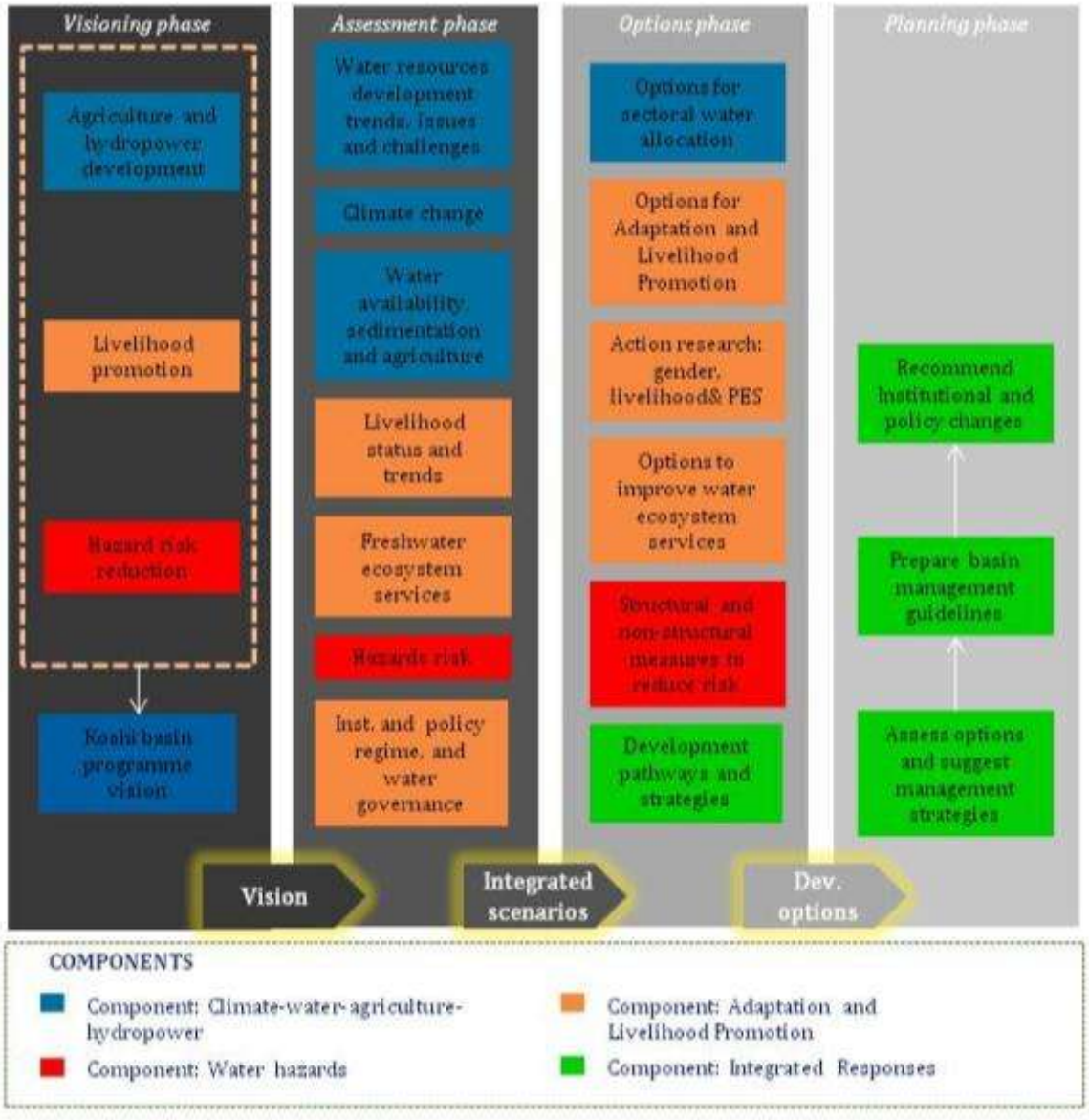


Figure 1 Analytical framework

1.4.2 Special issues

- *Information quality and accessibility* – consolidation and quality control of information is critical to reach a common understanding amongst stakeholders of the key political

and institutional processes that determine water-related decision-making. A system of managing water-related information that is freely accessible to stakeholders will be developed and maintained, while acknowledging and safeguarding nationally sensitive data management issues.

- *Scale, boundaries and institutions* – spatial and temporal boundaries for information collection, assessment and options can be physical or institutional, for example basin boundaries, watersheds or administrative units. The temporal boundaries are the time limits (both past and future) for considering key trends. It is proposed that 2010 be taken as baseline year for all analysis when appropriate. The hydrological and climate variables can be analysed at a monthly time-step. Analysis related to climate forecasting will extend to year 2100. While the focus of analysis will be primarily at basin level, it will be important to conduct action research of lower levels (e.g. watershed) to be able to make judgements regarding, for example, upstream and downstream impacts and dependencies.
- *Tradeoffs and conflicting interests* - decisions on whether (or which) tradeoffs are acceptable are typically political in nature. However, good communication, and good planning can reduce the scale and cost of a trade-off and will be emphasised for transparent decision making.
- *Adaptive management* - the dynamic nature of physical processes and societal responses related to water management and the great variability between years and areas poses a great challenge. Uncertainty related to availability of resources, the condition of infrastructure and user demand is changing continuously. The KBP will adopt a flexible planning approach backed by developing and maintaining basin-wide knowledge management system to allow necessary revision and upgrading of plans and activities.

1.4.3 Action research and showcase programmes

Action research and showcase programmes will be carried out to improve understanding of the impact of water and risk management on people and livelihood and propose structural and non-structural measures for water storage, community adaptation strategies against different climate change and socio-economic scenarios, and minimise the livelihood shocks due to climate and hazard related uncertainty. Special focus will be given to issues of **gender and inequality** and links to drivers of change and river basin management, and potential for **incentive based mechanism** to improve water use efficiency and productivity.

The Action research and showcase programmes will be conducted on sites that represent:

1. Significant (and contrasting) projected temperature and precipitation change
2. Current biophysical and agro-ecological gradient and anticipated land use pressure
3. Current (and/or future) socio economic and (where relevant) demographic gradients, including gender participation in livelihood system
4. Different institutional (e.g. land tenure) arrangements and governance history
5. Existence of significant good historical hazard, hydro-climatic, agricultural production, socioeconomic and demographic data relevant to agricultural production system
6. Need for innovative solutions to reduce poverty and build resilience to climate change

The sites will be selected in phases.

1. Desk-based study - consisting of literature review, data mining, image analysis – will be carried out to preliminary identify a set of sites in three Koshi countries. Furthermore, additional "paired sites" may be identified later in Phase-I where projected climate change in 2050 matches well with the selected sites' climate.
2. Baseline survey – will be conducted during Jan-June 2013 in the identified sites, in parallel with a basin-wide assessment, to gather baseline information on basic indicators related to household water demand and use, livelihood/ agriculture/ natural resource management strategies, needs and uses of climate, water and agricultural related information and current risk management and adaptation practices. ICIMOD will develop the survey methodology and sampling framework in coordination with the partners. The ICIMOD survey teams will work closely with partners in the field.

2. Refinement of Programme Design

2.1 Review of KBP Vision, Goal and Objectives

The water resources impacts from economic, social and climatic drivers were well recognised during the Inception Workshop, as was the need for regional perspective to basin water management approaches, infrastructure options and institutional capacity, in order to adapt to the uncertainty of a changing environment. The required response should constitute robust basin-wide analyses of multiple development options and trade-offs through trans-boundary scientific and technical cooperation, and thus these key elements are included in the refined KBP vision, goal and objectives (*see* Sec 1.2 and 1.3). The KBP component-wise visions are stated in the following sections.

2.2 Revised KBP Governance

The organization and management is based on the premise that the Koshi countries (China, Nepal and India) have full engagement of the programme and ICIMOD will facilitate the process of planning and basin-wide implementation which is described in detail hereafter. In its facilitating role, ICIMOD will be responsible for the coordination of the implementation by setting up a Programme Management Unit (PMU). The advisory role will be vested with the Programme Advisory Committee (PAC) in which the Koshi countries will be represented through operational and/or strategic partners.

2.2.1 Programme advisory committee (PAC)

The PAC will be the highest advisory body of the Programme. Its role will be to ensure Programme coherence and oversee Programme policy, strategy, and implementation. It will undertake the following responsibilities.

- Determine Programme policies and strategies
- Mediate different interests among Koshi countries and facilitating agencies
- Approve the Programme implementation plan
- Approve annual work plans, budgets and reports
- Approve changes to the Programme implementation manual
- Evaluate Programme progress and impacts
- Provide a communication channel with regional bodies and other national, regional and global organizations as required
- Seek consensus with higher national authorities as required
- Facilitate the development of follow-up phases of the current Programme phase 1 on the basis of progress made and emerging needs.

- Facilitate the development of complementary Programme proposals in line with national and regional interest of countries.
- Facilitate the development of a contingency plan for post-Programme operation and maintenance of the technical Programme outputs and for post-Programme co-ordination.

The PAC will consist of representatives of international and national experts, and will be serviced by the ICIMOD-based Programme Management Unit (PMU). To ensure the effectiveness of the PAC, annual meetings will be held. As an important part of its activities, the PAC will prepare detailed proposals for further phases of the Programme and in particular with regard to Action research and Piloting. The proposed composition of the PAC is as follows.

Chair	• Director of Program Operations, ICIMOD
PAC member secretary	• Programme coordinator, Koshi BP, ICIMOD
AusAID	• First Secretary, AusAID Delhi
CSIRO	• Director, Water for a Healthy Country Flagship
China	• Representative, CAS-IGSNRR/ CAS-IMHE
Nepal	• Representative, WECS
India	• Representative, NIDM

2.2.2 Programme Management Unit (PMU)

The ICIMOD based PMU will act as a focal point to coordinate the Programme activities, foster regional cooperation in basin-wide knowledge sharing, and provide a forum for exchange of expertise. The PMU will meet on a quarterly basis, The PMU responsibilities are outlined below.

- Act as a focal point to implement and coordinate the Programme activities
- Monitor and report on Programme progress in a timely manner
- Provide all services (training, on-going assistance and advice, etc.) which are not provided under other arrangements
- Foster regional technical and professional cooperation for river basin management
- Provide a forum for exchange of expertise and knowledge

The proposed composition of the PMU is:

- Programme coordinator, ICIMOD
- Assistant programme coordinator, ICIMOD
- Programme manager, Basin Management Programme, ICIMOD

2.2.3 Strategic Partners

The strategic partners are institutions from the region (or active in the region) that are recognized and influential in a domain of excellence relevant to the KBP. They represent the state-of-the-art-knowledge in designing and implementing policy-oriented research and, as such, have developed a strategic vision of the issues at stake.

The strategic partners have been involved in the Inception Workshop, thus contributing to the programme orientation, the clarification of its focus and priorities, and inputs for its operationalisation. Beyond a strategic perspective, the programme will interact with the strategic partners, in particular because they may also contribute to the programme outreach and visibility. In the course of programme implementation, strategic partners will be invited to provide support, backstopping, and quality assurance of the work and findings.

2.3.3 Operational Partners

The KBP will engage with Partners who will take key implementation responsibility in the Programme, be it at regional or national level. Work under the different components will be organised through operational partners. Operational partners will be identified for each of the components to carry out in-country or regional activities. ICIMOD through the Programme Management Unit will play a central coordination and capacity building role to ensure the smooth implementation of programme activities through the operational partners.

2.2 Component 1 – Knowledgebase

2.2.1 Revised Outputs, Strategic Approach, Activities and Deliverables

Short title

Knowledgebase

Outcome 1

Improved access to and use of a basin-wide knowledge base on change drivers, their impact on freshwater ecosystem services and integrated responses

Outputs

1.1. A continuously updated basin-wide knowledge base, decision support system and a web-based information sharing platform to support river basin management; and
1.2. A thematic baseline report on the institutional, socio-economic and bio-physical characteristics of the Koshi basin including current adaptive capacity and strategies.

Strategic approach

1. Koshi Knowledge network – Anchored within a common baseline assessment framework the KBP will work with partners to collect and collate data and information on the following key themes: Climate Change, Water Resources, Land Resources, Socioeconomics, Environment and Policy and institutional setting; and
2. Web based information system - for systematic storage, retrieval, exchange and analysis of relevant information (e.g. documents, atlases, data, maps, etc.) and from where users can get information from and contribute to it from different locations based on agreed data exchange mechanism.

Activities

1.1 Develop the baseline assessment framework following a DPSIR analytical approach to anchor the data collection and analysis activities, and enhance overall programme integration

1.2 Define human and natural drivers and pressures - Climate Change, Water Resources development; Water Resources management; Water hazard risk: causes, proclivity management; Land Resources: LULCC; Land Resources: Watershed and forest management; Environment: Standards and guidelines; Socio-economics: Country and sub-basin socio-economic profiles; Socio-economics: Water-related investment; Socio-economics: Gender, Socio-economics: Benefit sharing mechanisms; Policy and Institutions

1.3 Describe current state of and impact of environmental changes on the ecosystems and livelihood - Water Resources: status and trends; Climate Change impact on water resources; Land Resources: degradation assessment; Environment: status and trends; Socio-economics: determinants of water productivity in agriculture; sensitivity to climatic variability; Policy and Institutions: capacity development)

1.4 Describe the planned and autonomous (including traditional knowledge) responses currently being adopted by government and communities – Climate Change: Current adaptation practices; Policy and Institutions: Climate change policy; Policy and Institutions: IWRM and access to ecosystem services by vulnerable communities and investment

1.5 Explore Options for coupling a basin-wide hydro-agro-economic - energy model

1.6 Define the database infrastructure and develop GIS Schema

1.7 Develop web-based information to support river-basin scale planning and management

Deliverables

1. Year 1 - Web-based river basin information system containing baseline data and information
2. Year 1 – Draft baseline report prepared for consultation
3. Year 2 - Publication of baseline report
4. Year 2-4 – Continuous updating of information system

2.3 Component 2 – Climate-Water-Agriculture-Hydropower

2.3.1 Vision of Component 2

A regional coordinated approach to water resources development and community practices guided by climate-hydrology-agriculture-hydropower information/tools shared by governments and communities and adopted for energy and food security in the Koshi basin

2.3.2 Revised Outputs, Strategic Approach, Activities and Deliverables

Short title

Climate-Water-Agriculture-Hydropower

Outcome 2

Improved evidence based decision making to address issues of water availability for agriculture and energy security considering climate change

Outputs

2.1. Downscaled climate scenarios for sub-basin and catchments
2.2. Comprehensive hydrological model
2.3. Flexible hydrological-agriculture models
2.4. Decision Support System
2.5. Options for agriculture and hydropower development under different hydro-climatic scenarios

Strategic Approach

1. Align the project with basin development planning by engaging multiple stakeholders during the programme and through capacity building activities
2. Advocate with key stakeholders the importance of collecting additional data for multiple purposes and value adding to the data collected
3. Engage key people from regional countries in the model development

Activities

2.1 **Assess current knowledgebase** on water availability and agricultural practices including cropping, land, water (surface/groundwater), agronomic inputs and labour use patterns

2.2 **Model climate and LULC change effect on the hydrology** - Set up a combination of suitable hydrological and hydrodynamic models of the basin considering description of major infrastructures (diversions, storages, etc.) and Cryospheric processes in the Upper catchment.

2.3 **Generate water availability scenarios** at sub-basin level based on the calibrated and validated model for the baseline and future climate and agriculture scenarios;

2.4 **Construct future water resources development scenarios** in the model;

2.5 **Produce water demand scenarios** - considering historical trends and development plans. The demand should delineate between major water use sectors (agriculture, water supply and sanitation, industry, energy, ecosystem etc.);

2.6 **Impact assessment** – based on the water availability and demand scenarios, assess the hydrological impact on major water use sectors (agriculture, water supply and sanitation, industry, energy, ecosystem etc.);

2.7 **Adaptation options identification and proposal** - review and analyze integrated water resources development and management policy frameworks and strategies, and local institutional capacity, political commitment, and preparedness for to respond to change in a bid to minimize identified adverse impacts and identify a set of adaptation options and prioritized proposal for piloting the adaptation options potentially applicable for the basin taking into account natural/physical conditions and institutional capacity and effectiveness on economic, social and environmental grounds

2.8 Couple hydrological and climate scenarios and socio-economic, including infrastructure development

2.9 Develop a comprehensive Decision Support System capable of analysing a number of natural and socio-economic development options and tradeoffs; Build the capacity of the partners in the use of DSS.

Deliverables

1. Year 1 – Baseline data and information on climate, climate change, cryosphere, hydrology, water use, agriculture, identification of data and information gaps
2. Year 2 – Climate scenario, coupled hydro-agriculture-economic model
3. Year 3 Agricultural and energy adaptation options
4. Year 3-4 – Decision Support System, web portal, training manual and training events

2.3.3 Communication, outreach, actor engagement strategies

This component will aim to engage key ministries/departments and research institutes involved in climate, hydrology and agriculture management in the Koshi basin.

Strategies are needed to communicate and engage key stakeholders during the lifetime of the programme that result in changes in practice needed to achieve the KBP vision. Based on the Outcome Logic Models developed in the Inception workshop Table 1 outlines the strategies required to ensure key stakeholder engagement in Component 2 and to achieve the vision. This table also identifies any changes to activities/deliverables required to implement these strategies.

Table 1 New engagement strategies to achieve Component 2 vision

Actor(s)	***Strategies***	***To achieve what?***	***Changes***
Agriculture departments/ministries	• Align the project with development planning • Engaging multiple stakeholders throughout the project • Capacity building and social inclusion • Piloting model driven agricultural solutions	• To know where and what to crop • Improvement of irrigation systems • Skills in using the DSS • Trusting the DSS • DSS supporting land use policy	Flexible hydrological (agriculture) models of the Koshi basin Options for agriculture under different climate scenarios • DSS • Identify viable irrigation areas and their future demand • Providing knowledge to support policy development
Hydro/met departments/ministries	• Find funding for data collection and instrumentation • Convince them of the value of collecting additional data for multiple purposes • Value adding to the data collected	• Collecting new and improved data that reduces model uncertainty • More women with climate and hydrological modelling skills • Acceptance of modelling as being a useful tool for	Downscale regional climate scenarios for sub-basin catchments Flexible hydrological models of the Koshi basin • Training in the use of models • Guidance and installation to improve the

		planning	monitoring network
Water resource departments/ministries	• Engage key people from regional countries in the model development process • Communication strategy • Expectation management	• Commitment for regional cooperation • Understanding of the value of hydrological models for planning • DSS supporting water policy development	Flexible hydrological models of the Koshi basin • Regional knowledge sharing workshops • Providing knowledge to support policy development
Research organisations and NGOs	• Evidence based understanding of the basin • Use of a common and consistent data set • Improved skills in using climate and hydrological data	• Get agreement to share model input data to public • Provide a service to support access to model output data	• Provide web based outputs from climate models • Provide web based outputs from hydrological models • Provide web based data sets used to develop the models

2.4 Component 3 – Water Hazards

2.4.1 Vision of Component 3

Reduced risk to communities and infrastructure in the Koshi basin from water hazards and climate extremes through enhanced capacity development and appropriate institutional frameworks for social and gender sensitive policies and practices, and improved transboundary cooperation in early warning systems.

2.4.2 Revised Outputs, Strategic Approach, Activities and Deliverables

Short Title

Water Hazards

Outcome 3

Communities and implementing agencies have an improved understanding and adopt good practice for water-related hazard risk management

Outputs:

3.1. Koshi basin flood and drought information system, as part of the parent Koshi web-GIS, to facilitate sharing of data on the spatial and temporal prevalence of water related hazards.

3.2. Hazard assessment: use historical and project generated data to reduce hazard risk, scenario analysis and mapping with special emphasis on glacial lake outburst floods.

3.3. Case studies of good practices in water-related disaster risk management and water-related hazards, their underlying causes and management

3.4. Capacity building plan outlining the training and capacity building required to help mandated government agencies and other relevant actors implement Koshi basin development plans with inclusion of hazard mitigation component

Strategic Approach

1. Development of common criteria and framework for holistic hazard, risk and vulnerability assessment and data sharing
2. Creation of regional platform with three national governments for cooperation in hazard management activities in the Koshi basin.
3. Study and analyse national policies and regional/bilateral agreements to advocate and promote favourable amendments for basin wide hazard mitigation.
4. Learn from each other, jointly develop social and gender inclusive resilience and adaptation framework

Activities

3.1 Develop and test pilot Koshi flood and drought information system
3.2 Catalogue best practice on gender sensitive and inclusive approaches to DRR & livelihood
3.3 Water hazards mapping (Floods, GLOF, debris flow, landslides, droughts) and hazard scenario analysis
3.4 Review and case studies of early warning system for all hazards, community response strategy and good DRR practices
3.5 Action research and pilots on climate smart community based DRR approaches
3.6 Review policies, practices and develop policy briefs (trans-boundary cooperation in Hazard risk reduction in the Koshi basin)
3.7 Develop policy papers from good practice case studies and strengthen early warning systems and gender sensitive and inclusive DRR practices.

Deliverables

1. Years 1-4: Annual progress reports of Component 3 activities
2. Years 1-4: Reports of capacity building, exposure visits, workshops and meetings
3. Year 1: Baseline data and information; Report on water hazards
4. Years 1-2: Hazard assessment analysis reports
5. Year 2: Report on good practice for water hazard risk management
6. Year 3: Report on detailed case studies with management recommendations
7. Year 4: Strategic road map for future hazard risk reduction in Koshi basin
8. Year 4: Strategic recommendations for up-scale activities beyond project period3.4.3

2.4.3 Communication, outreach, actor engagement strategies

This component will link with on-going hazard management and trans-boundary data sharing initiatives of ICIMOD and other institutions in the region (e.g., HYCOS, Satellite data sharing). The component will create a regional platform with three national governments for cooperation in hazard management and exchange of lessons and experience of hazard risk management activities in the Koshi basin. Further, the component will facilitate regular communication and exchange of information among partners through a web based platform and explore opportunities for exchange visits and capacity building with the help of centres of excellence.

Strategies are needed to communicate and engage key stakeholders during the lifetime of the programme that result in changes in practice needed to achieve the KBP vision. Based on the Outcome Logic Models developed in the Inception workshop Table 2 outlines the strategies required to ensure key stakeholder engagement in Component 3 and to achieve the vision.

This table also identifies any changes to activities/deliverables required to implement these strategies.

Table 2 New engagement strategies to achieve Component 3 vision

Actor(s)	*Strategies*	*To achieve what?*	*Changes*
DRR agencies, National planning agencies, Water resources departments	Linking with on-going prospects (e.g., HYCOS, Satellite data sharing) and increased consultative meeting with China / Government of Tibet and India / Government of Bihar	Change in perception towards a basin wide approach and cooperation for data sharing and participation in regional initiative	Data Sharing Joint activities Capacity building Exposure visits
Nepal: WECS, DHM, DoLIDAR, MOLD	Consultative meetings and capacity building activities to create proactive linkages with DHM, DWIDP and MOLD within a hazard mitigation perspective	Greater integration and harmonisation of DRR roles and responsibilities in Nepal	Consultative meetings and capacity building activities

2.5 Component 4 – Adaptation and Livelihood Promotion

2.5.1 Vision of Component 4

Effective adaptation to climate change and livelihood promotion in the Koshi Basin through identification and development of livelihood options and practices that sustainably use basin resources and are sensitive to socio-cultural and geophysical context

2.5.2 Revised Outputs, Strategic Approach, Activities and Deliverables

Short title

Adaptation and Livelihoods

Outcome 4

Communities and implementing agencies adopt inclusive and equitable adaptation strategies to address existing and future drivers of change

Outputs

4.1. Vulnerability assessment of the Koshi basin and systematic review of existing adaptation strategies.

4.2. The social, economic and environmental costs and benefits of upstream-downstream risk reduction measures are assessed and benefit sharing options identified.

4.3. Best practices in adaptation to climate change identified and tested with a special focus on gender sensitive and inclusive approaches

4.4. Adaptation strategies developed for a range of socio-economic, environmental, geo-spatial settings and for identified vulnerable socio-economic groups with a supporting Toolkit for implementation

4.5. Enhanced capacity for improved planning and implementation of adaptation practices and pathways

4.6. Policy level recommendations for climate proofing development plans at basin level

Strategic approach

1. Literature review
2. Stakeholder identification
3. Action research to identify and pilot adaptation activities
4. Showcase Programme - support projects that promote innovative policies, measures, and actions for sustainable water management in the Koshi Basin.
5. Stake holder consultation and exposure visits
6. Identify and promote local change champions & local knowledge.
7. Knowledge sharing workshops and capacity building

Activities

4.1 Identify vulnerable sub-basins and communities for a range of socio-economic, geo-spatial and environmental settings and explore development potentials for adaptation and inclusive development strategies.

4.2 Conduct economic valuation of water services; review national PES approaches and existing payment/incentive mechanisms and develop methodological guidelines for PES implementation with a view to integrating sustainable natural resource management with climate change adaptation activities.

4.3 Implement action research on adaptation and livelihood strategies to address food security, energy, hydropower and sustainable land use management, water storage and productivity; incentive based mechanism in ecosystem management that have policy relevance.

4.4 Implement showcase programme: structural and non-structural measures for water storage; community adaptation strategies against different climate change and socio-economic scenarios

4.5 Build response capacity at local level by mainstreaming adaptation activities in local development planning and implementation.

Deliverables

1. Year 1 – Report on basin-wide vulnerability assessment and systematic review of inclusive adaptation strategies with specific focus on up-stream and down-stream interdependence.
2. Year 3 – Documentation of local, regional and international best adaptation practices and strategies relevant for the Koshi basin with specific focus on improving water storage and water productivity, food security, and livelihood improvement.
3. Year 3 – Action research at pilot sites initiated for testing adaptation practices and pathways including integration of local knowledge.
4. Year 3 – Reports of local capacity building activities to plan and implement adaptation practices at local level in the pilot sites
5. Year 3 - Report on Gender and inequality issues in development
6. Year 4 – results of action research on adaptation measures for water storage, community adaptation across socio-cultural and geophysical contexts.
7. Year 3-4 – Policy recommendations and best adaptation practices appropriate across socio-cultural and geophysical contexts within the Koshi basin.

2.5.3 Communication, outreach, actor engagement strategies

This component will aim to engage policy makers, project implementers, civil society and district NGOs involved in adaptation and livelihood promotion in the Koshi basin.

Strategies are needed to communicate and engage key stakeholders during the lifetime of the programme that result in changes in practice needed to achieve the KBP vision. Based on the Outcome Logic Models developed in the Inception workshop 4 outlines the strategies required to ensure key stakeholder engagement in Component 4 and to achieve the vision. This table also identifies any changes to activities/deliverables required to implement these strategies.

Table 3 New engagement strategies to achieve Component 4 vision.

Actor(s)	***Strategies***	***To achieve what?***	***Changes***
Policy makers government agencies	• field exposure visits • multi-stakeholder platform for dialogue and communication • evidence based learning through pilots	• evidence based decision making & collect input from civil society • Awareness of different stakeholder needs • provide input to research • adapt plans and projects based on new knowledge	• best adaptation practices and strategies • upstream-downstream risk reduction measures and benefit sharing options • policy level recommendations for climate proofing development plans at basin level
Research group and project implementers	• facilitate local, regional and global learning and knowledge sharing • facilitate collaborative, interdisciplinary research • capacity building for demand based research and communication	• demand/need based approach • improve communication of research • strengthen interdisciplinary work • better coordination and cooperation amongst researchers	• toolkits for adaptation strategies and practices • trainings and capacity building for planning and implementing adaptation practices and pathways
Civil society and district NGOs	• translate/communicate research for general public (e.g. practical manuals) • facilitate dialogue between civil society and policy makers • learning platform including social media, multi-media content • pilot implementation for evidence based learning	• gain trust of policy makers/researchers • cooperate with research to get 'message across' • better collaboration with different government agencies • use knowledge adapted to the local knowledge	• best adaptation practices and strategies piloted • toolkits for adaptation strategies and practices • knowledge sharing and learning platform • trainings and capacity building for planning and implementing adaptation practices and pathways
Civil society and district Communities	• identify, test, communicate adaptation strategies that are sensitive to the	• adopt sustainable, poverty reducing adaptation strategies • communicate and	• best adaptation practices identified, piloted and promoted • knowledge sharing and

	socio-cultural and geophysical context • facilitate forum for knowledge exchange	advocate for needs • Empowerment (focus on disadvantaged groups)	learning Platform

2.6 Component 5 – Integrated Responses

2.6.1 Vision of Component 5

Strategic roadmap for basin-wide water-related investment, building on the outputs of previous components, and supported by policy and institutional analysis, cooperation through early stakeholder engagement and capacity building, and inclusive river basin management approaches.

2.6.2 Revised Outputs, Strategic Approach, Activities and Deliverables

Short title

Integrated responses

Outcome 5

Improved cooperation and enhanced capacity for policy and decision makers to implement sustainable basin-wide management of, and investment in, the Koshi river basin

Outputs

5.1 Improved understanding of existing sustainable development policy framework

5.2 Improved understanding of institutional arrangements across multiple scales in the basin concerning implementation of IWRM principles and access to ecosystem services by vulnerable communities

5.3 Recommendations for more inclusive river basin management approaches considering gender and inequality issues and their linkages to drivers of change

5.4 Capacity Development:

a. Programme level capacity building plan

b. Workshops to promote institutional take-up and technical/ professional development

c. Workshops to facilitate information/experience sharing with other basin-wide river basins

5.5 River basin/land use management guidelines

5.6 Strategic roadmap for water-related investment in the Koshi basin.

Strategic approach

1. Policy and institutional analysis

2. Policy-in-use analysis (involving policy makers)

3. Programme identification for River basin management

4. Regional cooperation promotion

5. Capacity development

Activities

5.1 Capacity dev plan for regional partners and other relevant stakeholders on Water Hazards and livelihood improvement - Development of a Programme level capacity building plan, including capacity building workshops for professional/technical development on various thematic areas including regional monitoring, river basin management, hazard management and natural resources management

5.2 Analyse the policy and institutional framework for the implementation of IWRM principles and approaches and assess gaps and necessary improvements

5.3 Develop a framework and method for systematic basin-wide review of water governance in the Koshi river basin; suggest a set of governance indicators which could be continuously monitored and used in communicating to the Koshi stakeholders;

5.4 Review the current legal and institutional provisions at the national level in relation to basin water management, water governance and sustainable development; the opportunity for regional cooperation in basin water management with concrete prioritized recommendations on the most appropriate institutional arrangements/ set up for regional water management and water governance in the Koshi Basin;

5.5 Review of existing commitments laid out in various multilateral environmental agreements, bilateral agreements etc. amongst the Koshi countries for regional resources management; identification of gaps and opportunities;

5.6 Strengthen the regional platform for facilitating cooperation in regional monitoring and information sharing through early engagement with Track II stakeholders and early informing of Track I stakeholders.

5.7 Facilitate exchange of experiences, appropriate technologies, best practices, and knowledge among decision makers across countries through development of case studies, dissemination workshops, exposure trips and promotion of the KBP open access knowledge platform.

5.8 Development of best practice river basin/land use management guidelines based on workshops and other component outputs

5.9 Develop a strategic roadmap for water-related investment in the Koshi basin by integrating component outputs and engaging with Track I stakeholders and donor organisations.

Deliverables

1. Year 1 – Capacity development plan including identification of partners

2. Year 2 – Report on Sustainable Development Policy framework and Institutional arrangement for IWRM
3. Year 3 – Policy dossiers in each country of Koshi basin
4. Year 2-3 – Annual report on Capacity building activities
5. Year 4 – Basin Management Guidelines
6. Year 4 – Strategic roadmap for water-related investment in the Koshi basin

2.6.3 Communication, outreach, actor engagement strategies

This component will engage both Track II and Track I stakeholders. Track II stakeholders will be engaged early in the project and will include research institutes (government and non-government), INGOs, and other professionals. Our main research partners will generally be derived from Track II stakeholders. Track I stakeholders will include relevant government ministries and regional government institutions as appropriate. Track I stakeholders will be kept informed of the programme's progress through ICIMOD's country focal persons and ICIMOD's nodal institutions in China, Nepal and India. When greater engagement of Track I stakeholders is required for programme activities, beyond provision of information, advice will be sought from ICIMOD's nodal institutes.

Strategies are needed to communicate and engage key stakeholders during the lifetime of the programme that result in changes in practice needed to achieve the KBP vision. Based on the Outcome Logic Models developed in the Inception workshop Table 4 outlines the strategies required to ensure key stakeholder engagement in Component 5 and to achieve the vision. This table also identifies any changes to activities/deliverables required to implement these strategies.

Table 4 New communication strategies to achieve Component 5 vision.

Actor(s)	***Strategies***	***To achieve what?***	***Changes***
Track I – government ministries, local government	Periodic progress briefs – at least annual and before major events	To inform stakeholders of programme progress and stimulate interest and feedback	New deliverable – Progress Briefs
Track II – research institutes, INGOs and other professionals	Facilitate structured Track II dialogue at workshops	To foster advocacy for greater basin-wide cooperation	No new activity, incorporate into capacity development workshops
Track I and II	Exposure trips to international best practice	To create awareness of good practices in river basin management in other similar complex basins	New activity to arrange exposure trips
	Towards end of Phase I	To communicate robust	No new activity,

	facilitate combined Track I and Track II structured dialogue amongst key actors	evidenced based analyses demonstrating the benefits of enhanced cooperation in the Koshi	incorporate into capacity development workshops
Donor agencies	Include donors in KBP workshop dialogues	To demonstrate progress to donors, demonstrate robust case studies and scenarios and thereby stimulate investment interest in the Koshi basin	No new activity, invite donors to key workshops

2.7 Component 6 – Communication and Outreach

2.7.1 Revised Outputs, Strategic Approach, Activities and Deliverables

Outputs

6.1. Information and data sharing policy agreed amongst partners

6.2. Report on programme level knowledge management and communication strategy

6.3. Web-based information sharing platform

6.4. Knowledge Management and Communication activities, e.g. workshops, online discussion forums, contribution to other high visibility events

6.5. Programme publications

Activities

6.1 Develop web-based information sharing platform, enhanced use of social networks and alternative media

6.2 Identify Options for Basin level knowledge management and dissemination strategy

6.3 Share and deliver knowledge in audience-appropriate form

6.4 Support to intra-component, and component outputs with quality Knowledge Management and communication tools

6.5 Raise awareness of programme results and demonstrate programme outputs through information and communication processes and activities

Deliverables

1. Information and data sharing policy prepared by yr 1
2. Knowledge management and communication strategy completed by yr 1

3. Online platform developed and actively used by yr 1
4. Information and communication activities and awareness raising completed by Year 4
5. Impact stories and impact assessment processes in place by Year 4
6. Cross-cutting products and learning material; photos, maps, graphics, computer games, mobile applications, and multimedia delivered by Year 4
7. Programme publications
8. Outreach through media, local communities, local governments and youth

2.8 Component 7 – Project Management

2.8.1 Revised Outputs, Activities and Deliverables

Outputs

7.1. Development and periodic updating of the Programme Manual.

7.2. Establishment of the Programme Management Unit (PMU).

7.3. PMU to provide secretariat for the Programme Advisory Committee (PAC).

7.4. Development of the Monitoring and Evaluation (M&E) plan for the KBP and for input to the wider ICIMOD River Basin Programme.

7.5. Preparation of all reporting requirements for both ICIMOD and AusAID purposes.

7.6. Development and periodic updating of the Work Plan.

7.7. Coordinate and support integration across programme components and between partners.

Activities

7.1 Act as a focal point to implement and coordinate the Programme activities
7.2 Monitor and report on Programme progress in a timely manner for both KBP indicators and wider ICIMOD River Basin Programme Indicators
7.3 Foster integration across the programme components with ICIMOD and partners.
7.4 Foster regional technical and professional cooperation for river basin management
7.5 Provide a forum for exchange of expertise and knowledge
7.6 Coordinating programme workshops, conferences and seminars.

Deliverables

1. Programme Manual and annual revisions
2. M&E Plan
3. Annual planning reports for ICIMOD and reports as required by AusAID
4. Work Plan and annual revisions.
5. PMU meeting minutes
6. PAC meetings minutes

7. Workshop/conference/seminar reports

3. Revised Work Plan

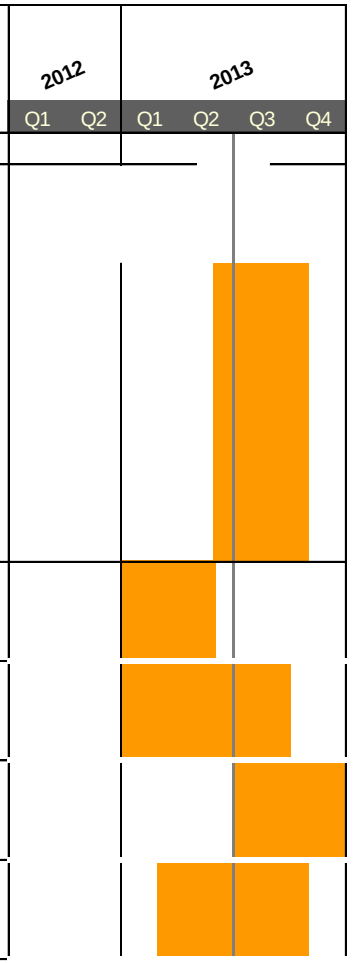
3.1 Detail work plan 2012-2013

KBP Activity #	Major activity	Methods	RBP Activity #	KBP Comp #	KBP Partner	ICIMOD focal person	2012 Q1	2012 Q2	2013 Q1	2013 Q2	2013 Q3	2013 Q4
1.1	Develop Baseline Assessment Framework	DPSIR approach to anchor the data collection and analysis activities	8.1	1	-	Wahid						
1.1	Coordination of baseline report	Collation and synthesis of baseline report based on DPSIR inputs from components 2-5	8.1	1	-	Wahid						
1.2	**Define human and natural drivers and pressures**	Data extraction, development of the meta-database and data synthesis										
	Climate Change	Rainfall and temperature to assess current climate variability, reports from previous climate studies	8.1	2	IWMI	Arun						
	Water Resources development	Reports from previous sectoral studies and plans on WRD including agri, irrig, hydropower and WSS	8.1	2	IGSNRR, WECS, NIDM	Arun						
	Water Resources management	Reports on current policy and practice for water resources management	8.1	2	IGSNRR, WECS, NIDM	Wahid						
	Water hazard risk: causes, proclivity management	Reports on previous studies of water hazards occurrence and policies and practice for hazard risk management	1.2, 8.1	3	IMHE, IGSNRR, TU, NIH-R	Hari						
	Land Resources: LULCC	LULC spatial datasets with time series for trend analysis, reports on previous LULC change studies	8.1	6	-	Murthy						

KBP Activity #	Major activity	Methods	RBP Activity #	KBP Comp #	KBP Partner	ICIMOD focal person	2012		2013			
							Q1	Q2	Q1	Q2	Q3	Q4
	Land Resources: Watershed and forest management	Reports on previous studies of watershed and forest management policies and practice	8.1	4	IGSNRR, WECS, TERI	Renate						
	Environment: Standards and guidelines	Current standards and guidelines for water bodies (surface and groundwater); enforcement practices	8.1	4	IGSNRR, WECS, TERI	Renate						
	Socio-economics: Country and sub-basin socio-economic profiles	Socio-economic profiles of each country; detail in sub-basin study sites.	8.1	4	DU-IEG	Golam						
	Socio-economics: Water-related investment	Reports on current or planned water-related investments	8.1	1	WECS, TERI	Wahid						
	Socio-economics: Gender	Reports on previous gender or gender-related studies in the Koshi basin	8.1	4	DU-IEG	Monohara						
	Socio-economics: Benefit sharing mechanisms	Reports on examples of Benefit sharing mechanisms in the Koshi basin	8.1	4	WECS, TERI	Laxman						
	Policy and Institutions	Policy dossiers for each country in Koshi basin, reports on institutional analysis concerning water resources	8.1	4	WECS, DU-IEG	Golam						

KBP Activity #	Major activity	Methods	RBP Activity #	KBP Comp #	KBP Partner	ICIMOD focal person	2012 Q1	2012 Q2	2013 Q1	2013 Q2	2013 Q3	2013 Q4
1.3	**Describe current state of and impact of environmental changes on the ecosystems and livelihood**	Data extraction, development of the meta-database and data synthesis										
	Water Resources: status and trends	Flow data, flow gauging station network characteristics, sediment data, reports on studies of WR	8.1	2	DHM, NIDM	Arun						
	Climate Change impact on water resources	Reports on previous studies of impacts from climate change basin and sub-basins	8.1	2	IWMI	Arun						
	Land Resources: degradation assessment	Reports on studies of land degradation and habitat loss	8.1	4	IGSNRR	Murthy						
	Environment: status and trends	Reports on studies of current status of water bodies and water dependent ecosystems	8.1	2	-	Arun						
	Socio-economics: determinants of water productivity in agriculture; sensitivity to climatic variability	Census data and trends for Koshi sub-basins; reports on studies of development indicators and trends	2.3	4	DU-IEG	Golam						
	Policy and Institutions: capacity development	Reports on previous studies of capacity development needs for water resources management	8.1	5	-	Wahid						

KBP Activity #	Major activity	Methods	RBP Activity #	KBP Comp #	KBP Partner	ICIMOD focal person
1.4	**Describe the planned and autonomous (including traditional knowledge) responses currently being adopted by government and**	Data extraction, development of the meta-database and data synthesis				
	Climate Change: Current adaptation practices	Reports on previous studies of autonomous and planned adaptation practices	6.1	5	-	Golam
	Policy and Institutions: Climate change policy	Reports on studies of climate change policies (e.g. NAPA, national climate change strategies); institutional set up	6.1	5	-	Golam
	Policy and Institutions: IWRM and access to ecosystem services by vulnerable communities and investment	Reports on previous studies of transboundary water resources management and investment	6.1	5	-	Wahid
1.5	Explore Options for coupling a basin-wide hydro-agro-economic - energy model	Systematic review of literature under current situation of data availability	2.2	1	CSIRO-eWater-IceWarm	Wahid
1.6	Define the database infrastructure and develop GIS Schema	Database prototype, GIS schema, workshops, online discussion forums	2.3, 8.3	6	-	Murthy
1.7	Develop web-based information system	Database, web-protocol	2.3, 8.3	6	-	Murthy
2.1	Assess current knowledgebase on water availability and agricultural practices	Literarature review, data analysis	1.1	2	IWMI	Arun



KBP Activity #	Major activity	Methods	RBP Activity #	KBP Comp #	KBP Partner	ICIMOD focal person	2012 Q1	2012 Q2	2013 Q1	2013 Q2	2013 Q3	2013 Q4
2.2	Model climate and LULC change effect on the hydrology	Mathematical modelling by parter	2.1	2	IWMI	Arun						
3.1	Develop and test pilot Koshi flood and drought information system	System design; data source identification and collection, outreach	4.1	3	IMHE, DHM, NIDM, IWM	Hari						
3.2	Catalogue best practice on gender sensitive and inclusive approaches to disaster risk management and livelihood improvement	Systematic literature review and stakeholder consultation	6.2	3, 4		Hari, Golam						
4.1	Identify vulnerable sub-basins and communities for a range of socio-economic, geo-spatial and environmental settings	Vunerability assessment	6.3	4		Golam						
5.1	Capacity dev plan for regional partners and other relevant stakeholders on Water Hazards and livelihood improvement	Need assessment workshop; stakeholder consultation; review of govt plans	7.1, 7.2	5		Wahid						
6.1	Develop web-based information sharing platform, enhanced use of social networks and alternative media		8.2	6		Anja						
6.2	Identify Options for Basin level knowledge management and dissemination strategy	Need assessment workshop; stakeholder consultation; review of govt plans	8.2	5		Anja						

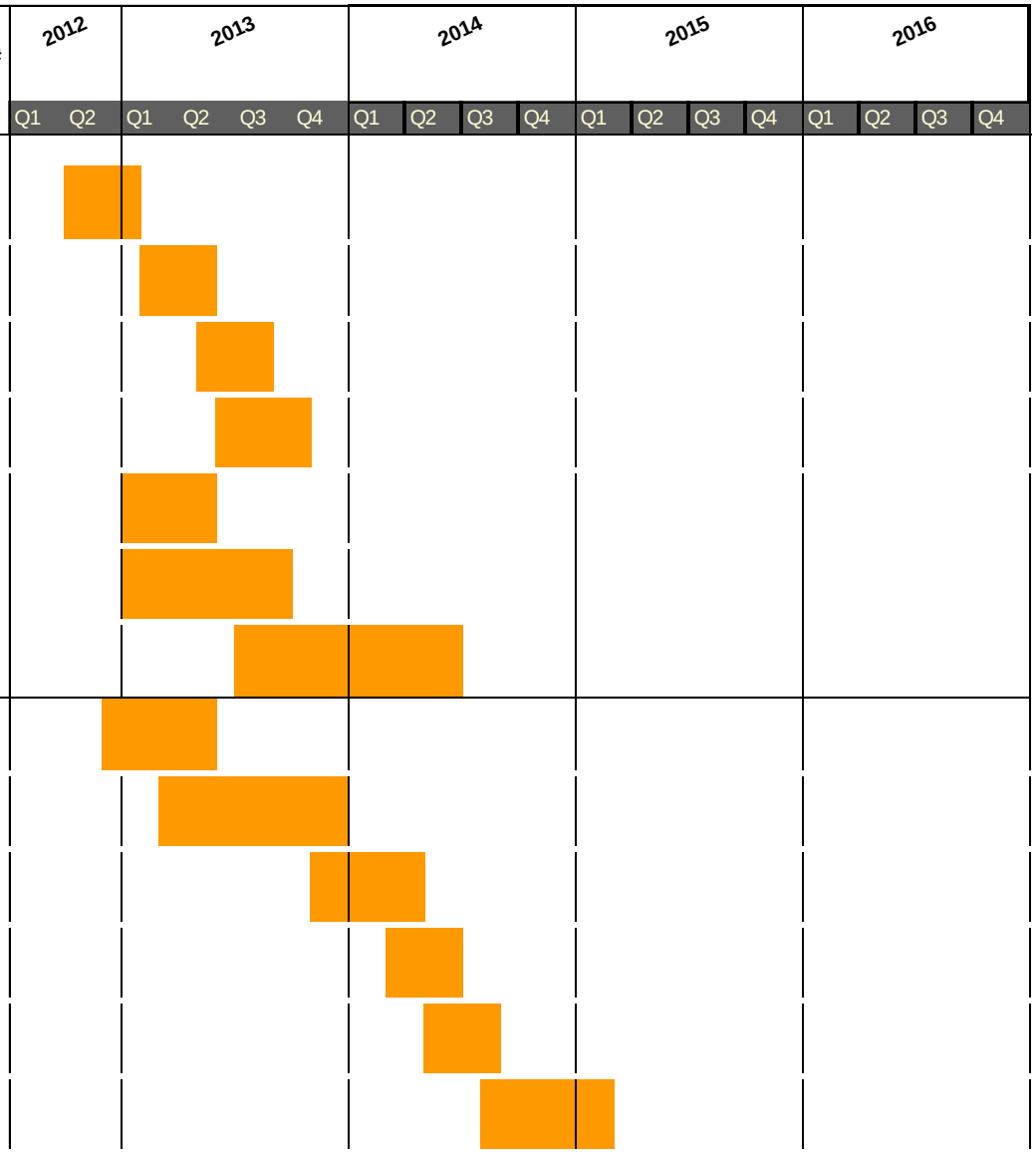
KBP Activity #	Major activity	KBP Comp #	ICIMOD responsibility	2012		2013			
				Q1	Q2	Q1	Q2	Q3	Q4
7.1	Act as a focal point to implement and coordinate the Programme activities	7	PMU						
7.2	Monitor and report on Programme progress in a timely manner	7	PMU						
7.3	Foster integration across the programme components with ICIMOD and partners.	7	PMU						
7.4	Foster regional technical and professional cooperation for river basin management	7	PMU						
7.5	Provide a forum for exchange of expertise and knowledge	7	PMU						
7.6	Coordinating programme workshops, conferences and seminars	7	PMU						

3.2 Events calendar 2012-2013

	Event	Month Year
1	Inception workshop	Sept. 2012
2	ICIMOD internal planning workshop and allocation of tasks	Jan. 2013
3	Review workshop with partners and stakeholders to discuss options for coupled basin-wide hydro-agro-economic-energy model, decision support system and a set of Basin Monitoring Indicators	July 2013
4	Workshops about Koshi basin programme organized for journalists, policy makers, planners, and community leaders (women & men) in China	Sept. 2013
5	Workshops about Koshi basin programme organized for journalists, policy makers, planners, and community leaders (women & men) in India	Sept. 2013
6	Workshops about Koshi basin programme organized for journalists, policy makers, planners, and community leaders (women & men) in Nepal	Oct. 2013
7	Planning workshop and partner's meeting to discuss Draft Baseline report and review work plan	Nov. 2013

3.3 Four-year work plan

KBP Comp. #	KBP Act. #	Major activity	KBP Output #
1	1.1	Develop Baseline Assessment Framework	1.2
	1.2	Define human and natural drivers and pressures	1.2
	1.3	Describe current state of and impact	1.2
	1.4	Describe the planned and autonomous responses	1.2
	1.5	Explore Options for coupling basin-wide hydro-agro-economic - energy model	1.2
	1.6	Define the database infrastructure and develop GIS Schema	1.1
	1.7	Develop web-based information system	1.1
2	2.1	Assess current knowledgebase on water availability and agricultural practices	2.1
	2.2	Model climate and LULC change effect on the hydrology	2.2
	2.3	Generate water availability scenarios	2.3
	2.4	Construct future water resources development scenarios	2.3
	2.5	Produce water demand scenarios	2.3
	2.6	Impact assessment – based on the water availability and demand scenarios,	2.4



KBP Comp. #	KBP Act. #	Major activity	KBP Output #	2012		2013				2014				2015				2016			
				Q1	Q2	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	2.7	Adaptation options identification and piloting proposal	2.5																		
	2.8	Couple hydrological and climate scenarios and socio-economic, including infrastructure	2.4																		
	2.9	Develop a comprehensive Decision Support System	2.4																		
3	3.1	Develop and test pilot Koshi flood and drought information system	3.1																		
	3.2	Catalogue best practice on gender sensitive and inclusive approaches to DRR & livelihood	3.3																		
	3.3	Water hazards mapping (Floods, GLOF, debris flow, landslides, droughts) and hazard scenario	3.2																		
	3.4	Review and case studies of early warning system for all hazards, community response	3.2																		
	3.5	Action research and pilots on climate smart community based DRR approaches	3.3, 3.4																		
	3.6	Review policies, practices and develop policy briefs - Hazard risk reduction	3.2																		
	3.7	Develop policy papers from good practice case studies gender sensitive and inclusive DRR	3.3																		

KBP Comp. #	KBP Act. #	Major activity	KBP Output #	2012		2013				2014				2015				2016			
				Q1	Q2	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
4.1	4.1	Identify vulnerable sub-basins and communities	4.1																		
	4.2	Conduct economic valuation of water services;	4.2																		
	4.3	Implement action research on adaptation and livelihood strategies	4.3, 4.4																		
	4.4	Implement showcase programme: structural and non-structural measures for water storage;	4.5																		
	4.5	Build response capacity at local level by mainstreaming adaptation activities	4.6																		
5	5.1	Capacity dev plan for regional partners and other relevant stakeholders on Water Hazards	5.4																		
	5.2	Analyse the policy and inst. framework for the implementation of IWRM and CC	5.1, 5.2																		
	5.3	Develop a framework and method for systematic review of water governance	5.1																		
	5.4	Review the current legal and institutional provisions at the national level in relation to	5.2																		
	5.5	Review of existing commitments laid out in various multilateral environmental agreements,	5.2																		
	5.6	Strengthen the regional platform for facilitating cooperation	5.4																		

KBP Comp. #	KBP Act. #	Major activity	KBP Output #	2012		2013				2014				2015				2016			
				Q1	Q2	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	5.7	Facilitate exchange of experiences, appropriate technologies, best practices, and knowledge	5.4																		
	5.8	Development of best practice river basin/land use management guidelines	5.5																		
	5.9	Develop a strategic roadmap for water-related investment	5.6																		
6	6.1	Develop web-based information sharing platform, enhanced use of social networks and	6.3																		
	6.2	Identify Options for Basin level knowledge management and dissemination strategy	6.1, 6.2																		
	6.3	Share and deliver knowledge in audience-appropriate form	6.4																		
	6.4	Support to intra-component, and component outputs with quality Knowledge Management	6.4																		
	6.5	Raise awareness of programme results and demonstrate programme outputs	6.4																		

KBP Comp. #	KBP Activity #	Major activity	KBP Output #	2012		2013				2014				2015				2016			
				Q1	Q2	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
7	7.1	Act as a focal point to implement and coordinate the Programme activities	7.5																		
	7.2	Monitor and report on Programme progress in a timely manner	7.1, 7.4																		
	7.3	Foster integration across the programme components with ICIMOD and partners.	7.7, 7.6																		
	7.4	Foster regional technical and professional cooperation for river basin management	7.3																		
	7.5	Provide a forum for exchange of expertise and knowledge	7.2, 7.3																		
	7.6	Coordinating programme workshops, conferences and seminars	7.3																		

4. Revised Logical Framework

4.1 Summary of Draft Logical Framework

Outcomes	Indicators	Means of Verification	Assumption (A) / Risks (R)
Goal: To contribute to inclusive poverty reduction in the Koshi basin by evaluating the range of possible water related development pathways through evidenced based decision making and basin-wide cooperation considering climate change, hazards and the provision of sustainable freshwater ecosystem services.	National statistics show reduced poverty levels and external evaluations show reduction in vulnerability to climate change and improved freshwater ecosystem services	National poverty statistics, external evaluation reports and impact studies.	Development programmes are implemented in a sustainable manner with sound analysis in the basin. Policy makers are committed to change and make favourable policies.
Outcome 1. Improved access to and use of **a** basin-wide knowledge base on change drivers, their impact on freshwater ecosystem services and integrated responses	Knowledge base contributed to and used by national agencies by Year 2 of project	Reports from national agencies. Citation in publications. Number of website hits. Respondent surveys.	**A.** Early adoption by project partners and wider stakeholders. Good information/data sharing amongst. **R.** Availability of data or proxies.
Outcome Improved evidence based decision making to address issues of water availability for agriculture and energy security considering climate change	Relevant national agencies use hydrological-agro models by Year 2; Decision support systems are available for use by year 4	Reports from national agencies citing these models.	**A.** Models are of sufficient quality to warrant use. Relevant agencies have sufficient training to use models. **R.** Data availability.
Outcome 3: Communities and implementing agencies have an improved understanding and adopt good practice for water-related hazard risk management.	Communities and implementing agencies have access to case studies of different water-related hazards and relevant, practical approaches to disaster risk management by Year 3.	Reports from national agencies citing these published case studies.	**A.** Sufficient training is given to implementing agencies and communities. **R.** Disaster risk management approaches are compatible with existing national DRR frameworks
Outcome 4: Communities and implementing agencies adopt inclusive and equitable adaption strategies to address existing and future drivers of change.	Communities and implementing agencies are better equipped with the tools and methodologies to better adapt to change in an inclusive manner by Year 4	Reports from national agencies citing these tools. Reports from other donors citing these tools.	**A.** Tools are easy to use and relevant to communities and implementing agencies. Potential users have sufficient training. **R.** Suitable study sites available.
Outcome 5: Improved cooperation and enhanced capacity for policy and decision makers to implement sustainable basin-wide management of, and investment in, the Koshi river basin	Project outputs used by national agencies for the sustainable management of freshwater ecosystems in the Koshi river basin and for cooperation on basin-wide issues by Year 4.	Reports from national agencies citing project. Project related basin-wide cooperation in Koshi basin such as early warning systems for water-related hazards.	**A.** Early support and adoption by national agencies. Basin-wide cooperation between national agencies. **R.** Insufficient cooperation between national agencies.

4.2 Detailed Draft Logical Framework

Outcome/Output/Activities	Indicators	Means of Verification	Assumption (A) / Risks (R)
Project Statement			
Goal: To contribute to inclusive poverty reduction in the Koshi basin by evaluating the range of possible water related development pathways through evidenced based decision making and basin-wide cooperation considering climate change, hazards and the provision of sustainable freshwater ecosystem services.	National statistics show reduced poverty levels and external evaluations show reduction in vulnerability to climate change and improved freshwater ecosystem services	National poverty statistics, external evaluation reports and impact studies.	Development programmes are implemented in a sustainable manner with sound analysis in the basin. Policy makers are committed to change and make favourable policies.
Component 1: Basin-wide knowledge base of institutional, socio-economic and biophysical context			
Outcome 1. Improved access to and use of **a** basin-wide knowledge base on change drivers, their impact on freshwater ecosystem services and integrated responses	Knowledge base contributed to and used by national agencies by Year 2	Reports from national agencies. Citation in publications. Number of website hits. Respondent surveys.	**A.** Early adoption by project partners and wider stakeholders. Good information/data sharing amongst. **R.** Availability of data or proxies.
Outputs:			
1.1 A continuously updated basin-wide knowledge base, decision support system and a web-based information sharing platform to support river basin management	Web-based information platform goes live by Year 1 is completed by Year 2.	Spatial and temporal data, baseline report and other relevant documents are available in online platform and cover each thematic area and each jurisdiction.	
1.2 A thematic baseline report on the institutional, socio-economic and bio-physical characteristics of the Koshi basin including current adaptive capacity and strategies	Baseline report is drafted by Year 1 and published in Year 2		
Major Activities			
1.1 Develop the baseline assessment framework following a DPSIR analytical approach to anchor the data collection and analysis activities, and enhance overall programme integration 1.2 Define human and natural drivers and pressures - Climate Change, Water Resources development; Water Resources management; Water hazard risk: causes, proclivity management; Land Resources: LULCC; Land Resources: Watershed and forest management; Environment:			

Outcome/Output/Activities	Indicators	Means of Verification	Assumption (A) / Risks (R)
Standards and guidelines; Socio-economics: Country and sub-basin socio-economic profiles; Socio-economics: Water-related investment; Socio-economics: Gender, Socio-economics: Benefit sharing mechanisms; Policy and Institutions 1.3 Describe current state of and impact of environmental changes on the ecosystems and livelihood - Water Resources: status and trends; Climate Change impact on water resources; Land Resources: degradation assessment; Environment: status and trends; Socio-economics: determinants of water productivity in agriculture; sensitivity to climatic variability; Policy and Institutions: capacity development) 1.4 Describe the planned and autonomous (including traditional knowledge) responses currently being adopted by government and communities – Climate Change: Current adaptation practices; Policy and Institutions: Climate change policy; Policy and Institutions: IWRM and access to ecosystem services by vulnerable communities and investment 1.5 Explore Options for coupling a basin-wide hydro-agro-economic - energy model 1.6 Define the database infrastructure and develop GIS Schema 1.7 Develop web-based information system to support river-basin scale planning and management			
<u>Component 2: Climate and hydrological impacts on water availability and agriculture</u>			
Outcome 2. Improved evidence based decision making to address issues of water availability for agriculture and energy security considering climate change	Relevant national agencies use downscaled models and hydrological models by Year 2	Reports from national agencies citing these models.	**A.** Models are of sufficient quality to warrant use. Relevant agencies have sufficient training to use models. **R.** Data availability.
Outputs:			
2.1 Downscaled climate scenarios for study sub-basins and catchments	Climate scenarios established by Year 1	Reports on model development, validation	

Outcome/Output/Activities	Indicators	Means of Verification	Assumption (A) / Risks (R)
2.2 Comprehensive hydrological model	Hydrological models developed and coupled with climate models by 18 months	and application. Peer-reviewed publications.	
2.3 Flexible hydrological-agriculture models	Hydro-agro model available by year 2		
2.4. Decision Support System	DSS prepared by Year 3		
2.5 Options for agriculture and energy development under different climate scenarios	Options for Agriculture developed in Year 4		
Major Activities			
2.1 **Assess current knowledgebase** on water availability and agricultural practices including cropping, land, water (surface/groundwater), agronomic inputs and labour use patterns 2.2 **Model climate and LULC change effect on the hydrology** - Set up a combination of suitable hydrological and hydrodynamic models of the basin considering description of major infrastructures (diversions, storages, etc.) and Cryospheric processes in the Upper catchment. 2.3 **Generate water availability scenarios** at sub-basin level based on the calibrated and validated model for the baseline and future climate and agriculture scenarios; 2.4 **Construct future water resources development scenarios** in the model; 2.5 **Produce water demand scenarios** - considering historical trends and development plans. The demand should delineate between major water use sectors (agriculture, water supply and sanitation, industry, energy, ecosystem etc.); 2.6 **Impact assessment** – based on the water availability and demand scenarios, assess the hydrological impact on major water use sectors (agriculture, water supply and sanitation, industry, energy, ecosystem etc.);			

Outcome/Output/Activities	Indicators	Means of Verification	Assumption (A) / Risks (R)
2.7 **Adaptation options identification and proposal** - review and analyze integrated water resources development and management policy frameworks and strategies, and local institutional capacity, political commitment, and preparedness for to respond to change in a bid to minimize identified adverse impacts and identify a set of adaptation options and prioritized proposal for piloting the adaptation options potentially applicable for the basin taking into account natural/physical conditions and institutional capacity and effectiveness on economic, social and environmental grounds 2.8 Couple hydrological and climate scenarios and socio-economic, including infrastructure development 2.9 Develop a comprehensive Decision Support System capable of analysing a number of natural and socio-economic development options and tradeoffs; Build the capacity of the partners in the use of DSS.			
Component 3: Water-related hazards			
Outcome 3: Communities and implementing agencies have an improved understanding and adopt good practice for water-related hazard risk management.	Communities and implementing agencies have access to case studies of different water-related hazards and relevant, practical management approaches.	Reports from national agencies citing these published case studies.	**A.** Sufficient training is given to implementing agencies and communities. **R.** Disaster risk management approaches are compatible with existing national DRR frameworks
Outputs:			
3.1 Koshi basin flood and drought information system, as part of the parent Koshi web-GIS, to facilitate sharing of data on the spatial and temporal prevalence of water related hazards	Beta version of Flood and Drought information system by Year 1	Reports on hazards in the Koshi basin, their causes, prevalence, and good practice for their management.	
3.2 Hazard assessment: use historical and project generated data to reduce hazard risk, scenario analysis and mapping with special emphasis on glacial lake outburst floods.	Report on hazard assessment by Year 2		

Outcome/Output/Activities	Indicators	Means of Verification	Assumption (A) / Risks (R)
3.3 Case studies of good practices in water-related disaster risk management and water-related hazards, their underlying causes and management	Report on case studies of good practice by Year 2		
3.4 Capacity building plan outlining the training and capacity building required to help mandated government agencies and other relevant actors implement Koshi basin development plans with inclusion of hazard mitigation component	Capacity building plan prepared by Year 1 and revised annually.	Report and peer-reviewed papers on case study sites published.	
Major Activities			
3.1 Develop and test pilot Koshi flood and drought information system 3.2 Catalogue best practice on gender sensitive and inclusive approaches to DRR & livelihood 3.3 Water hazards mapping (Floods, GLOF, debris flow, landslides, droughts) and hazard scenario analysis 3.4 Review and case studies of early warning system for all hazards, community response strategy and good DRR practices 3.5 Action research and pilots on climate smart community based DRR approaches 3.6 Review policies, practices and develop policy briefs (trans-boundary cooperation in Hazard risk reduction in the Koshi basin) 3.7 Develop policy papers from good practice case studies and strengthen early warning systems and gender sensitive and inclusive DRR practices.			
Component 4: Adaptation and Livelihood Promotion			
Outcome 4: Communities and implementing agencies adopt inclusive and equitable adaption strategies to address existing and future drivers of change	Communities and implementing agencies are better equipped with the tools and methodologies to better adapt to change in an inclusive manner by Year 4	Reports from national agencies citing these tools. Reports from other donors citing these tools.	**A.** Tools are easy to use and relevant to communities and implementing agencies. Potential users have sufficient training. **R.** Suitable study sites available.
Outputs:			

Outcome/Output/Activities	Indicators	Means of Verification	Assumption (A) / Risks (R)
4.1 Vulnerability assessment of the Koshi basin and systematic review of existing adaptation strategies.	Vulnerability assessments and systematic review completed by Year 1	Project report. Peer-reviewed publications.	
4.2 The social, economic and environmental costs and benefits of upstream-downstream risk reduction measures are assessed and benefit sharing options identified	Report on benefit sharing options completed by Year 3		
4.3 Best practices in adaptation to climate change identified and tested with a special focus on gender sensitive and inclusive approaches	Best practice report with focus on gender available in Year 3		
4.4 Adaptation strategies developed for a range of socio-economic, environmental, geo-spatial settings and for identified vulnerable socio-economic groups with a supporting Toolkit for implementation	Toolkit for adaptation strategies and practices available by Year 3	Toolkit available online. Toolkit cited by national agencies and other donor agencies	
4.5 Enhanced capacity for improved planning and implementation of adaptation practices and pathways	Reports of local capacity building activities during Year 2-3	Project report. Peer-reviewed publications.	
4.6 Policy level recommendations for climate proofing development plans at basin level	Policy recommendations by Year 3-4 based on action research outputs	Pilot case study reports. Peer-reviewed publications	
Major Activities			
4.1 Identify vulnerable sub-basins and communities for a range of socio-economic, geo-spatial and environmental settings and explore development potentials for adaptation and inclusive development strategies. 4.2 Conduct economic valuation of water services; review national PES approaches and existing payment/incentive mechanisms and develop methodological guidelines for PES implementation with a view to integrating sustainable natural resource management with climate change adaptation activities. 4.3 Implement action research on adaptation and livelihood strategies to address food security, energy, hydropower and sustainable land use management, water storage and productivity; incentive based mechanism in ecosystem management that have policy relevance.			

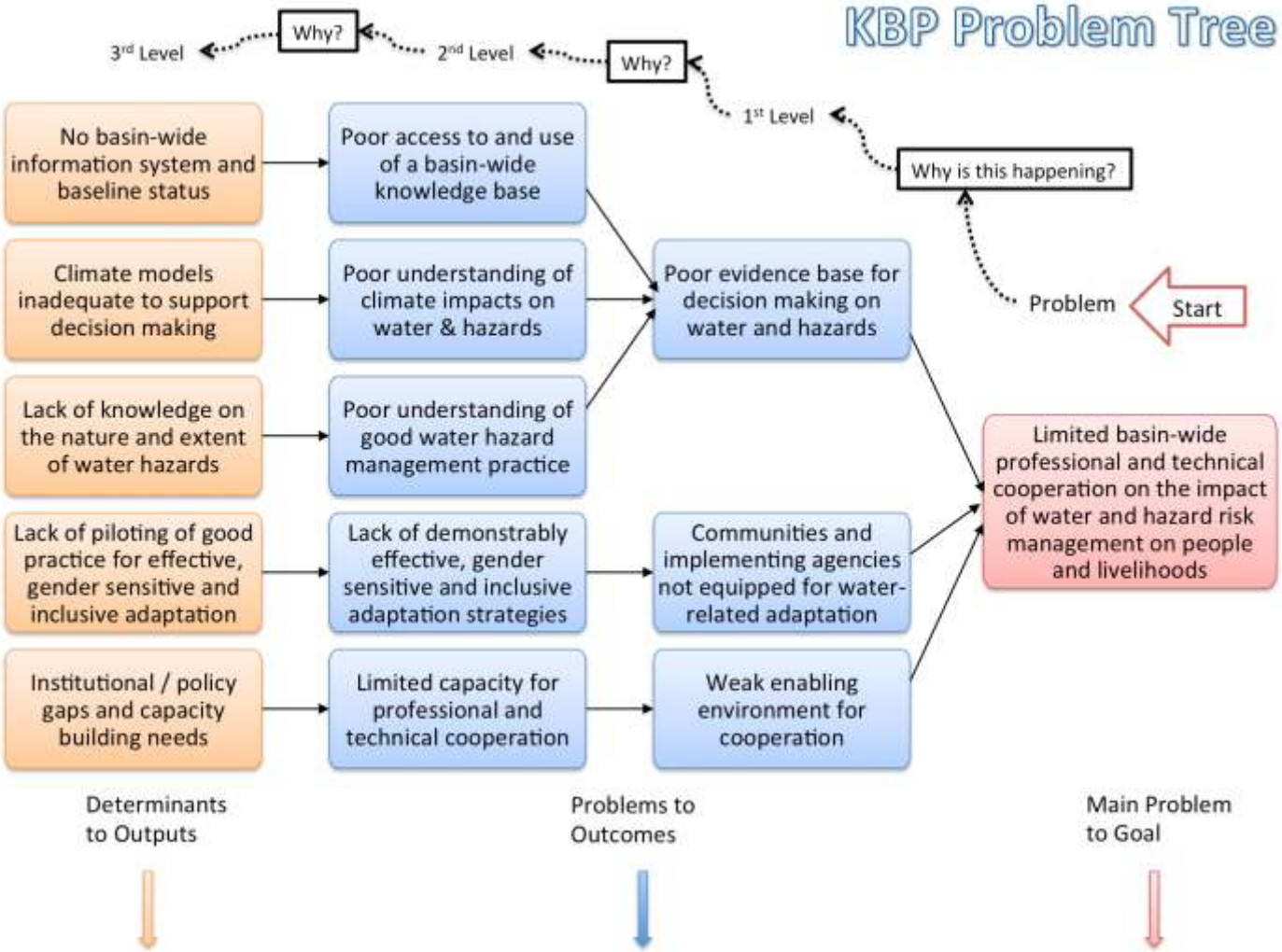
Outcome/Output/Activities	Indicators	Means of Verification	Assumption (A) / Risks (R)
4.4 Implement showcase programme: structural and non-structural measures for water storage; community adaptation strategies against different climate change and socio-economic scenarios 4.5 Build response capacity at local level by mainstreaming adaptation activities in local development planning and implementation.			
Component 5: Integrated responses through improved basin-wide cooperation and capacity building			
Outcome 5: Improved cooperation and enhanced capacity for policy and decision makers to implement sustainable basin-wide management of, and investment in, the Koshi river basin	Project outputs used by national agencies for the sustainable management of freshwater ecosystems in the Koshi river basin and for cooperation on basin-wide issues by Year 4.	Reports from national agencies citing project. Project related basin-wide cooperation in Koshi basin such as early warning systems for water-related hazards.	**A.** Early support and adoption by national agencies. Basin-wide cooperation between national agencies. **R.** Insufficient cooperation between national agencies.
Outputs:			
5.1 Improved understanding of existing sustainable development policy framework	Policy framework study complete by Year 2	Project report. Peer-reviewed publications.	
5.2 Improved understanding of institutional arrangements across multiple scales in the basin concerning implementation of IWRM principles and access to ecosystem services by vulnerable communities	Institutional arrangement study complete by Year 2	Project report. Peer-reviewed publications.	
5.3 Recommendations for more inclusive river basin management approaches considering gender and inequality issues and their linkages to drivers of change	Gender and inequality issues study completed by Year 3	Project report. Peer-reviewed publications.	
5.4 Programme level capacity building plan including specific workshops to promote institutional take-up, technical/professional development and information and experience sharing	Capacity building plan by Year 1 (and reviewed annually)	Project report	
5.5 River basin/land use management guidelines	Basin management guidelines by Year 4	Attendance list, workshop reports.	
5.6 Strategic roadmap for water-related investment in the Koshi basin	Strategic roadmap prepared by Year 4	Project report	

Outcome/Output/Activities	Indicators	Means of Verification	Assumption (A) / Risks (R)
Major Activities			
5.1 Capacity dev plan for regional partners and other relevant stakeholders on Water Hazards and livelihood improvement - Development of a Programme level capacity building plan, including capacity building workshops for professional/technical development on various thematic areas including regional monitoring, river basin management, hazard management and natural resources management 5.2 Analyse the policy and institutional framework for the implementation of IWRM principles and approaches and assess gaps and necessary improvements 5.3 Develop a framework and method for systematic basin-wide review of water governance in the Koshi river basin; suggest a set of governance indicators which could be continuously monitored and used in communicating to the Koshi stakeholders; 5.4 Review the current legal and institutional provisions at the national level in relation to basin water management, water governance and sustainable development; the opportunity for regional cooperation in basin water management with concrete prioritized recommendations on the most appropriate institutional arrangements/ set up for regional water management and water governance in the Koshi Basin; 5.5 Review of existing commitments laid out in various multilateral environmental agreements, bilateral agreements etc. amongst the Koshi countries for regional resources management; identification of gaps and opportunities; 5.6 Strengthen the regional platform for facilitating cooperation in regional monitoring and information sharing through early engagement with Track II stakeholders and early informing of Track I stakeholders.			

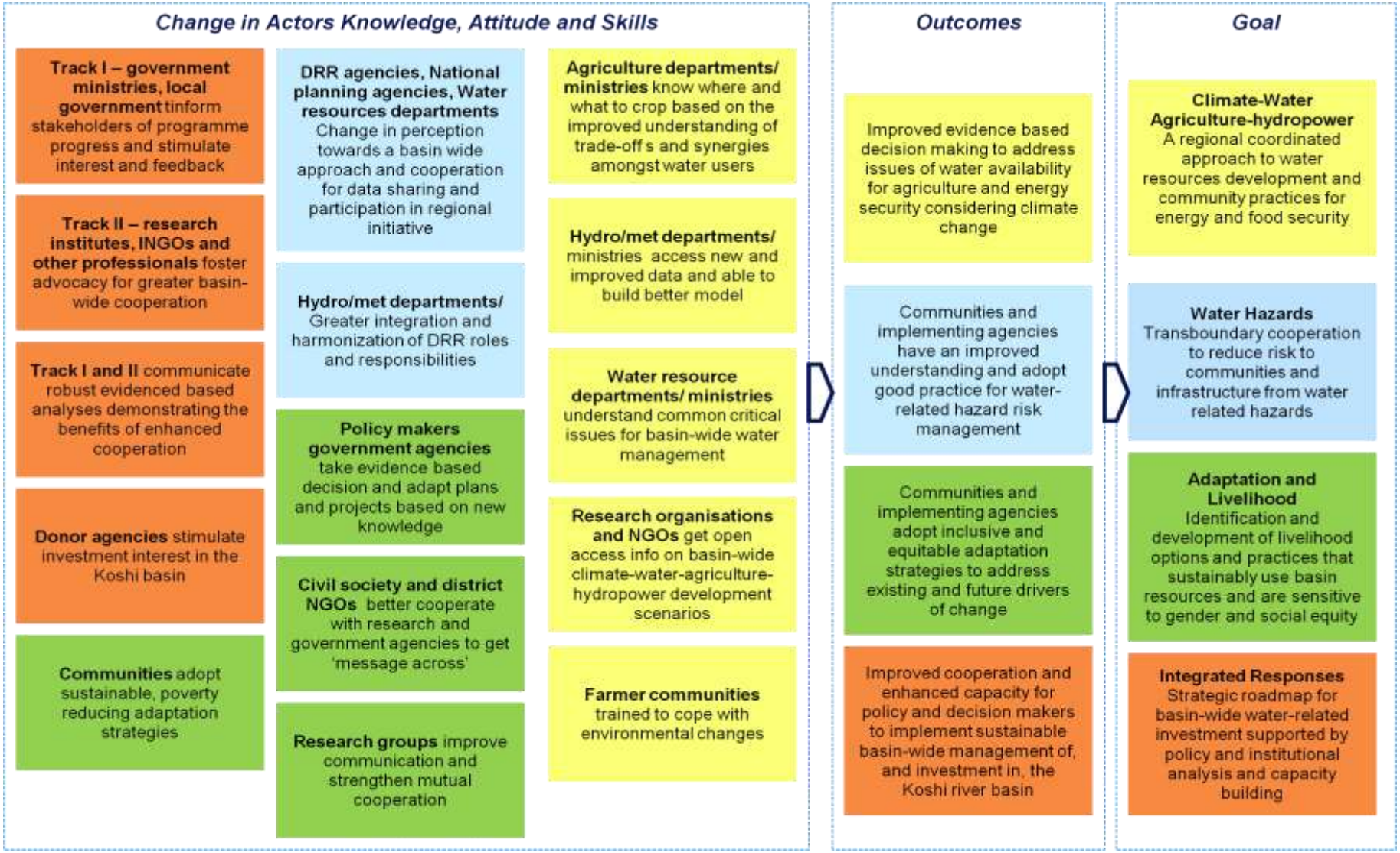
Outcome/Output/Activities	Indicators	Means of Verification	Assumption (A) / Risks (R)
5.7 Facilitate exchange of experiences, appropriate technologies, best practices, and knowledge among decision makers across countries through development of case studies, dissemination workshops, exposure trips and promotion of the KBP open access knowledge platform. 5.8 Development of best practice river basin/land use management guidelines based on workshops and other component outputs 5.9 Develop a strategic roadmap for water-related investment in the Koshi basin by integrating component outputs and engaging with Track I stakeholders and donor organisations.			
Component 6: Knowledge management and outreach			
Outputs:			
6.1 Information and data sharing policy agreed amongst partners	Information and data sharing policy prepared by yr 1.5	Partners sign up to information and data sharing policy	
6.2 Report on programme level knowledge management and communication strategy	Knowledge management and dissemination strategy completed by yr 1	Project report	
6.3 Web-based information sharing platform	Online platform completed and actively used by yr 1	Number of website hits	
6.4 Knowledge Management and Communication activities, e.g. workshops, online discussion forums, contribution to other high visibility events	Dissemination activities (including awareness raising, impact stories, cross-cutting products and learning material) completed by Year 4	Workshop attendees, discussion contributors, press articles	
6.5 Programme publications	Programme publications	Number of publications	
Major Activities			
6.1 Develop web-based information sharing platform, enhanced use of social networks and alternative media 6.2 Identify Options for Basin level knowledge management and dissemination strategy			

Outcome/Output/Activities	Indicators	Means of Verification	Assumption (A) / Risks (R)
6.3 Share and deliver knowledge in audience-appropriate form 6.4 Support to intra-component, and component outputs with quality Knowledge Management and communication tools 6.5 Raise awareness of programme results and demonstrate programme outputs through information and communication processes and activities			

Annex 1 – Problem Tree



Annex 2 – Impact pathway summary



Annex 3 – Baseline assessment – Framework

Introduction

The Baseline Assessment is a key output of the Koshi Basin Programme (KBP). It establishes the state of knowledge in the basin, identifies trends and gaps, and provides a baseline from which to prioritise actions. It will also identify indicators for monitoring trends and progress in achieving the overall programme's objectives and pathways to wider impacts.

A Drivers-Pressures-State-Impact-Response (DPSIR) approach has been adopted for this framework. This framework will act as an anchor to facilitate harmonisation across all programme components for the data collection and analysis activities. This common approach also aims to foster programme integration and to maintain focus on the KBP objectives by embedding the Baseline Assessment Framework into the impact pathway model.

The DPSIR Framework Explained

The DPSIR approach was first proposed by the OECD and later adopted in various forms by numerous national and international organizations. It is used to help design assessments, identify indicators, and communicate results and can support improved environmental monitoring and information collection (Stanners et al., 2007). Essentially it reflects a systems analysis view of the relations between the environmental system and the human system (see Figure 1). The main function of this approach in the KBP is to help provide a common structure for the data collection and analysis. Indicators can also be developed for each part of the DPSIR framework to facilitate the monitoring of changes over time. By working off the same framework it will facilitate better integration of the KBP components into an overall comprehensive programme. Each element is briefly described in the bullets below (adapted from Omann et al., 2009).

DRIVERS are changes in the social, economic and institutional systems (and/or their relationships), which are triggering, directly and indirectly, *Pressures* on the environment.

PRESSURES are consequences of human activities (i.e. release of chemicals, physical and biological agents, climate change, extraction and use of resources, patterns of land use), which have the potential to cause or contribute to adverse effects (*Impacts*).

The **STATE** of the environment is the quantity and quality of biological features, of physical and chemical features of ecosystems, and/or

A **RESPONSE** is a policy action, initiated by institutions or groups (politicians, managers, consensus groups) which is directly or indirectly triggered by [the societal perception of] *Impacts* and which attempts to prevent, eliminate, compensate, reduce or adapt to them and their consequences.

of environmental functions and services, vulnerable to *Pressure(s)*, in a certain area.

IMPACTS are changes in the environmental functions and services, affecting (negatively) the social, economic and environmental dimensions, and which are caused by changes in the *State* of the environment.

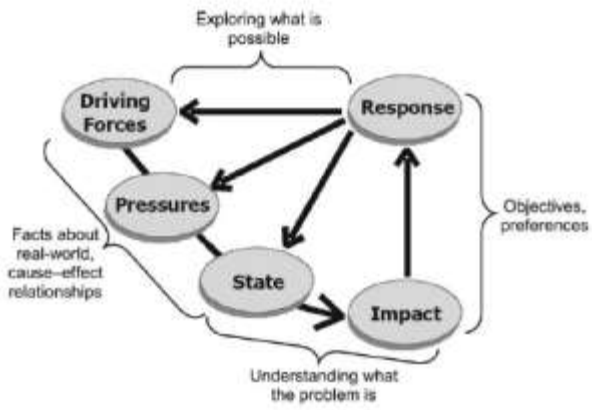


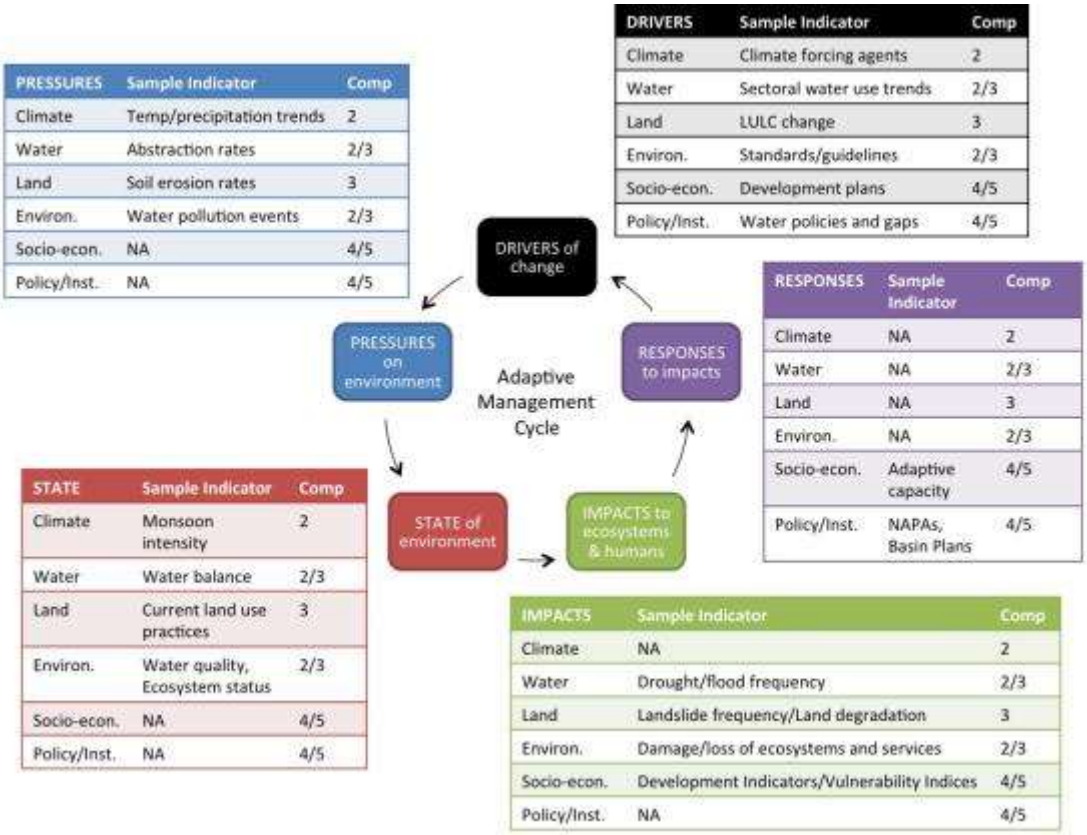
Figure 1 DPSIR framework (Mysiak et al., 2005).

Koshi Basin Programme Baseline Assessment Framework

A modified version of DPSIR framework is proposed for the KBP, which incorporates the following thematic areas identified during the Inception workshop.

- Climate Change
- Water Resources
- Land Resources
- Environment
- Socio-economics
- Policy/Institutional Setting

Figure 2 presents the KBP Baseline Assessment Framework linking the thematic areas with the DPSIR approach. Sample indicators are provided for each DPSIR element where applicable and the programme components responsible for collecting baseline data in each case are also listed. Some more detail on the data requirements and additional indicators for each thematic area may be elaborated by the Components.



PRESSURES	Sample Indicator	Comp
Climate	Temp/precipitation trends	2
Water	Abstraction rates	2/3
Land	Soil erosion rates	3
Environ.	Water pollution events	2/3
Socio-econ.	NA	4/5
Policy/Inst.	NA	4/5

DRIVERS	Sample Indicator	Comp
Climate	Climate forcing agents	2
Water	Sectoral water use trends	2/3
Land	LULC change	3
Environ.	Standards/guidelines	2/3
Socio-econ.	Development plans	4/5
Policy/Inst.	Water policies and gaps	4/5

RESPONSES	Sample Indicator	Comp
Climate	NA	2
Water	NA	2/3
Land	NA	3
Environ.	NA	2/3
Socio-econ.	Adaptive capacity	4/5
Policy/Inst.	NAPAs, Basin Plans	4/5

STATE	Sample Indicator	Comp
Climate	Monsoon intensity	2
Water	Water balance	2/3
Land	Current land use practices	3
Environ.	Water quality, Ecosystem status	2/3
Socio-econ.	NA	4/5
Policy/Inst.	NA	4/5

IMPACTS	Sample Indicator	Comp
Climate	NA	2
Water	Drought/flood frequency	2/3
Land	Landslide frequency/Land degradation	3
Environ.	Damage/loss of ecosystems and services	2/3
Socio-econ.	Development Indicators/Vulnerability Indices	4/5
Policy/Inst.	NA	4/5

Figure 2 Koshi Basin Programme Baseline Assessment Framework. Note 'NA' = not applicable.

This approach will also facilitate the preparation of the Thematic Baseline Report by providing a structure that explicitly links the environment with socio-economic activities. Sample indicators are presented in Figure 2 but additional ones will need to be developed for each thematic area across the DPSIR categories where applicable. These indicators will form the basis for the analysis of trends, the identification of information and knowledge gaps and for informing where interventions are required.

Linking the Baseline Assessment Framework to the Koshi Web Info system

The thematic areas listed above will form the building blocks for the baseline assessment activities and also facilitate the development of the Koshi Web Info system. Early consultation between the thematic areas and the Web Info system team, which will develop the GIS schema, is being pursued to ensure the manner in which data/information is collected is fit for purpose.

Impact Pathway Model and the Baseline Assessment Framework

The Baseline Assessment is a key foundation for driving the Programme towards the expected impact pathways. Figure 3 below presents a simplified Impact Pathway Model for the KBP indicating how the programme outputs, including the DPSIR baseline assessment, will drive outcomes towards the expected pathways for impact (after CGIAR approach, see http://monitoring.cpwf.info). This Impact Pathway Model highlights some key selected outcomes for the KBP. The changes in the behaviour or practice of these key actors and their

changes in knowledge, attitude and skills are broadly based on the output of breakout groups during the KBP Inception Workshop.

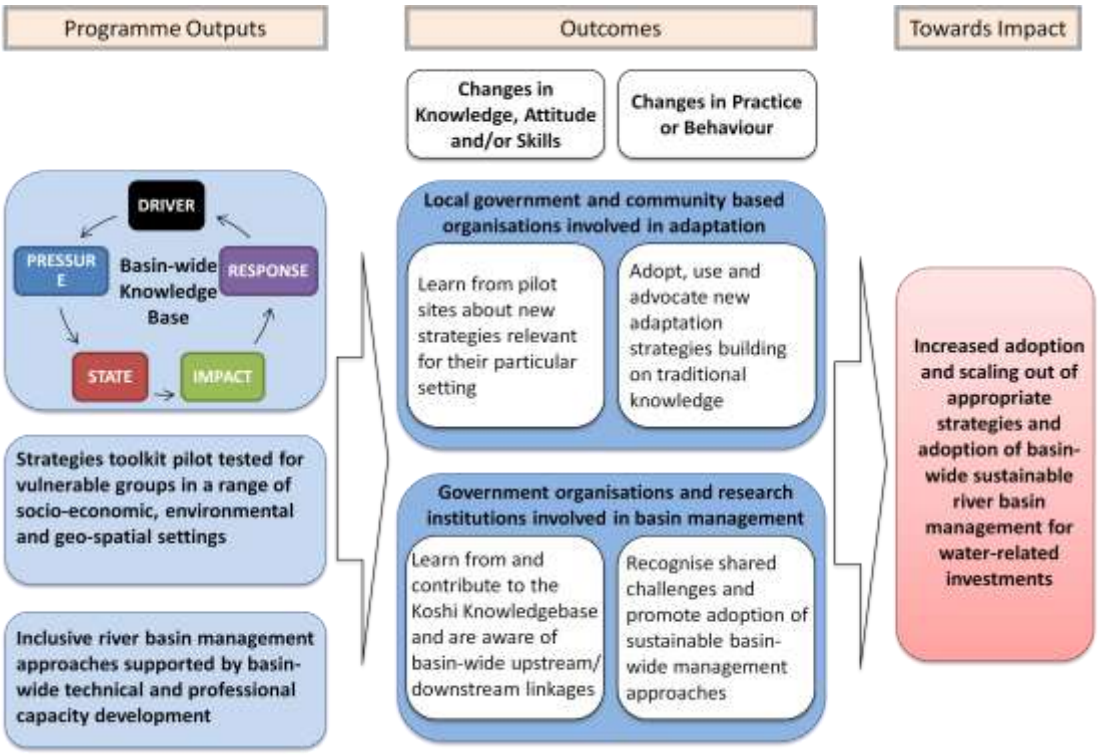


Figure 3 Baseline assessment to Simplified Impact Pathway Model (after CGIAR approach).

References

Mysiak et al. (2005) Towards the development of a decision support system for water resource management. Environmental Modelling & Software, 20:203-214.

Omann et al. (2009) Climate change as a threat to biodiversity: An application of the DPSIR approach. *Ecological Economics*, 69:24-31.

Stanners, et al. (2007) Frameworks for environmental assessment and indicators at the EEA. In: Hak, et al. (eds), Sustainable Indicators: A scientific assessment, Scientific *Committee on Problems of the Environment*, SCOPE 67, Island Press, London.

Annex 4 – Baseline assessment – Outline

Sect.	Title	Description	Chapter lead
1	**Introduction**		
1.1	Baseline Analysis Framework: e.g. DPSIR framework – if a full DPSIR approach is considered too onerous a modified version may be preferred, e.g. Drivers+Pressures: what are the human and natural drivers and pressures in the Koshi basin and how are they changing? State+Impact: what is the current state of ecosystems and populations in the Koshi and what are the key trends and impact on ecosystems and societies? Responses: what are the planned and autonomous (including traditional knowledge) responses currently being adopted by government and communities and how will these responses need to change to address future threats?	A conceptual framework is being prepared to anchor the data collection and analysis activities. Adoption of a common framework for all components should help enhance overall programme integration. The framework will also help identify measurable indicators of change, which the KBP will use to monitor progress in achieving impact pathways. Thematic areas should be clearly identified within this framework.	Wahid
1.2	Thematic areas: Climate Change Water Resources Land Resources Environment Socio-economics Policy/Institutional Setting	Building on schematic from Programme Manual provide detailed lists of data requirements for each thematic area	Wahid
1.3	Web-GIS	Development of Web-GIS including database infrastructure, GIS schema and interoperability issues with existing databases	IKM and MENRIS
2	**Drivers and Pressures**		**Relevant Component Leads or**

Sect.	Title	Description	Chapter lead designates
2.1	Climate Change: Meteorological data, previous climate studies	Rainfall and temperature to assess current climate variability, monitoring station characteristics, reports from previous climate studies in Koshi basin	Arun
2.2	Water Resources: Current water resources development	Reports from previous sectoral studies and plans on water resources development in Koshi basin including agriculture, irrigation, hydropower and water supply and sanitation	Arun
2.3	Water Resources: Current water resources management practices	Reports on current policy and practice for water resources management in the Koshi basin	Wahid
2.4	Water Resources: Water hazard risk management	Reports on previous studies of water hazards occurrence and policies and practice for hazard risk management in Koshi basin	Hari
2.5	Land Resources: Land use and land cover change	Land cover and use spatial datasets with time series for trend analysis, reports on previous LULC change studies	MENRIS
2.6	Land Resources: Watershed and forest management	Reports on previous studies of watershed and forest management policies and practice in the Koshi basin	Renate
2.7	Environment: Standards and guidelines	Current standards and guidelines for water bodies (surface and groundwater) in the Koshi basin and enforcement practices	Arun
2.8	Socio-economics: Country and sub-basin socio-economic profiles	Socio-economic profiles of each country, particularly the Koshi portions, with more detail in sub-basin study sites.	Golam
2.9	Socio-economics: Water-related investment	Reports on current or planned water-related investments in the Koshi basin	Wahid
2.10	Socio-economics:	Reports on previous gender or gender-related studies in the Koshi	Monohara

Sect.	Title	Description	Chapter lead
	Gender	basin	
2.11	Socio-economics: Benefit sharing mechanisms	Reports on examples of Benefit sharing mechanisms in the Koshi basin	Laxman
2.12	Policy and Institutions: Framework in Koshi basin	Policy dossiers for each country in Koshi basin, reports on institutional analysis concerning water resources management and investment in the Koshi basin	Golam
3	**State and Impact**		**Relevant Component Leads or designates**
3.1	Climate Change: Current impacts from climate change	Reports on previous studies of impacts from climate change in the Koshi basin and study sub-basins	Arun
3.2	Water Resources: Current status	Flow data, flow gauging station network characteristics, sediment data, reports on studies of water resources in the Koshi basin, water quality results, water quality monitoring network characteristics	Arun
3.3	Land Resources: Degradation assessments	Reports on studies of land degradation and habitat loss in the Koshi basin	Renate
3.4	Environment: Status assessments	Reports on studies of current status of water bodies and water dependent ecosystems in the Koshi basin	Arun
3.5	Socio-economics: Development indicators	Census data and trends for each country, with greater detail in study sub-basins, reports on studies of development indicators and trends in the Koshi	Golam
3.6	Policy and Institutions: Capacity development	Reports on previous studies of capacity development needs for water resources management in the Koshi	Wahid
4	**Responses**		**Relevant Component Leads or**

Sect.	Title	Description	Chapter lead designates
4.1	Climate Change: Current adaptation practices	Reports on previous studies of autonomous and planned adaptation practices in the Koshi basin	Golam
4.2	Policy and Institutions: Climate change policy	Reports on previous studies of climate change policies (e.g. NAPA, national climate change strategies) in each country, reports on studies of institutional set up for climate policy implementation	Golam
4.3	Policy and Institutions: Transboundary water resource management and investment	Document current transboundary water resources policies in each country, reports on previous studies of transboundary water resources management and investment in the Koshi basin and regionally	Wahid

Annex 5- Proceedings of the Workshop

Opening Session

Opening remarks were provided by Prof Ouyang Hua (ICIMOD), Dr David Molden (ICIMOD), Dr Russell Rollason (AusAID) and Dr SM Wahid (ICIMOD).

The 2008 Koshi floods resulted in loss of lives and property in both Nepal and India, highlighting the increasing vulnerability of the people living in the flood plains of Koshi basin due to various drivers of change, including climate change. The Koshi basin programme was conceived to help people adapt to change as well as to influence river basin governance.

In the Koshi river basin, there are knowledge gaps that need to be addressed. There is insufficient understanding of drivers of change at play, for example, how climate change is impacting on water resources and people's livelihoods; how men and women are being differently impacted by change and responding to it. There is also a lack of evidence-based knowledge to inform policy and decision-making. Agencies, institutions and communities are not prepared for climate and water-related adaptation. These issues are all framed within a weak enabling environment for cooperation, which limits basin-wide approaches and collaboration.

The Koshi Basin Programme provides a platform to bring several multi-faceted issues together. The key issues playing out in the Koshi river basin are: too much too little water ranging from floods to droughts to siltation, changing of the river morphology, food production, rising energy demand, poverty (with migration increasingly becoming a big issue), access to ecosystem services, and, of course, the livelihoods of men, women and children.

The Koshi basin issues can be approached from different angles. If you look at the biophysical dimension, the glaciers in the upper reaches of the Koshi basin are melting bringing water and sediments down to the plains, with implications for farmers' livelihoods. The water from the Koshi river basin passes through China, Nepal, India and Bangladesh, underscoring its transboundary nature and very different institutional settings for river basin governance in these countries. At the same time the Koshi Basin Programme provides a sound basis for regional cooperation in areas such as flood risk management, food production and irrigation, economic opportunities, energy, with potential for benefits sharing.

The programme needs to deliver change or impact in terms of improved practice and policy by working with partners and communicating to the right groups of people. It should also look at issues in a holistic manner so that basin can be better managed.

From the AusAid perspective, ICIMOD is well positioned to lead the Koshi Basin Programme, because it is an intergovernmental organization with 29 years of experience in the region, thereby making it an important platform for dialog. There is also a sound basis for why the Koshi basin was chosen for this programme, namely that – it is transboundary in nature, Koshi is a sub-basin of the Ganges basin where over 600 million people directly or indirectly are

affected the water-food-energy nexus issues. Improved Koshi basin management can have beneficial impacts on very large populations, especially the poor people of Bihar.

Expectations of the Koshi basin Programme include: an improved understanding of the water-food-energy nexus; developing new knowledge on how to address the situation of too much, too little water (both floods and drought); informing political dialogue for transboundary cooperation, and; building institutional capacity for river basin management.

Contributions to poverty reduction and enhanced resilience to change are key goals of the KBP. Its overall strategic objectives include: policy relevant knowledge development, testing of actionable adaptation pilots and livelihoods strategies for scaling out and scaling up, and improving the enabling environment for decision and policy making.

Technical Session 1 and 2

Prof Don Blackmore

Prof Don Blackmore provided some scene-setting remarks to open the first Technical Session.

The Koshi programme provides ICIMOD and supporting researchers an opportunity to do something spectacular – to bring about a change in conventional research through action research and pathways for change.

"You cannot manage what you cannot describe and measure!" A key outcome from the Koshi programme will be bringing the research components forward to the community and changing community perceptions of reality to what reality is! This programme poses a challenge for regional research organizations like ICIMOD as research primarily rewards only academic papers and not always provides the "sufficient certainty" which is needed for governments to make decisions (tackle the hard questions and trade-offs). As a surrogate basin manager for the Koshi basin, in the absence of a proper basin managing authority, defining ownership and integration will be key challenges that need to be addressed. This programme will also test the culture of a research organization like ICIMOD, as management of a transboundary river basin is quite different compared to the workings of a research organization.

Prof Bill Young, CSIRO Director, Water for a healthy country flagship

Prof Bill Young provided an overview of CSIRO activities in Australia and more recently in South Asia, highlighting some key areas that it can contribute to the KBP.

CSIRO is Australia's national science agency and is ranked in the top 1% in 14 research fields with a very big focus on applied research and development. With over 6500+ staff over 55 locations in Australia, CSIRO's primary aim is to build national prosperity and wellbeing and focuses on excellent science, research outcomes and making a difference. Of CSIRO's 6 national research flagships, the water flagship, setup in 2003, aims to develop science and technologies that improve the social, economic and environmental outcomes from water management. It has been contributing to the Australian water sector and has also been delivering into the national water reform process. The CSIRO water flagship has observed a

growing engagement in the international water sector, especially in South Asia through partnering efforts with key technical institutions from Australia and in the South Asia region.

The water flagship can provide the following as a toolkit for integrated water resources management under a changing climate in major river basins:

- Climate to hydrology methods
- New generation river models
- Water information systems
- Flood forecasting and monitoring

Dr Francis Chiew, CSIRO

Global warming will change future climate patterns thus intensifying the hydrological cycle, increasing global precipitation and atmospheric water vapour content. Changes in the average annual conditions will also incur changes in hydrology with some parts of the world being drier and some parts of the world being wetter resulting in increased hydrological variability and thus reduced water availability/supply. This further compounds the issue of water management; longer droughts and longer wet periods leading to loss of traditional storage (glacier retreat, drying streams etc). The demand for water will continue to increase with the need to grow food for expanding global population, increased urbanisation and higher water consumption because of increased affluence.

Dr Robert Carr, eWater

With water owned by the states, Australia is a contested basin. As part of resolving water disputes between states, Australia embarked upon developing new modelling capabilities to provide water managers with a basic platform to make decisions and talk to each other. Integrated Water Resource Management had become increasingly complex, especially in the last twenty years. To reach a common point of truth between state governments, the eWater Cooperative Research Centre (CRC) was established. eWater Source has been recognized as Australia's national hydrological platform and represents the collective knowledge 45 partners of the CRC. It will provide for a national consistency in water resources planning across jurisdictions by integrating economic and environmental issues of water for planning, implementation and compliance monitoring.

Source is designed to support the creation, testing and end-user delivery of environmental simulation models, and supports the management, manipulation and presentation of a variety of data types, as well as support for testing, integrating and calibrating simulation models. It also underpins a range of spatial and temporal modelling systems including the toolkit models. Applications include examining surface water – groundwater interactions, environmental flows (e.g. to support spawning of migratory fish) and cultural flows (e.g. to maintain flows for religious festivals in the Ganges). Source can also analyse trade-offs for different investment scenarios.

For the Koshi the first step will be to develop a Koshi basin conceptual model, then do the necessary research to support decisions, and then explore the trade-offs. Basin objectives should be re-examined periodically. Source can integrate different types of models that are already developed or in development.

Dr Luna Bharati, IWMI

IWMI has been working in the Koshi river basin since 2009 and has also been researching on the possible usage of small scale storage such as farm ponds, check dams, small reservoirs etc. as an adaptation measure. The Koshi Basin area upstream of Chatara has been considered in IWMI's study in the mountainous region of eastern Nepal and southern Tibet (57,760 sq. km). The basin can be divided into the Trans-mountain Region, Central Mountain Region, Eastern Mountain Region, Central Hill Region and Eastern Hill Region.

SWAT, a semi distributed hydrological model, that does water balance calculations per Hydrological Response Units/ sub basins was used. Spatial Data - Digital Elevation Model, LULC, Soil Map and Soil Properties for the region and Time Series Data - meteorological data across 26 Stations and flow data across 15 Stations were fed into the model. Past climate data (1996-2005) and future climate projected data from various RCMs were also used. Calibration of the models was carried out using observed stream flow data. With over 90% coefficient of determination for monthly flows between observed and simulated flow, the results were promising. Where glacier data was lacking for the upper catchments, estimates were used.

Results indicate that the Southern part of the basin is wetter than the trans-Himalayan northern part of the basin while ET is higher than runoff in the upper sub-basins while runoff is higher than ET in the lower sub-basins. From a water management perspective, this basin shows a lot of potential, i.e. it is a surplus basin. Water yield is highest also in the mountain region and lowest in the Trans-mountains. The basin exhibits a highly variable range with 5mm rainfall during the dry season in Trans mountain region and up to 1629 mm in the Central mountain zone.

While these activities helped establish the hydrological characteristics at a basin wide level for the Koshi river basin, projected climate data for the region was downscaled using MarkSim Weather Generator (RCM) – an average of CNRM-CM3, CSIRO-Mk3.5, ECHam5, and MIROC3.2 GCMS under the A2 and B1 scenarios. With the Koshi basin being a primarily monsoon driven system, significant changes were not observed in the climate change projections for 2030 or 2050. For the region, projected ranges for seasonal precipitation trends is within the observed range for the winter and the pre-monsoon seasons, while projected ranges indicate a lower minima for the monsoon season indicating that adaptation measures could be critical during the monsoon season. Flow statistics for the region indicate an increased likelihood of flooding events.

Sub-basin analysis is planned for this year (Mole and Lagarche sub-basins) including an assessment of the social and economic impacts of water shortages and water storage technologies within the sustainable livelihoods approach.

Mr Sriranjan Lacoul, Water and Energy Commission Secretariat (WECS)

The Koshi River Basin Management (KRBM) strategic plan was drafted by WECS. To achieve the objectives of the national water sector under the Water Resources Strategy 2002 (WRS) and the National Water Plan 2005 (NWP), the KRBM was formulated based on identified policy principles involving three pillars — economic efficiency, social equity and environmental sustainability — that emphasize on the optimum utilization of the water and related resources. With "Local capacities to respond to climate change" and "Policy and institutional development" as its two overarching components and the KBRM's primary goal is to contribute to the improvement in the living conditions of the people in Koshi River Basin (KRB) in a sustainable manner by optimizing the use of water and related resources. The Koshi river basin is the largest river system in Nepal and has tremendous water resources potential. WECS will be the leading agency implementing the Koshi River Basin Management plan supported by lead agencies in the government and development partners.

The KRBM hopes to contribute towards the improvement of conditions of people living in the KRB through clear objectives:

- Optimize economic benefits due to water and related resources (economic efficiency);
- Maintain and enhance life support system of KRB for the present and future generations (environment sustainability);
- Enhance capacity to cope and adapt to risks and stresses due to climate change (enhancing local capacities to respond to climate change effects); and
- Put appropriate policies and institutions in place to operationalize IWRM at KRB (policy and institutional development).
- Ensure rights of poor and marginalized groups in the management, decision-making and benefit sharing of water and related resources (social equity)

Expected outputs from the management plan include the following

- Only 20% of the population in KRB under the poverty line by 2016 and further decreased to 14% by 2021 from a base percentage of 29.3% in 2010.
- Gini coefficient (measure of inequality) from an existing 43.6 and 34.9 in urban and rural areas respectively in 2010 reduced to the levels in 2003/04 by 2016 and further reduced in 2021.
- Species diversity retained throughout the period
- Number of degraded wetland ecosystems identified and restored.

Prof Futaba Kazama, ICRE, University of Yamanashi, Japan

Dr Pandey, presenting on behalf of Prof Kazama, outlined their work on groundwater in Kathmandu Valley.

Over 2.5 million people are suffering acute dry-season water shortages in Kathmandu valley, where there is a lack of management of ground water as a resource in its own right. Over 500 borings, thousands of tube wells, and dug wells have been developed to access ground water. However ground water is depleting and more pressure on ground water is expected. There is a need to study the ground water storage potential of different aquifers. The University of Yamanashi Japan can contribute to KBP in the following ways:

- Developing a distributed hydrological model and analyzing hydro-climatic trends for selected tributaries (e.g. Kathmandu Valley and Sun Koshi watersheds);
- Conduct water poverty analysis for the whole Koshi basin, and at district or sub-watershed level;
- Incorporate peoples' perception on climate change/variability, their impacts, indigenous knowledge and adaptation for selected watersheds;
- Conduct Kathmandu valley focused initiative, entailing summary of groundwater-related issues, studies, and results; improve ground water markets, and conduct unsaturated zone soil hydraulic properties analysis;
- Design and implement similar studies for other parts of the Koshi Basin: baseline database, identify recharge processes and areas, assessments of groundwater quality and groundwater use potential.

Prof Zhang Yili, IGSNRR, Chinese Academy of Sciences

Prof Zhang provided an outline of research into land use and land cover change in the Koshi basin.

The questions that need to be asked are: what is the baseline land use and land cover (LULC) situation in KB, including main drivers of LULC change? Whether Normalized Difference Vegetation Index (NDVI) change trends in a long time series in the KB is consistent with that in the Tibetan Plateau? And what will to LULC change in future under climate change? To answer these questions fieldwork has been conducted in the Tibetan plateau (in the upper reaches of Koshi Basin) to classify land use & land cover change types at different elevations, including changes in water bodies such as GLOFs. A classification accuracy test was also conducted. Natural drivers of LULC change and inter-annual variation in NDVI, temperature and precipitation for the period April-October from 1980-present were determined. Also alpine grassland in Tibetan Plateau was studied over the period 1976-2006 to identify topographic and climatic factors favouring its contraction and expansion. The overall conclusions of the study are as follows:

- There was a significant difference between land use/cover types in southern and northern KB. The obvious vertical zonality was observed in main land use/cover types in the KB.

- There were two turning points (1994 and 2000) in NDVI from 1982 to 2000; the first point was ahead of that in 1997 in Eurasia. During the period, the responses of NDVI to temperature and precipitation are complex.

- Human activity was the main influence on grassland contraction in areas with slight slope, near to river, lake and road in 1976-2006; while the increase of temperature, and precipitation in areas with steep slope, far from river, lake and road promoted grassland expansion.

The challenges for KBP are:

- Access to more and better data, including high resolution of remote sensing images and the need for ground-truthing (field investigation).

- Determining the status of LULC change in KB in high resolution.

- As human activities are the main driver of change of the typical land use and land cover change in the central Himalaya, it has major implications on hydrological processes, biodiversity resources and ecosystem services – so what suite of practice and policy options are needed to address the adverse consequence /and accentuate positive consequences of LULC change?

- How is LULC projected to change under different climate and economic scenarios in future? Land use/cover modeling, incorporating ecological processes, is needed.

Prof Narendra Khanal, Tribhuvan University, Nepal

The major water-related hazards in the Koshi basin are flash floods, riverine and sheet flooding, landslides, sedimentation, river shifting, and GLOF in upper reaches. These can, and often do, result in loss of life and property. In the case of Nepal, the extent of loss of life has been highest in the hill region of Nepal over the period 1970-2008. Damage to crops owing to floods, drought, hailstorm and pests and diseases are also a factor in the Koshi basin from a food security point of view. Bhotekoshi/Sunkoshi, Imja/Dudh Koshi, and Tsho Rolpa/Tamakoshi areas are vulnerable in the event of GLOFs. Landslide dammed outburst floods (LDOFs) such as the ones that hit Balephi and Larcha (in SunKoshi) in 1982 and 1996 caused deaths and destruction. The embankment breach in the lowlands in 2008 unleashed Koshi floods displacing 7000 families in Nepal side and affected some 3 million in both Nepal and India. Drought is a significant issue in Panchkhal outside of Kathmandu valley. Water induced disasters are likely to increase as a result of increased extreme precipitation events and expansion of glacial lakes due to climate change. The following activities are recommended for KBP:

- Mapping and assessment of hazard, vulnerability and risk;

- Monitoring of glacier and glacial lakes;

- Establishment of early warning system – for weather events and floods;

- Enhancement of coping and adaptation capacity at local, national and regional levels through awareness creation, skill development training, exchange visits and technology transfer.

Prof Nilabja Ghosh, Institute of Economic Growth, Delhi, India

Prof Ghosh provided an overview of the water-agriculture-food security nexus in India.

Water is a double-edged sword for crops because of the phenomenon of "too much and too little water". While excess water causes water logging, flooding, fertilizer run off, soil erosion and land degradation, drought or little rain wreaks havoc in terms of crop damage. Therefore, weather forecasting, advisories on input use, including irrigation, and flood protection are important, as is research in better technology and water management practices. Canal irrigated land area is growing in India, with ground water irrigation gaining in popularity. Surface water irrigated land area has stayed more or less constant between the 1975-2005 period. Water availability determines crop choice: typically pulses and coarse cereals in areas of low, variable rainfall, with rice and wheat in areas where irrigation and groundwater development is available. There has been a recent policy move towards horticultural crops, commercial high value crops, and food processing to improve farm income. Climate change has added an extra dimension of uncertainty in terms of monsoon rainfall patterns and drought occurrences. Water conflicts between countries and between states in India are growing. In India, there is lack of information on emerging water technologies such as drip, sprinkler, and irrigation in hill regions. Data is scarce on the quantum of water used for different crops, with little emphasis on conjunctive irrigation use or externalities of water use such as over extraction and inundation of cropland. The way forward under KBP could be:

- Greater cooperation among communities, more efficient institutions;
- Need for trials on new technologies, engineering innovations in water management, flood control to flood risk management;
- Provide some thoughts on river linking, water conservation techniques and rainwater harvesting;
- Agri-development is becoming unsustainable, improvements are needed on rice cultivation (SRI, rotation, reducing fallowing due to water logging, shift to multi-cropping, emphasis on pulses in rice fallows, in-season drainage);
- Diversification needed towards high value crops - the National Food Security Mission of India plans to include rice, wheat, pulses, oilseeds, supply of inputs and use of water saving technology;
- Attention needed on water quality, waste disposal, recycling and treatment of water.

Technical Session 2 – Work Plan

The tentative work plan for the KBP was presented by Dr S M Wahid and followed by discussion.

The KBP is a basin-wide professional and technical cooperation programme with a focus on the impact of climate, water and risk management on people and livelihoods. It is designed to deliver new knowledge products and provide a platform for cooperation. The programme has three objectives: sound knowledge base, gender inclusive and equitable adaptation and integrated responses. It has six components in all: knowledge base; climate, water and agriculture; water related hazards; adaptation; integrated responses; and knowledge management, with their own respective sets of outputs.

The workflow entails identification of vulnerable communities and sub-basins for in-depth study; action research on gender, livelihoods and payments for ecosystem services; developing goals, development objectives and strategies to deliver gender inclusive and equitable adaptation through the aforementioned six components. The time line is broken broadly into three segments, with characterizing the koshi basin in year 1, setting goals and identifying solutions in year 2-3, and designing options for adaptation practices and policies in year 4-5.

Technical Session 2 – Impact Pathway

ICIMOD are integrating Impact Pathway Analysis (IPA) into its programmes and the KBP is one of the first to adopt this approach. IPA is a project planning and monitoring and evaluation (M&E) approach. A project's impact pathways describe how the project will develop its research outputs and who outside the project needs to use them to achieve developmental outcomes and impact. Part of the process of developing impact pathways involves project staff and stakeholders working together to map how knowledge and research products must scale out and scale up in to achieve the project's development goals.[1] IPA is important because:

- People plan and implement projects on the basis of their change models - their implicit theories about how the world works, i.e., impact pathways
- If you can improve the impact pathways (IPs) you can improve the practice, making impact more likely
- IPs show a project's rationale and networks
- Provides impact hypotheses for ex-post impact assessment

The following schematic outlines the typical IPA process and how it was adapted for application to the Koshi Basin Inception Workshop. Tasks highlighted in blue were the focus of the group work sessions, with the Outcome Logic Models forming the main outputs.

[1] http://boru.pbworks.com

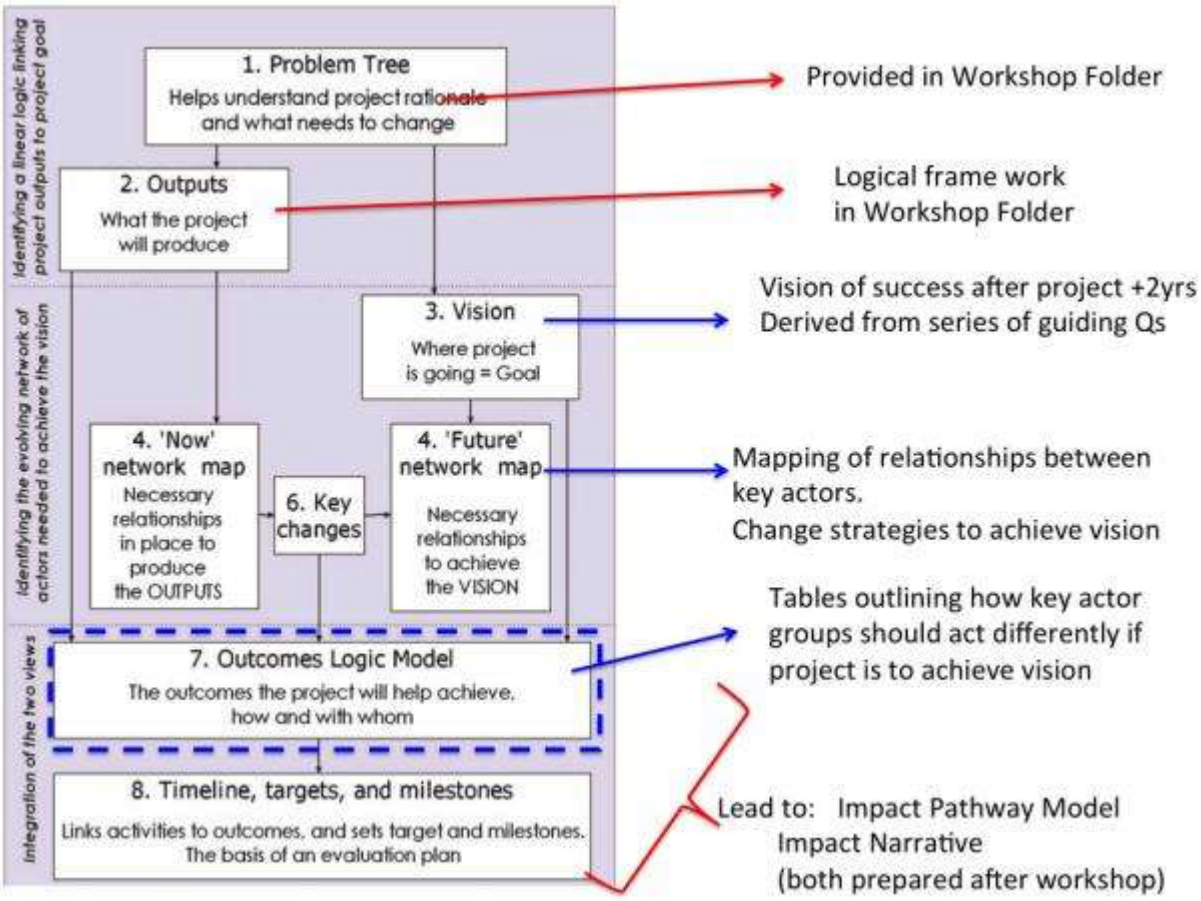


Figure 2 Impact Pathway Analysis approach adapted for Koshi Inception Workshop (based on schematic available at http://boru.pbworks.com).

An Impact Pathway Model will be developed in consultation with ICIMOD and its partners.

Technical Sessions 3 and 4 – Group Work on Impact Pathway

Participants were divided into groups based on the following four key research components of the KBP:

1. Climate-Water-Agriculture-Hydropower (Comp 2)
2. Hazards (Comp 3)
3. Adaptation (Comp 4)
4. Integrated Responses (Comp 5)

Because of the large number of workshop participants (50+) these four groups were further sub-divided into sub-groups A and B, e.g. A2 Hazards and B2 Hazards. Therefore, in total there were eight groups, two groups per component. This achieved an optimum group size of 5-7 participants – this size is considered optimal for encouraging individual contribution and stimulating group discussion.

ICIMOD staffs were assigned as Moderators to each of eight groups to lead the discussions and steer the groups through each of the three exercises. The groups each identified an individual Rapporteur, who would present later at plenary the groups' ideas and findings.

A guidance note for the group work was distributed to the participants and is included as an annex to this report and broadly followed Impact Pathway process described above. In summary, the participants were asked to complete three related exercises:

- Visioning: groups were asked to think about what success would like look for their component two years after completion of KBP Phase 1.

- Network Mapping: groups were asked to identify who are the key actors (programme implementers, next users and final users) in the KBP and what are the current relationships. Participants were then asked to analyse the network maps and identify where relationships need to change to realise the programme vision. Actions points were then identified – as thunderbolts on the maps and then listed on a separate work sheet – to capture the changes needed.

- Outcome Logic Models – Outcome logic models (OLMs) are simple tables designed to capture the changes in actor(s) behaviour required to achieve a change in practice needed to achieve the programme vision. They also identify the strategies needed to achieve these changes and how these strategies link to programme outputs in the logical framework.

Taken together these three exercises were designed to help improve the KBP outcomes and impacts by identifying strategies for change in key actor(s) practice, which will be integrated into KBP planning (via the logical framework). These Impact Pathways will be revisited periodically during the lifetime of the KBP to track progress along these pathways to impact.

Technical Session 5 – Group Work Presentations and Discussion

The eight groups were brought back to plenary on Wednesday morning to present their findings and open the floor for discussion to the wider participants. The Rapporteurs for the group work sessions were:

- Climate-Water-Agriculture: A1 – Dr Luna Bharati; B1 – Dr Geoff Podger

- Hazards: A2 – Dr Anil Kumar Gupta; B2 – Prof Narendra Khanal

- Adaptation: A3 – Dr Juerg Merz B3 – Prof Nilabja Ghosh

- Integrated Responses: A4 – Prof Bill Young; B4 – Mr Kamal Ram Joshi

The group work sessions provided a rich source of material and new insights which can be incorporated into the KBP planning and implementation.

Vision statements were presented by each of the groups and these have been distilled to inform the overall KBP as well as individual component visions. Examples of visions developed by the groups include:

- A4 (Integrated Responses): "Robust scenario analyses of multiple development options has informed an agreed strategic roadmap for investment in water infrastructure."
- B3 (Adaptation): "Improved adaptation practices sensitive to socio-cultural and geophysical context through transboundary political negotiation, cross-learning and implementation at multiple scales."

The figure below illustrates some of the outputs of the participants working together to develop network maps for the KBP for their particular component.

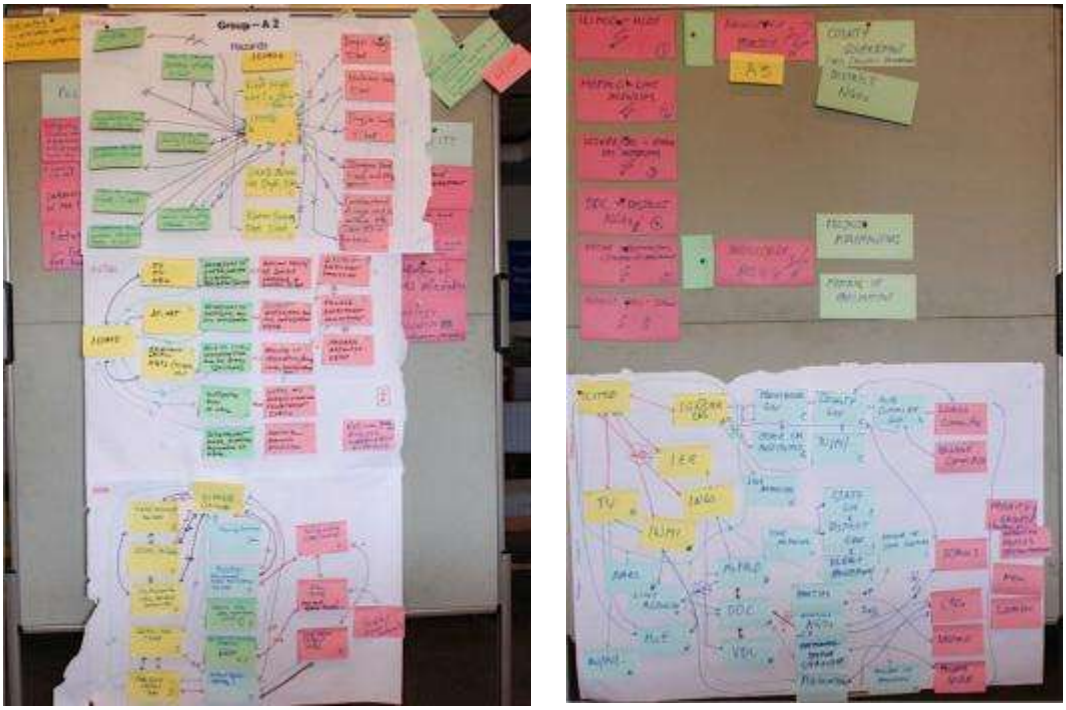


Figure 3 Network maps for Group A2 (Hazards) and Group A3 (Adaptation)

Network mapping was used to identify actors and relationships required to achieve the component visions.

One group, B1 (Component 2: Climate, Water and Agriculture) developed its network map as a PowerPoint slide (see figure below). It identifies, using colour codes, different key partners in each country, their relationships and thunderbolt symbols that signify areas where the KBP needs to effect change in order to achieve the component vision.

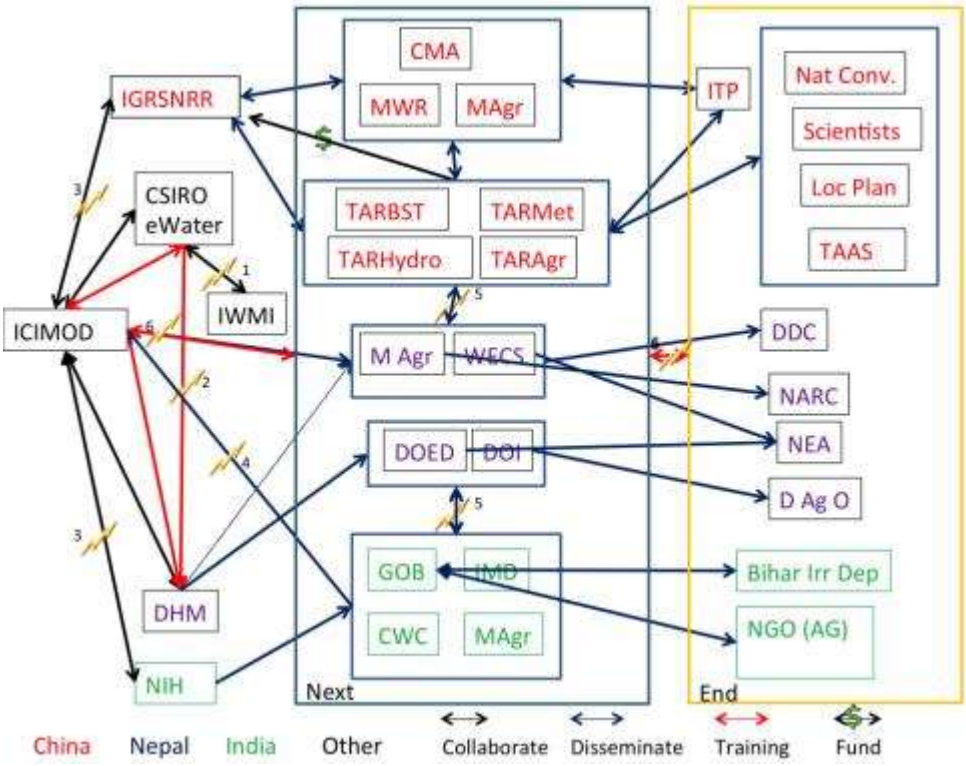


Figure 4 Network map for Group B1 (Climate-Water-Agriculture)

Outcome Logic Models (OLMs) were the final output from the group work exercises. They aim to build on the visions and network maps developed in the previous exercises to create OLMs for different actors. These OLMs are in fact simple tables which identify the strategies needed to be developed in the KBP for a particular groups of actors to create a change in practice needed to achieve the component vision. These tables also identified changes to existing outputs or new outputs needed to implement these strategies. The figures below illustrate the kind of OLMs developed by the groups using examples from B3 (adaptation) and B1 (climate-water-agriculture).

Outcome Logic Model

Actor	Change in Practice/ Behaviour	Change in knowledge, attitude, skills	Programme strategy	Programme output
Communities	*select among sustainable, poverty reducing adaptation strategies *communi-cate/ advocate for needs	-Improve knowledge about strategies/ practices - Empower-ment (focus disadvan-taged groups)	•Identify, test, communicate adaptation strategies which are sensitive to the socio-cultural and geophysical context •Facilitate forum for exchange	(linked to Output: report on best practices for gender sensitive and inclusive approaches)

Figure 5 Outcome Logic Model from Group B3 (adaptation) for community actors

Water Resource departments/ ministries

Change in practice	Change in attitude/ knowledge	Strategies	Outputs
• Improved trans-boundary cooperation through a better understanding of the basin hydrology • Use of models in planning and the development of infrastructure for energy and agriculture	• Commitment for regional cooperation • Understanding of the value of hydrological models for planning • Common understanding of the critical issues • An agreed basin-wide approach to water management • DSS supporting water policy development	• Engage key people from regional countries in the model development process • Communication strategy • Expectation management	2.2 Flexible hydrological models of the Koshi basin • Regional knowledge sharing workshops • Providing knowledge to support policy development

Figure 6 Outcome Logic Model for Group B1 for water resources ministries and departments

The visions, networks and outcome logic models have been used to refine the outputs, activities and engagement strategies of each of the KBP components.

Technical Session 5 – Way Forward

Closing remarks were provided by Dr Russell Rollason (AusAID), Dr Eklabya Sharma, Dr David Molden (ICIMOD) and Dr SM Wahid (ICIMOD). In addition, Dr Sharma invited the following participants to voice their views on the way forward; Prof Chen Ningsheng (IMHE, China), Dr Anil Kumar Gupta (NIDM, India), Mr Sriranjan Lacoul (WECS, Nepal), Dr Luna Bharati (IWMI), Dr Juerg Merz (Helvetas), Prof Bill Young (CSIRO) and Dr Arun Shrestha (ICIMOD).

The series of take home messages can be summarised as follows:

- Engage governments and motivate movers and shakers early on

- Develop a suite of options – policy and practice related – to improve livelihoods and reduce hazards
- Go for early achievements (e.g. flood early warning systems) and communicate results to get 'buy-in' from stakeholders from early on
- Focus on GLOF and flood risk management
- Look into what kinds of studies should be taken up, and an inter-governmental mechanism for regional cooperation, including data requirements and sharing
- Facilitate the wellbeing of people, hazard mitigation, and improvement of livelihoods, etc., through mutual trust and cooperation among concerned stakeholders
- Water management isn't really being done from basin perspective but rather in an ad-hoc, fragmentary manner. It is important to take a basin approach by putting pieces together – scale vision down to what happens at community level. Pushing 'basin perspective' can be an achievement in itself
- Build on partnerships where we can harness ground level knowledge
- Establish and communicate implementation arrangement and governance ; design and manage engagement processes across partners
- A clear group of intellectual thought leaders are needed for the internal management of the programme, including conceptual framework;
- Operational aspects should include open access to information, and web-based platforms for programme
- As KBP is a research programme for development, it should focus on how to get impact through impact pathways. As for development part, it should contribute to poverty and risk reduction and enhancement of livelihoods
- The programme should come up with a strategic roadmap for strategic investments in the Koshi Basin, thereby creating a basis for enhancing cooperation and trust among the countries.
- Sequencing of activities will be crucial, as will picking up new activities over time. Achieving integration among activities and disciplines will be important, for which a management advisory group or some mechanism may be needed

Review of Inception Workshop process

Day 1 went largely according to the planned agenda, with participants actively interacting with the speakers in Q&A sessions.

Day 2 was a critical day, which served to increase the ownership and involvement of the various participants, and 'pick their brains' on the outline of the programme and solicit ideas and suggestions for improvement.

From the beginning it was apprehended that the time-frame might be a bit too tight, and as a result had build in an 'overflow' session in the morning of the third day. That proved to be a good choice. All three exercises, on a vision statement, a network map and the OLM's, were done in 8 groups, corresponding to four KBP components.

The first exercise on vision statements was a relatively easy exercise which went well. The second exercise on the network maps prove more challenging but the final results of most groups were very good. Next to the network map, participants were asked to identify bottlenecks in the various relations that the identified actors had, and indicate these with a thunderbolt symbol in the network map. On another flipchart they were asked to suggest KBP

activities to overcome these bottlenecks. The network map and corresponding suggestions for KBP activities took a bit longer than initially planned.

The third, and last, exercise of the second day was on drafting Outcome Logic Models (tables) for the 4 most relevant actors of the network map. This exercise, although taking a bit more time than expected, also went well and important strategic suggestions and suggestions for changes in KBP Outputs came up.

The third day started with presentations of the various groups of their vision and Outcome Logic Models. Participants were asked to present the vision and 2 critical issues of their OLM's. The presentations were conducted per component, meaning that the two groups working on one component presented first, followed by a short Q&A sessions. The rest of day three followed the agenda.

The outcomes of the workshop was satisfactory with the actual results of the workshop (exercises and presentations), which exceeded expectations. There was a significant 'buy-in' of the participants and overall enthusiastic engagement in the Q&A's and the exercises.

The results of the exercises were a bit overwhelming in their level of detail, scope and actual number of suggestions and ideas, but this was the idea of the workshop in the first place: to get feedback, ideas and suggestions from the participants on the KBP initial plan, in order for ICIMOD to fine-tune and improve the project plan.

Partnership mapping

The workshop brought together professionals from different organizations including universities, research institutes and non-governmental organizations. It was a good opportunity for networking and partners were identified and engaged for planning and implementation of KBP activities. During the coming months formal relationships will be established and additional institutions will be added to the list.

Partner	Activity	Comp #
CSIRO-eWater	Integrated modelling and river basin decision support system	1, 2
IWMI	Water availability and agricultural adaptation options	1, 2, 4
CAS-IMHE	Water related hazard risk reduction in Koshi	3
CAS-IGNSRR	Water related hazard assessment and documentation of best practices in Koshi sub-basins in China	3
TU-CDGeog,	Water related hazard assessment and documentation of best practices in Koshi sub-basins in Nepal	3
NIH-R	Water related hazard assessment and documentation of best practices in Koshi sub-basins in India	3
DU-IEG, India	Economic evaluation of water ecosystem services, benefit sharing options and institutional/policy IWRM framework of the Koshi Basin under climate change	4, 5

Partner	Activity	Comp #
WECS, Nepal	Institutional/policy IWRM framework of the Koshi Basin under climate change in Nepal	5
CAS-IMHE	Institutional/policy IWRM framework of the Koshi Basin under climate change in China	5
TERI, India	Policy development	5
CAS, China	Policy development	5
Univ. Jena	River basin decision support system	5
Univ. Yamanashi	Groundwater assessment	2
DHM, Nepal	Water hazards and early warning system	3
DWIDP, Nepal	Water hazards and early warning system	
ADAPT-Nepal	Action research: Best practice in DRR (Nepal)	3
Gorakhpur Environmental Action Group	Action research: Best practice in DRR (India)	3
NIDM, India	Water hazards and early warning system; Knowledge dissemination and policy development	3
FMISC, India	Water hazards and early warning system; Knowledge dissemination and policy development	3
NIT-Patna, India	Support Water modelling study	2
IWM, Bangladesh	Support flood and water modelling; Knowledge dissemination and policy development	2
Helvitas	Action research to address key questions defined by baseline assessment report: gender, livelihood& PES in Nepal	4
	Showcase programmes in Nepal: Gender inclusive and equitable adaptation	5
Univ. Beijing	Action research to address key questions defined by baseline assessment report: gender, livelihood& PES in China	4
	Showcase programmes in China: Gender inclusive and equitable adaptation	5
TBD	Action research to address key questions defined by baseline assessment report: gender, livelihood& PES in India	4
TBD	Showcase programmes in India: Gender inclusive and equitable adaptation	5

Annex 6 – Inception Workshop Agenda

Workshop objectives

1. Share the objectives, expected outcomes, strategic approach, proposed activities and tentative work plan of the KBP with the partners;
2. Forge operational and strategic partnerships to implement the work plan;
3. Discuss issues of spatial and temporal scale of various analysis and criteria for selecting locations for in-depth analysis, strategies for data and information collection, and stakeholder interaction;
4. Initiate an impact pathway analysis for the initiative, showing how the results will be used and scaled up and out to make a positive change during and beyond the lifetime of the programme.

Schedule of activities

Sept. 03 (Monday)	**OPENING SESSION** **Chairperson: Dr. David J. Molden, Director General, ICIMOD** **MC: Dr. Eklabya Sharma, Director of Programme Operations (DPO), ICIMOD**		
Morning	Registration of Participants	09:00-09:30	Rekha Rasaily
	Welcome remarks	09:30-09:40	Prof. Hua Ouyang, Programme Manager, IWHM, ICIMOD
	Opening remarks	09:40-09:50	Dr. David J. Molden, Director General, ICIMOD
	Opening remarks	09:50-10:00	Dr. Russell Rollason, First Secretary AusAID, Australian High Commission, New Delhi
	Introduction to the KBP programme; Objectives and expected outcome of the workshop	10:00-10:15	Dr. S M Wahid, Coordinator, KBP, ICIMOD
	Introduction of participants	10:15-10:30	Chair
	Photo session	10:30-10:45	Photographer
	Tea Break	10:45-11:15	
	TECHNICAL SESSION 1 **Chairperson: Prof. Don Blackmore**		
	River water assessment at CSIRO & predicting hydrologic responses to Climate Change	11:15-11:30	Prof Bill Young and Francis Chiew, CSIRO

	eWater Source – integrated modelling and decision support system	11:30-11:45	Dr Robert Carr, eWater
	Impact of climate change on water resources and agriculture in the Koshi basin	11:45-12:00	Dr. Luna Bharati, IWMI
	Koshi River Basin Strategic Plan	12:00-12:15	Mr. Shriranjal Lacoul, WECS
	Discussion	12:15-12:30	Chair
	Lunch	12:30-13:45	
Afternoon	**TECHNICAL SESSION 2** **Chairperson: Prof. Hua Ouyang, Programme Manager, IWHM, ICIMOD**		
	Land use change in the Koshi basin	13:45-14:00	Prof. Zhang Yili, CAS-IGSNRR
	Water-agriculture-food security	14:00-14:15	Dr. Nilabja Ghosh, DU-IEG
	Socio-economic impacts of water-related hazards in the Koshi basin	14:15-14:30	Prof. Narendra Khanal, TU
	Groundwater potential in the Koshi basin	14:30-14:45	Prof. Futaba Kazama, University of Yamanashi
	Discussion	14:45-15:00	Chair
	Tea Break	15:00-15:30	
	Programme Components, Work Plan, Site Selection Criteria Discussion	15:30-16:15	Dr S M Wahid, Coordinator, Koshi Basin Programme
	Introduction to Impact Pathway Analysis Approach in Koshi Programme and outline of the Group Work Sessions Discussion	16:15-17:00	Dr. Garrett Kilroy, ICIMOD Consultant
	Reception Dinner	18:00	
Sept. 04 (Tuesday)	**TECHNICAL SESSION 3 – Group work 1** **Chairperson: Dr Arun Shrestha, IWHM, ICIMOD**		
Morning	Team building exercise Instructions to group work	09:30-10:00	Facilitator: Mr Bart van Halteren, MDF
	Group Work: 2 groups (A and B) 4 sub-groups based on components (1,2,3,4) (eight groups in total): Group A Tasks – Visioning Exercise	10:00-11:00	Facilitator *Moderators provided by ICIMOD*

	A1 Climate/Hydro./Agriculture A2 Water Hazards A3 Adaptation A4 Integrated Responses		*Rapporteurs to be selected by the groups*
	Group B Tasks – Visioning Exercise B1 Climate/Hydro./Agriculture B2 Water Hazards B3 Adaptation B4 Integrated Responses		
	Tea Break	11:00-11:30	
	Group work continues. Group Tasks – Network Mapping	11:30-13:00	Facilitator
	Lunch	13:00-14:00	
Afternoon	**TECHNICAL SESSION 4 – Group work 2** **Chairperson: Prof Don Blackmore**		
	Group work continues. Group Tasks – Outcome Logic Models	14:00-15:30	Facilitator
	Tea Break	15:30-16:00	
	Group work continues and preparation for plenary presentations	16:00-16:30	Facilitator
	Plenary: Presentation and discussion of group work	16:30-18:00	*Chair* *Facilitator*
Sept. 05 (Wednesday)	**TECHNICAL SESSION 5 – Group work 3** **Chairperson: Dr. Rollason Russell, AusAID**		
Morning	Impact Pathway discussion • Review of Impact Pathway Analysis Group work by component • Post Workshop Deliverables	09:30-10:30	Facilitator/ICIMOD
	Tea Break	10:30-11:00	
	Summary: 1. Recommendations and outcomes of the	11:00-12:00	ICIMOD

workshop 2. Agreement on action points		
Chair's remarks	12:00-12:15	Dr. Rollason Russell, First Secretary AusAID, Australian High Commission, New Delhi
Way Forward	12:15-12:30	Dr. Eklabya Sharma, DPO, ICIMOD
Closing remarks	12:30-12:45	Dr. David J. Molden, DG, ICIMOD
Vote of Thanks	12:45-13:00	Dr S M Wahid, Coordinator, Koshi Basin Programme
Lunch	13:00-14:00	

Annex 7 – List of Workshop Participants

Bangladesh

1. Prof. M. Monowar Hossain
Executive Director
Institute of Water Modelling
House No. 496, Rd. No. 32
New DOHS, Mohakhali, Dhaka – 1206
Bangladesh
Tel No. +88-2-8804590-1-6
Email – mnh@iwmbd.org

China

2. Prof. Zhang Yili
Institute of Geographical Sciences and Natural Resources Research
Chinese Academy of Science (CAS)
11A, Datun Road, Chaoyang District, Beijing, 100101, China
Tel No.: +86 010-64889790, Cell No. + 86-13501074491
E-mail: zhangyl@igsnrr.ac.cn

3. Prof. Yao Zhijun
Department of Natural Resources and Environmental Security
Institute of Geographic Sciences and Natural Resources Research (IGSNRR)
Chinese Academy of Sciences (CAS)
11A, Datun Road, Chaoyang District
Beijing 100101, China
Email - yaozj@igsnrr.ac.cn

4. Dr. Zhou Caiping
Institute of Geographical Sciences and Natural Resources Research
Chinese Academy of Science (CAS)
11A, Datun Road, Chaoyang District, Beijing, 100101, China
Email - zhoucp@igsnrr.ac.cn

5. Prof. Yang Xiaoliu
College of Urban and Environmental Sciences
Peking University
No.5, Yiheyuan Road Haidian District
Beijing, P. R. China - 100871
Email: xlyang311@gmail.com

6. Dr. Dong Qi
Division of International Organizations
Bureau of International Cooperation
Chinese Academy of Sciences
52 Sanlihe Rd., Beijing P.R. China, Postcode: 100864
Tel: 0086-10-68597246, 13501305801, Fax: 0086-10-68511095
Email: dongqi@cashq.ac.cn

7. Prof. Deng Wei
Director General
Institute of Mountain Hazards and Environment
Chinese Academy of Science (CAS)
No. 9 Sec. 4 Renmin South Avenue
PO Box 417, Chengdu,
China 610041
Tel No.: 86 028-85228023, Cell No. +86-13982162227
E-mail: dengwei@imde.ac.cn

8. Prof. Chen Ningsheng
Institute of Mountain Hazards and Environment
Chinese Academy of Science (CAS)
No. 9 Sec. 4 Renmin South Avenue
PO Box 417, Chengdu, China 610041
Tel No.: +86-028-85224993, Cell No. +86 13808171963
E-mail: chennsh@imde.ac.cn

9. Prof. Fang Yiping
Institute of Mountain Hazards and Environments, CAS
4 Duan Renmin Road, Chengdu 610041, P. R. China
Email: ypfang@imde.ac.cn

India

10. Dr. Anil Kumar Gupta
Associate Professor, Policy-Planning, Environment and Climate-change
National Institute of Disaster Management
Government of India, Ministry of Home Affairs
IIPA Campus, New Delhi, 110 002, India.
Tel No.: 0091-11- 23724311 Direct (office); Fax: 91-11-23702446, 23702442
Email: envirosafe2007@gmail.com, anil.nidm@nic.in

11. Dr. Nilabja Ghosh
A6 Staff Quarters
Institute of Economic Growth
University of Delhi Enclave
Delhi – 110007, India
Cell No. +91-9811912468
Email: nila@iegindia.org / nilabjag@yahoo.com

12. Dr. Shresth Tayal
Fellow, Water Resources Division
Area Convener, Centre for Himalayan Ecology
The Energy and Resources Institute,
Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi - 110 003, INDIA
Tel. (+91 11) 2468 2100 and 41504900, Ext: 2268
Fax (+91 11) 2468 2144 and 2468 2145
Email: styal@teri.res.in

13. Prof. Mahendra S. Nathawat

Indira Gandhi National Open University
New Delhi, India
Email: msnathawat@ignou.ac.in

14. Dr. Bijay K. Singh
Gorakhpur Environmental Action Group
Post Box No. 60, 224
Purdilpur, M G College Road
Gorakhpur -273001 (U.P.) India
Tel No. - +91-0551-2230004, Fax - +91-551-2230005
Cell No. - +91-9415335949
Email - geag@geagindia.org / geag_india@yahoo.com

Nepal

15. Mr. Sriranjan Lacoul
Division Chief – Joint Secretary
Water Resources Division/WECS
Water and Energy Commission Secretariat (WECS)
Singh Durbar, Kathmandu, Nepal
Tel No.: (+977-01) – 4211428, Fax: 977- 01- 4211425
Cell: 9851023257
E-mail: lacouls@gmail.com

16. Mr. Sher Bahadur Gurung
Central Department of Geography
Tribhuvan University
Kirtipur
Email: sherbahadur@gmail.com

17. Mr. Gautam Rajkarnikar
Deputy Director General
Department of Hydrology & Meteorology
Babar Mahal, Kathmandu
Tel No. 5530941 (Resi), Cell No. 9841275904
Email: gautamraj@hotmail.com / pinku_gautam@hotmail.com

18. Prof. Narendra Khanal
Central Department of Geography
Tribhuvan University
Kirtipur, Nepal
Tel No.: +977-1-4274533; Cell No.9841381322
Email: nrkhanal@enet.com.np; nrkhanal.geog@gmail.com

19. Prof. Lochan Prasad Devkota
Head of Department
Central Department of Hydrometeorology
Tribhuwan University, Kritipur
Kathmandu, Nepal
Tel No. +977-1-4331418, 5524539 (Resi)
Cell No. +977-9841510968

Email: devkotalp@hotmail.com

20. Mr. Kamal Ram Joshi
Under Secretary
Senior Divisional Engineer
Water Resources Division/WECS
Water and Energy Commission Secretariat (WECS)
Singh Durbar, Kathmandu, Nepal
Telephone: (+977-01) – 4211428, Fax: 977- 01- 4211425
Cell No.: 9841282557
E-mail: joshikamalram@hotmail.com

21. Dr. Luna Bharati
International Water Management Institute (IWMI)-Nepal
C/o Department of Irrigation Building
Room # 427 & 428, Jawalakhel
Lalitpur, GPO 8975 EPC 416, Kathmandu, Nepal.
Telephone: +977-1 5542306 / 35382, Fax: +977-1 5535743
Email: l.bharati@cgiar.org

22. Mr. Kedar Lal Shrestha
Institute for Development and Innovation (IDI), Nepal
P.O.Box 12088, Kathmandu, Nepal.
Tel: 977-1-533028, 537059
Email - klshresthai@ntc.net.np

23. Dr. Narendra Man Shakya
Coordinator, Post Graduate Program
Water Resources Department
Institute of Engineering, Nepal
Cell No. 9851027725
Email - Nms.ioe@yahoo.com, nms@ioe.edu.np

24. Mr. Adarsha Prashad Pokhrel
Chairman
Association for Development of Environment and People in Transition (ADAPT-Nepal)
Sangam Chowk, Kathmandu, Nepal
G.P.O Box : 13394
Tel : +977-01-4104298
Email : adarshasita@gmail.com; saibaba@wlink.com.np

25. Mr. Mathura Dangol
Dy. Director General
Department of Water Induced Disaster Prevention (DWIDP)
Pulchowk, Lalitpur
Post Box No. 13105, Kathmandu, Nepal
Tel: 977-1-5535407, 5535502, 5535503
Fax: 977-1-5523528
Email - dwidp@ntc.net.np

26. Dr. Fraser Sugden
Researcher – Social Sciences

Department of Irrigation Building
Room # 153 & 154
Tel No. +977-1-5535252
Fax No. +977-1-5535743
Email: f.sugden@cgiar.org

27. Dr. Juerg Merz
International Programme Advisor
HELVETAS Swiss Inter cooperation Nepal
GPO Box 688, Kathamdnu
+977 1 5524925 / +977 9851044421
Email: juerg.merz@helvetas.org.np

28. Ms. Harshana Shrestha
WEM, AIT, Thailand
harshanashrestha@gmail.com

International

29. Russell Rollason
First Secretary AusAID
Australian High Commission
New Delhi
Ph +91 11 4149 4465
Fax +91 11 2688 7492
Mobile +91 9810408111
Email - Russell.Rollason@dfat.gov.au

30. Prof. Bill Young
Director
Water for a Healthy Country Flagship
CSIRO Land and Water - Black Mountain
Christian Laboratory, Clunies Ross Street
Black Mountain ACT 2601
Australia
Phone: 61 2 6246 5745
Email: Bill.Young@csiro.au

31. Dr. Francis Chiew
Program Leader and CSIRO OCE Science Leader
Land and Water
Phone: 61 02 6246 5717
Fax: 61 02 6246 5800
Email: Francis.Chiew@csiro.au

32. Mr. Geoff Podger
Principal Research Scientist
Phone: 61 2 6246 5851
Email: Geoff.Podger@csiro.au

33. Prof. Don Blackmore

Ph: +61-418224735
Email - donaldblackmore@gmail.com

34. Dr. Robert Carr
Deputy Chief Executive, eWater
UC Innovation Centre, Building 22
University Drive South
Bruce, ACT, 2617
Telephone: +61 2 6201 5168
Email - robert.carr@ewater.com.au

35. Dr. Sven Kralisch
Department of Geoinformatics, Hydrology and Modelling (DGHM)
Friedrich-Schiller-University, Jena (FSU-Jena)
Institute for Geography
Löbdergraben 32, D-07743 Jena, Germany
Tel No.: +49 (0)3641 948860
Fax No.: +49 (0)3641 948852
Email: sven.kralisch@uni-jena.de

36. Mrs. Bettina Bohm
Department of Geoinformatics, Hydrology and Modelling (DGHM)
Friedrich-Schiller-University, Jena (FSU-Jena)
Institute for Geography
Löbdergraben 32, D-07743 Jena, Germany
Tel No.: +49 (0)3641 948860
Fax No.: +49 (0)3641 948852
Email: bettina.boehm@uni-jena.de

37. Prof. Futaba KAZAMA
International Research Center for River Basin Environment (ICRE)
University of Yamanashi
4-3-11 Takeda, Kofu, Yamanashi 400-8511
JAPAN.
Tel. 055-220-8193
Email: kfutaba@yamanashi.ac.jp

38. Dr. Vishnu Prasad Pandey
Researcher
International Research Center for River Basin Environment (ICRE)
University of Yamanashi, 4-3-11, Takeda, Kofu, Yamanashi 400-8510, JAPAN
Tel No. +81 55 220 8670 Cell No.+81 8067516443
Email: e_vishnupandey@yahoo.com, vishnu.pandey@gmail.com

39. Mr. Bart van Halteren
Director MDF Pacific-Indonesia (MDF-PI)
Jl. Bypass Ngurah Rai 379
Sanur, Bali, Indonesia
Tel: +62-(0)361-287020
Fax: +62-(0)361-270826

International Centre for Integrated Mountain Development (ICIMOD)

1. **Dr. David Molden**
   Director General
   Email: dmolden@icimod.org

2. **Dr. Eklabya Sharma**
   Director Program Operation
   esharma@icimod.org

3. **Dr. Hua Ouyang**
   Programme Manager – IWHM
   houyang@icimod.org

4. **Mr. Farid Ahmed**
   Email: fahmed@icimod.org

5. **Dr. Arun Bhakta Shrestha**
   Email: abshrestha@icimod.org

6. **Dr. S. M. Wahid**
   Email: swahid@icimod.org

7. **Dr. Mandira S. Shrestha**
   Email: mshrestha@icimod.org

8. **Dr. Garrett Kilroy**
   Email: garrett.kilroy@gmail.com

9. **Dr. Rajan Kotru**
   Email: rkotru@icimod.org

10. **Dr. Golam Rasul**
    Email: grasul@icimod.org

11. **Dr. Laxman Joshi**
    Email: ljoshi@icimod.org

12. **Dr. Ritu Verma**
    Email: rverma@icimod.org

13. **Dr. Manohara Khadka**
    Email: mkhadka@icimod.org

14. **Dr. Brigitte Hoermann**
    Email: bhoermann@icimod.org

15. **Dr. Ramesh A. Vaidya**
    rvaidya@icimod.org

16. **Dr. Bhaskar Karky**

Email: bkarky@icimod.org

17. **Hari Krishna**
Email: hkrishna@icimod.org

18. **Ms. Neera S. Pradhan**
Email: nspradhan@icimod.org

19. **Mr. M. S.R. Murthy**
Email: mmurthy@icimod.org

20. **Mr. Birendra Bajracharya**
Email: bbajracharya@icimod.org

21. **Ms. Anja M. Rasmussen**
Email: arasmussen@icimod.org

22. **Mr. Tek Jung Mahat**
Email: tmahat@icimod.org

23. **Mr. Deependra Tandukar**
Email: dtandukar@icimod.org

24. **Mr. Utsav Maden**
Email: umaden@icimod.org

25. **Mr. Ujol Sherchan**
Email: usherchan@icimod.org

26. **Mr. Ramesh A Vaidya**
Email: rvaidya@icimod.org

Annex 8 – Group Work Guidance Note

1. Visioning Exercise (Time: 60 minutes)

1.1 Exercise Objective:

The objective of this exercise is to get the participants in the component groups to think about what success would look like two years after completion of the programme. Visioning is a tool that helps make explicit where people want to go with their project – the sort of outcomes and impacts they want to help bring about. You may also refer to the Problem Tree and Logical Framework (provided) as background material. Groups should consider in particular the different actors involved in their component and how they are doing things differently compared with at the start of the programme.

1.2 Exercise Process:

You wake up 2 years after the completion of the project. Your project has been a success and is well on its way to achieving its goal. Describe what this success looks like to a journalist. Answer the following questions with particular focus on your component activities:

- What are the next users now doing or using differently/ behaving differently?
- How are project outputs disseminating (*scaling out*) to groups/ actors other than the next users?
- What political support is nurturing this spread, and how? (*scaling up*)?
- What are the end users doing or using differently/ behaving differently?
- What are the benefits the end users are enjoying as a result of the project?
- How have gender issues changed as a result of the project?

Take 5 minutes to individually read these questions and reflect on the vision. The Group Moderator will take on the role of Journalist and ask the group these questions keeping in mind the activities of your particular component. Keep the vision realistic. Ideas for the vision should be written on cards and placed on a flipchart sheet for each question. Use the last 15 minutes to prepare for the plenary presentation and arrive at consensus on the two most important points for the questions discussed. Then write the vision in full sentences.

1.3 Exercise Outputs:

Individual flip chart sheets with vision for your component/group. Ensure all relevant actors of the above questions have been incorporated. These visions will help participants carry out the subsequent tasks. ICIMOD will also integrate the visions after workshop into a common vision for the programme.

2. Network Mapping Exercise (Time: 90 minutes)

2.1 Exercise Objective:

Participants draw a 'now' network map, showing how the programme actors currently relate to one another. Participants then consider how these relationships need to change or improve to achieve the vision and then devise a list of actions needed to bring about these changes in relationships.

2.2 Exercise Process:

1. Identify relevant actors within and outside the programme:
    a. Who are the actors involved in the area your component is working in?
    b. Use post-it notes for nodes – label them. Use different colour cards for different types of node: programme implementers (Yellow), next user (Blue) and end user (Pink)
    c. Remember actors operate at different scales: community/local, your own organization, regional, national, international
2. Develop a network map of key relationships (e.g. research/work, capacity building, reporting, information/experience sharing, etc.) between actors focusing on your component, but linking where necessary to actors in other components.
    a. Use arrows to describe direction
    b. Use colour lines (or dashes) to describe relationship type, **provide a legend on the map**.
3. Finalise the network map and analyse. Indicate with a ↯ (thunderbolt symbol) where changes / improvements from the current situation are needed to successfully achieve the vision.
4. On a single sheet develop a prioritized list of actions needed, per actor or group of actors, to achieve the vision. For Plenary highlight the two most important actions.

2.3 Exercise Outputs:

A network map and a list of actions needed to achieve the vision. This information will help identify which actors will need to change their practice to achieve the vision and what actions the programme can implement. These changes and actions are captured in the next exercise: Outcome Logic Models.

3. Outcome Logic Models Exercise (Time: 90 minutes)

3.1 Exercise Objective:

The next part of the workshop involves distilling and integrating the information from the vision and network maps into the outcomes logic model. This is the final output of the group work and will feed into the Koshi programme planning. Outcome Logic Models are based on the premise that a number of actors will need to be doing things differently if the programme is to achieve its vision. It is constructed in table format and each row of the table corresponds to an actor and describes the changes in practice, knowledge, attitude and skills (KAS) that are needed to achieve the vision. It also describes the project strategies to achieve these changes. Project strategies include co-developing project outputs (knowledge, technology, etc.) with stakeholders, capacity building, communication, political lobbying, etc.

3.2 Exercise Process:

The Table below should be completed. A new row should be used for each actor or group of actors that will change in the same way. Use cards to populate this table on flipchart sheet. Use the outputs of the visioning and network mapping exercises to guide your choice of actors.

1. Actor(s) who will change in the same way	**2. Their change in practice / behaviour**	**3. Change in Knowledge, Attitude and Skills (KAS) required to achieve the vision (change in practice)**	**4. Programme strategies to achieve the change in KAS and practice**	**5. Programme outputs involved in changes in KAS and practice**

Notes on completing each column:

1. Actor(s) who will change in the same way:

- Start with this question: *if this project is successful, **WHO** will change? What groups of people or organizations will be affected?* Be realistic, refer to the previously made vision and prioritize the most 'affected'. Then, try to be as specific about the actor groups as possible- in some cases you have the names or exact location of the actor(s)- use them here.

2. Their change in practice / behaviour:

- A change in **practice or behavior** is a change in the way people (in this case, the 'actors' in the 1st column) ***DO*** things. So here, try to use action words- such as 'use', 'coordinate', 'plan', 'participate in', 'integrate', etc.

3. Change in Knowledge, Attitude and Skills (KAS) required to achieve the vision (change in practice)

- To be able to 'use' something, people usually need to first **know/ understand** it, and its advantages, or have developed the **skills** to use it, or at least to **believe or trust** the benefits of using it. Look at your practice change and your vision, and make explicit 2-4 KAS changes that are key to having the actor groups change their practice.

4. Programme strategies to achieve the change in KAS and practice

- How will your project contribute to make these changes happen? What are **your ideas** on how to help people change? Here, it may help to think what other projects have done before that has NOT worked well- **what will your project do that is different**? Better? Strategies can be the **way** (for example, co-develop instead of impose) you do things

5. Programme outputs involved in changes in KAS and practice

- These come straight out of your logframe and your contracted deliverables. Which is (are) your component's main output (s) related to this 'line of change? **If any existing Outputs need to be changed, or new Outputs are required, please write them in RED.**

In the last 15 minutes the participants should discuss and prepare, for plenary presentation, in one table the two most important Outcome Logic Models that are needed to achieve the vision for the programme.

3.3 Exercise Outputs

A series of Outcome Logic Model Tables, which will allow ICIMOD and partners, refine and improve planning for outcomes. All these Tables will be analysed after the workshop and integrated into the Koshi basin programme planning. They will also be used to prepare an Impact Pathway Model – this is a refined product, which will act as a broad communication tool to discuss Impact Pathways with partners and other stakeholders.

Some definitions:

Project Implementers – people and organisations directly involved in producing the programme outputs

Next users – people and organizations who directly use the outputs of the project

End users – the people and organizations that the next users work with. Often the end users are the ultimate beneficiaries (e.g., resource-poor farmers), but not always.

Scaling out refers to the increasing adoption of project outputs, e.g. from farmer to farmer, or community to community, within the same stakeholder groups.

Scaling-up refers to a vertical institutional expansion based largely on first-hand experience, word-of-mouth, and positive feedback from adopters to policy makers and the other stakeholders. Scaling-up is key to building a more enabling environment for the scaling-out process.

Outcomes – are defined as one or more of the following: (i) a change in behaviour, (ii) a use of a product (iii) benefit for the certain groups.

Activity – what we're doing inside the project

Outputs – what we produce that other people make use of, that solve the identified problems

Impact – impact can be defined as a vision or long-term development goal. It happens after the project life, and the project alone cannot bring it about.

Acknowledgements and Information Sources:

Ms. Sophie Alvarez, CIAT – International Centre for Tropical Agriculture, CGIAR

http://boru.pbworks.com, http://monitoring.cpwf.info