

Cooperation Fund for the Water Sector Pilot and Demonstration Activity Request Form

Activity Title: Learning from Agriculture: Wetland Interactions in Jiangsu Yancheng Wetlands, China	
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Country: China	Region: East Asia
Activity Proposed Start Date: July 2008	Activity Proposed Duration: 12 months
Cost Estimate: USD 50,000	
Implementing Organization Contact: International Water Resources Management Institute (IWMI)	

1. Background and Rationale:

Jiangsu province lies in the east of the PRC facing the Yellow Sea with a coast line of 1,040 kilometers (km). The total wetland area within the province comprises one of the biggest coastal wetlands in Asia. It is about 4 million hectares (ha) or 39% of the total area of the province, and includes natural wetlands of 1.74 million ha and artificial wetlands of approximately 2.26 million ha.

Yancheng municipality, one of northern Jiangsu's municipalities, is relatively underdeveloped within the province. It has a population of 8.1 million and is the province's second largest city (even larger than Nanjing, the provincial capital city). Out of its nine counties, three are ranked as provincial-level poverty counties. In total Yancheng covers an area of 1.5 million ha, and is the largest of the province's municipalities.

Roughly 70% of Jiangsu's coastal wetlands are located in Yancheng. The coastal wetlands in this municipality have a total area of 453,000 ha, stretching for about 580 km along the coast and covering about 30% of the municipality's area, comprising intertidal mudflats, creeks, salt marshes, and reed beds. Yancheng wetlands are located in the Huanghuai Delta, one of the four largest deltas in the PRC. The wetlands are bordered by the Yellow Sea in the east, upstream the Hongzehu lake catchment and are located downstream of the Huai river basin.

From a biodiversity perspective, the two most important areas surrounding the project area are the National Nature Reserve for Rare Birds (YNNRB) and the Dafeng Milu (David's Deer) National Nature Reserve (DMNRR). In recognition of the uniqueness of these wetland ecosystems and the species biodiversity that they harbor, the two reserves are listed in the Ramsar Convention and in the United Nations Educational, Scientific, and Cultural Organization's World Network of Biosphere Reserves. YNNRB is very rich in biodiversity, containing 480 plant, 370 bird, 281 fish, 48 mammal, and 45 amphibian species. Twelve animal species are under the country's first ranked, and 29 bird species are listed in the International Union of Conservation Nature Red List of Threatened Species. YNNRB is famous for the Red-crowned Cranes (*Grus Japonensis*). According to local estimates approximately 1,000 cranes, or 60% of the world's total, migrate every winter to YNNRB.

The wetlands of Jiangsu provide important ecosystem services. Local livelihoods are sustained through the capture and culture of marine and estuarine plant (e.g., reeds), and fish

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species. Wetland plants slow the flow of rivers and the mudflats absorb wave energy from the Yellow Sea, thereby controlling coastal erosion. The wetlands also improve water quality by absorbing some of the households and industrial waste, production of which is rapidly increasing in Yancheng municipality.

Yancheng's wetlands, despite their local, national, and global significance have been under serious threat. These threats include:

- (i) Land reclamation and conversion have significantly altered the ecology of the wetlands. Reclamation of the intertidal and lower shore marshlands has involved the construction of dikes for aquaculture and food crops. Conversion of the upper tidal marshlands has resulted in the clearing of the wetlands for crop production. A large part of the experimental and buffer zones have either been reclaimed or converted, which has effectively reduced the habitat area suitable for wildlife.
- (ii) The construction of roads and dikes inside the core zone and in the buffer and experimental zones has already altered the hydrology of the YNNRB and DMNNR. These structures have "compartmentalized" significant portions of the two reserves and has prevented the natural flow of water which has had several adverse ecological impacts.
- (iii) The introduction of alien species such as *Spartina alterniflora* originally intended to stabilize the mudflats, has expanded rapidly over a large area of YNNRB and DMNNR and has moved into the natural saltmarshes.
- (iv) Increasing pollution loads generated in the upstream areas of the many rivers crossing the wetlands have contributed to acute pollution levels of the tideland, the offshore sandbars, and the nearby sea. There are also potentially far reaching effects of declines in water flow and sediment from the rivers being experienced.

As a whole the Yancheng coastal ecosystem may be seen as a mosaic of diverse coastal habitats and users. Its management and protection thus cuts across many different sectors with a variety of conflicting interests and policies. In these circumstances sustainable wetland planning and management can only be successfully achieved when all multi-stakeholders are united, and engage in a collaborative process to define problems and possible solutions. Unfortunately, there are significant barriers preventing the development of integrated management for the valuable ecosystems in Yancheng. These barriers include:

- (i) No specific wetlands regulations exist to balance wetlands conservation with other conflicting activities including agriculture, industry, and urban development.
- (ii) No recognition of ecosystem services, and the potential way to improve downstream water conditions (like the Majiadao wetland area) to provide incentives for upstream users, who are relatively poor to internalize downstream costs.
- (iii) Current financial sources from each level of government, have been insufficient to support wetlands conservation, particularly in terms of compensating farmers who will be banned from farming or fishing within the wetland areas.
- (iv) There is inadequate technical guidance and services for ecotourism development in both natural and artificial wetlands, and there are also insufficient technical standards and procedures to ensure sustainable ecotourism development.
- (v) Lack of enforcement of environmental laws at the local level has led many enterprises or farmers to assume that direct discharge to waterways is the only solution.

- (vi) Lack of cooperation between responsible agencies and the lack of coordinated institutional arrangements results in different agencies promoting different ways of natural conservation through different financial sources.

The Jiangsu provincial and Yancheng municipality governments are highly aware of these problems, and understand the need to urgently address them. In recent years, with the acceleration of urbanization and industrialization, the issue of better coordination of wetlands functions among the agencies at the different government levels has increasingly been discussed. Also, integrated management of wetlands protection, biodiversity conservation, and watershed management have been raised. Improved alternative livelihood options to resource users have been emphasized as an integral part of the wetlands protection strategy. It is in the context of what has been described above that money is sought from the WTF to study and understand the linkages in the project site agriculture and fisheries is a significant feature and thus critical if developmental and conservation goals are to co-exist.

2. Objectives:

2.1 To contribute to the overall project's strategic planning process with regard to balancing its biodiversity conservation and poverty reduction/development objectives. This is to be achieved by providing an analysis of two key livelihood activities, namely agriculture and aquaculture in term of their importance to and impacts on the wetland and local livelihoods and possible scenarios or options for integrated management.

The above analysis will also provide a basis to:

- 2.2 Support the ADB's ongoing dialogue with the Government of China on the relationships between national agriculture, aquaculture, development and wetland management objectives and policies in China
- 2.3 Contribute to the ongoing efforts of the Ramsar Convention to better understand agriculture-wetlands-poverty reduction linkages and tradeoffs with a view to providing further guidance to contracting parties on how such interactions can be managed.

3. Scope and location of Work / Description of Activities (See Annex 2 for TOR):

The research will be conducted in the Yancheng National Nature Reserve for Rare Birds (YNNR) and the Dafeng Milu National Nature Reserve (DMNNR).

The key research components required for meeting the above stated objectives are:

- Assessing the contributions of agriculture and aquaculture to local livelihood systems (income, food security and human well-being) and the relative importance of these in the context of other ecosystem services provided by the wetland;
- Understanding the impacts of agriculture and aquaculture on the wetland system and resulting influence on other ecosystem services;
- Visually presenting key agriculture-aquaculture-wetland interactions through a mapping exercise that incorporates both spatial and temporal changes in land cover (use) patterns;
- Identifying the key drivers (e.g. national/provincial policies, poverty, lack of alternative income generating activities), that underlie the dynamic interactions between agriculture

and wetlands.

- Understanding the potential tradeoffs between agriculture and aquaculture and meeting the project's conservation and poverty reduction objectives, and identifying options for minimizing these tradeoffs

A multi-disciplinary, integrated approach will be adopted combining earth observation data (Remote sensing) and GIS tools based methodologies, livelihoods and policy analyses to investigate the dynamics of agriculture-aquaculture-wetlands interactions and the impacts of these interactions on local livelihoods as well as externalities namely national policy processes. To better understand the associations between conservation and poverty reduction/development issues in wetlands a conceptual analytical framework and methodology developed by IWMI (Annex 1) will be drawn upon and adapted to suite the needs of the current project. The framework has proved to be a useful tool for disaggregating the issues and drivers that impact a wetland in the pre-intervention stage and for identifying trade-offs between maintaining ecosystem integrity and biodiversity conservation on the one hand and poverty reduction and development aspects on the other in the post-outcome analysis. This becomes critical if one is to understand the equity and sustainability impacts of outcomes from project interventions in the Jiangsu Yancheng Wetlands in terms of conservation and poverty reduction aspects.

The activities to be undertaken are:

- A literature review of existing information relevant to the research topic. Key sources for such a review will include scientific journals and other technical reports or through past or ongoing projects in the selected sites.
- Liaising with the team of consultants developing the GEF proposal to explore the possibility of sharing secondary as well as any baseline data that may be collected by the consultants.
- Review of existing national, provincial and any other legislation, policy documents, plans and strategies related to wetland management, development, especially with respect to agriculture, aquaculture and poverty reduction.
- Acquisition of GIS/Remote Sensing (RS) images at the landscape scale that covers the entire wetland (Land Sat images multi-spectral) as well as at a higher resolution images (Aster / SPOT /ALOS/ IKONOS) to capture community level details within the two protected areas. Ground truthing to collect information on land cover pattern using GPS to be undertaken to study the spatial and temporal dynamics of the wetland.
- Selection of communities linked to each PA as a sample group for conducting the socio-economic and policy-related surveys. This will be based on a set of criteria (such as access of community to the core, buffer and experimental zones, heterogeneity in livelihood activities, poverty levels, distinct changes in land use in the area, etc). This information will be obtained from the secondary data and the landscape-scale spatial analysis which will help identify areas that combine agriculture/aquaculture-driven changes with high poverty concentrations.
- Draft report to ADB based on the literature review; analysis of secondary livelihoods and policy data and the maps generated indicating emerging linkages between agriculture/aquaculture-wetlands-poverty reduction and their implications
- Livelihoods-related socio-economic and policy-institutional data to be collected by using a combination of participatory methods and conventional surveys

- Analysis of data on biophysical parameters livelihoods and policy-institutions gathered through the field surveys
- Synthesis of final report linking the spatial and temporal environmental changes, socio-economic and policy-legal dimensions to arrive at the outputs specified in Section 5 below.

4. Implementation Schedule, Institutional Management Arrangements, and Proponent Qualifications:

Implementation Schedule

Activity	2008						2009					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Output 1: Report on agriculture/aquaculture-wetland-livelihoods linkages, tradeoffs and management options in the research sites												
Literature review	X	X	X									
Liaising with the team of consultants developing the GEF proposal	X	X	X									
Review of existing legislation, policy documents, plans and strategies		X	X	X	X							
Acquisition of GIS/Remote Sensing (RS) images		X										
Field visit by GIS/RS specialist & development of land cover/ use change approach			X	X	X							
Selection of sample groups surveys in each PA					X							
Draft report on emerging linkages between agriculture/aquaculture-wetlands-poverty reduction and their implications					X	X						
Socio-economic and policy-institutional field surveys in each PA							X					
Analysis of data on livelihoods and policy-institutions gathered through the field surveys								X	X	X		
Synthesis of final report linking the special, socio-economic and policy-legal dimensions									X	X	X	X

Proponent Qualifications

The International Water Management Institute (IWMI), a non-profit international research centre, and part of a worldwide consortium of 15 centres, supported by the Consultative Group on International Agricultural Research (CGIAR) has strived to understand and influence these

issues at global regional and national scales for over 20 years. IWMI through its work recognizes the importance of wetland ecosystems as repositories of biodiversity and the significant potential they have to support rural livelihoods; in particular, the critical need to integrate these ecological and livelihoods perspectives into wetlands conservation and poverty reduction initiatives. This is reflected in a dedicated research Theme to better understand the socio-economic, livelihoods and environmental tradeoffs between water management for food production and for the support of other ecosystem services of benefit to people, what tools can be used to analyze and evaluate them, and how agricultural water management can be modified to ensure sustainable net benefits. Also included in the scope of research are the inter-linkages and dynamics among different systems of natural resource governance, the extent of loss of ecosystem services through environmental degradation and the implications for the rural poor, particularly in terms of food security, income generation, gender equity, and health.

5. Expected Results (outputs/outcomes/effects/impacts):

Outputs:

1. Final Project Report on the relationships between agriculture and aquaculture, the wetland and related local livelihoods, paying particular attention to:
 - The spatial delineation of the impacts of agriculture and aquaculture on land cover/ use through mapping process of key agriculture-wetland interactions such as land cover/ use change
 - Their contributions to local livelihoods and their relative importance in the context of other ecosystem services;
 - Their impacts on the wetland system and resulting influence on other ecosystem services;
 - Key drivers (e.g. national/provincial policies, poverty/lack of alternatives) that underlie the above interactions with the wetland and associated livelihoods;
 - Potential tradeoffs between agriculture and aquaculture and meeting the project's conservation and poverty reduction objectives, and
 - Options for minimizing these tradeoffs
 - Implications of the learning at the project sites for national wetland management, agriculture, aquaculture and other development policies in China

Outcomes:

- 1.1 Better informed strategies for managing the impacts of agriculture and aquaculture at the site level based on an understanding of impact, drivers and tradeoffs.
- 1.2 A better understanding of the respective contributions of agriculture and aquaculture to local livelihoods assists the GEF project to identify suitable alternate livelihood strategies within the Buffer and Experimental (B&E) zones as compensation for lost or restricted access to core zone resources.
- 2.1 An additional resource available to the ADB and other stakeholders for future dialogue with Chinese authorities regarding national and regional conservation and development policies and options

3.1 Knowledge base for managing agriculture-wetlands-poverty reduction challenges available to the Ramsar Convention and member countries enhanced through access to the final project report.

Impacts:

- 1.1.1 Site-level negative impacts of agriculture and aquaculture practices addressed while detrimental effects on local livelihoods minimized.
- 1.2.1 Higher rate of success of the alternate/compensatory livelihoods component of the GEF project
- 2.1.1 Scope for information-based dialogue enhanced
- 3.1.1 Ramsar's Secretariat STRP better able to provide guidance to member countries on managing agriculture-wetlands-poverty reduction challenges

a) Measurable Performance Indicators:

- Draft interim report to the ADB by 31 December 2008. This shall include:
 - Land cover/use change thematic database illustrating the influence of agriculture and aquaculture on the wetland over time (this can be further feed into the Decision Support Systems (DSS) at National . regional level in accord with the relevant stakeholder/ executing agency (ADB)
 - Findings of an analysis of secondary data on livelihoods and policy linked to agriculture and aquaculture
- Final report to ADB by 30 June, 2009, the contents of which are outlined in Section 5

b) Stakeholders Participation:

The stakeholders to be involved are the local communities and government agencies (Protected area management, agriculture, aquaculture/fisheries) officials interviewed during field survey samples, and the ADB as the beneficiary of the research findings which will be linked to the overall GEF proposal and will provide additional evidence for ADB's dialogues with the Chinese government on wetlands and developmental issues. IWMI will also thus maintain close contact with the GEF consultants to ensure clear relevance to the development of the overall project proposal.

c) Scope for Replication/Use in Other Countries:

A key outcome is to present the results of the project to the senior levels of the concerned line agencies in order to obtain agreement to use the trade-off analysis methodology for evaluating options for balancing conservation and development objectives in other priority wetland sites in the country.

Cost Estimate:

<u>Inputs / Expenditure category</u>	<u>Total Costs</u> (in US\$)
1. <u>Civil Works</u> None	USD 0
2. <u>Equipment and Supplies</u> Office supplies (photocopying, printing, etc) and communication costs	USD 1,000
3. <u>Training, workshops, seminars, public campaigns</u> None	USD 0
4. <u>Specialists Services</u> Livelihoods specialist Fisheries specialist GIS/RS specialist Policy/Institutions specialist	USD 36,000
5. <u>Project Management</u> Overall coordination will be effected IWMI. Other aspects of project management such as per diems and travel are indicated in other line items of this budget.	USD 4,545
6. <u>Other Inputs</u> International Travel for research personnel to conduct field work	USD 6,950

7. Contingencies 3%	USD 1,500
Total PDA grant financed	USD 49,995

Annex 1: Conservation and Poverty Reduction Interactions and Trade-offs Analytical Framework

Recognizing the multi-disciplinary and multi-sectoral approach often called for in creating the diverse ecological, social, policy, legal, and institutional conditions necessary for implementing the wetlands wise use concept, a conceptual framework¹ was developed to help capture and organize these varied dimensions involved in implementing wetlands wise use projects that seek to link conservation and poverty reduction. In the overall synthesis of this report, the framework was also used to group lessons and best-practices to represent a logical process that reflects the diverse package of conditions and skills necessary to translate the concept of wise use into an effective management system for sustainable livelihoods and resource use options, within specific geographical, ecological, political and socio-economic contexts.

To develop our framework to better understand conservation and poverty reduction in wetlands, we initially searched for existing frameworks to ascertain if any suitable ones were already present that could be adapted for the purpose of our study. The conceptual framework we developed therefore draws on three well-established frameworks that are found in the literature and widely used in poverty reduction/development work, sustainable use and conservation discourse and institutional analyses especially in relation to common pool resources. The three frameworks are:

1. The Sustainable Livelihoods (SL) framework that provides a better understanding of the multi-dimensional nature and complex 'driving' forces and processes behind the poverty concept (Carney 1999; DFID 2001).
2. The Sustainable Use (SU) analytical framework developed by IUCN's Species Survival Commission (SSC) Sustainable Use Specialist Group (SUSG) for assessing factors that influence the sustainability of uses of wild living natural resources (Ahmed et al 2001; Zacagnini et al., 2001).
3. The Institutional Analysis and Development (IAD) Framework (Ostrom 1990; Oakerson 1992; Smith et al., 2005; Lorenzen et al., 2006) for investigating the use of common pool resources.

¹ Framework - in the context of our work, we use the broadest definition of "framework" as indicated by Schlager (1999) which states that "a framework organizes inquiry by specifying sets of variables of interest. A framework specifies classes of variables and their relationships to each other, providing a kind of intellectual scaffolding that gives a coherent structure to inquiry". A framework therefore allows the integration of several theories of action across domains that would otherwise be examined in isolation from one another and allows comparisons and evaluations (Koontz 2003).

Attachment 1

While the SL framework adopts a “people-centred” approach, the SU framework advocates an ecological or natural resources perspective. Together therefore the two frameworks help provide a balanced ecosystem-livelihoods approach. The IAD framework focuses on the interaction between local institutions and the environment and thus provides complimentary information to that obtained from the other two frameworks which are relevant in understanding the inter-relations between wetland conservation and poverty reduction processes (see Annex 1 for a more detailed description on each of the three frameworks). Interestingly as illustrated in Table 1, there are several common elements found among the three frameworks even though their origins and main focus vary.

Table 1. A comparison of the SL framework, SU framework and the IAD framework²

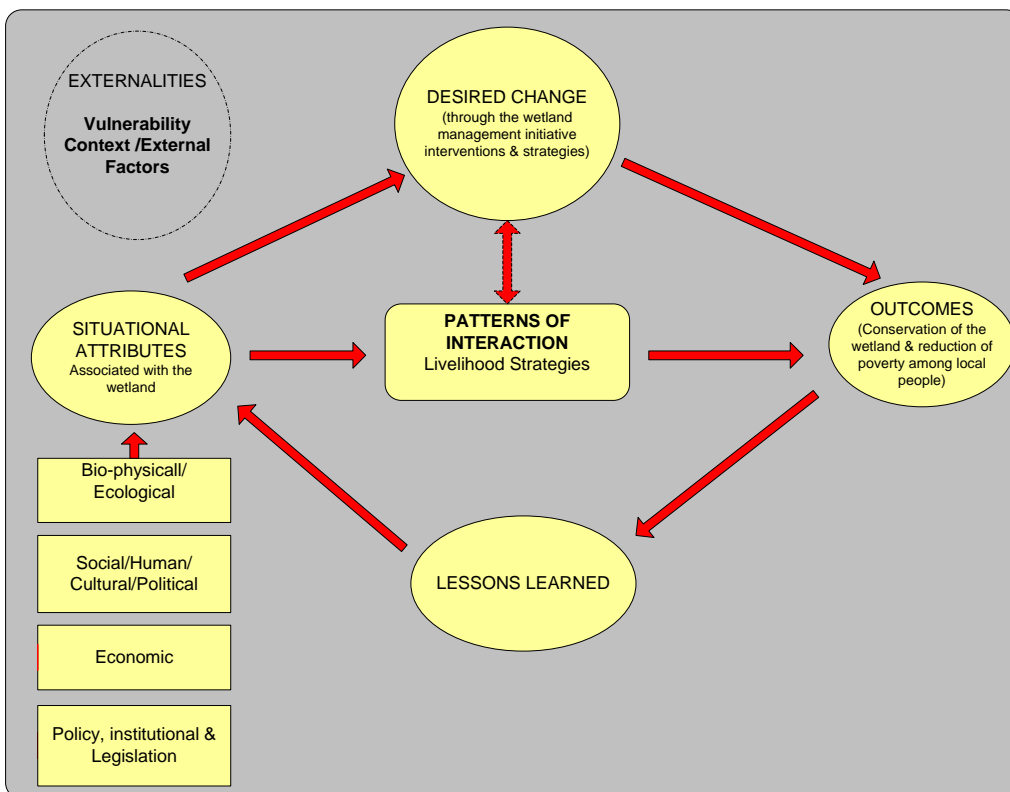
Different aspects/elements of the frameworks	Poverty & sustainable livelihoods	Sustainable use of natural resources	Institutional analysis in common pool resources
	SL framework	SU framework	IAD framework
Externalities that impact the ecosystem or the people	The vulnerability context describes external forces (usually beyond the control of the system) that influence peoples' livelihoods (e.g., natural events and political instability).	External factors (beyond the control of the stakeholder) that could be modifiable – e.g., conflicts, foreign debt) or not modifiable (e.g. natural disasters) and affect the natural resource.	Trends and shocks in terms of the physical environment and economic environment that may be beyond the level of the local people (i.e., the micro-level and instead acting at the meso-scale or macro scale).
Representing the multi-dimensional nature of livelihoods and natural resource use	Five broad categories of “capital” or assets are recognized – natural, human, social, physical and financial. People need a range of assets to achieve positive livelihoods outcome; no single category of assets on its own is sufficient.	Recognizes suites of factors related to the usable natural resource (ecological), user population (social); institutional, cultural and political and economic aspects governing resource use practices.	Recognizes the 5 livelihood assets of the resource users (natural, human, social, physical and financial). People possess a set of different assets to achieve different outcomes.
Transforming structures and processes	Includes policy, institutions and laws that govern poverty reduction and natural resource use.	Institutions recognized as one suite of factors (see above) that govern natural resource uses.	Includes policy, institutions and laws that influence natural resource use patterns.
Patterns of interaction	Describes livelihood strategies of the local people which are the range and combination of activities and choices that people make in order to achieve their livelihood goals.	Describes the natural resource use dependent activities in a system as extractive and non-extractive under the natural resource use suite of factors (see above)	Describes livelihood strategies of the local people which could include survival, diversification or specialization strategies.
Outcomes	Describes outcomes as the achievement and result of different livelihood strategies. Livelihood outcomes include: more income, increased well-being, reduced poverty and more sustainable uses of natural resources.	Describes the sustainable use of a resource being achieved through the different configurations of different factors (for example ecological, social and economic) and how they interact.	Describes outcomes as the result of the different interactions of different attributes of the natural resource. Outcomes could include environmental sustainability or livelihood sustainability.

² derived from Scoones, 1998; DFID 2001; Zacagnini et al., 2001; Smith et al., 2005 and Lorenzen et al., 2006

In terms of the assignment at hand (i.e., assessing whether poverty reduction and conservation related goals are simultaneously achievable in wetland management), drawing on relevant components from each of the established frameworks proved useful in designing a simple conceptual framework that suited to undertaken this particular exercise – i.e., to better understand conservation and poverty reduction aspects in wetlands.

In the proposed framework (Figure 1), all **situational attributes associated with the wetland** (such as the biophysical, social, economic, political and institutional) are used to describe the baseline situation existing at the wetland site. The **patterns of interaction** between the different types of attributes result in a particular type of **outcome**. The **desired change** that wetland management initiatives or actions generally hope to gain is to achieve a positive outcome that would increase ecosystem sustainability and help with poverty reduction. This in turn may change the wetland's attributes and result in a new situation. There is, therefore, a feedback, adaptive mechanism from the **lessons learned** through a management initiative. In addition, there are various **externalities** impacting the system (that may originate from either within or outside the wetland) and these may not only affect the attributes and patterns of interaction but also directly impact the outcomes. Further explanation of each element of the proposed framework is given below.

Figure 1 Proposed Analytical Framework for Understanding Conservation and Poverty Reduction within Wetlands



Situational Attributes associated with the wetland

This encompasses all the various factors or dimensions that are associated with the wetland status. For example the **Bio-physical attributes** of a wetland include the wetland's hydrological regime, soil quality, nutrient cycles and the ecological environment (such as lakes, lagoons, mangroves and fish) from which ecosystem services are derived. The ecological environment is especially important to those who engage in livelihood activities dependent on natural resources (such as fishing). Access by the poor to natural resources, including land, water, fisheries and wildlife is essential for sustainable poverty reduction. Overall, the hydrology regime could be considered as an over-arching factor by virtue of many wetlands' dependence on water flows, especially of coastal wetlands or those at the end of a river basin, and the influence of these may impact other biophysical and ecological parameters.

In the context of the framework, the **social, human, cultural and political attributes** are those that describe and define the local people living within the wetland system. **Human** attributes include the good health, skills and knowledge that make it possible for local people to pursue different livelihood strategies - essential if they are to utilise any of the other types of attributes. **Social** attributes represent the set of social resources people draw upon to achieve their livelihood outcomes. This includes family, friends, informal and formal social networks and political affiliations. **Cultural** attributes may be closely associated with how people view and utilise certain natural resources within a wetland.

Economic attributes in our framework include financial resources that people use to achieve their livelihoods outcomes. This includes available stocks (such as liquid assets like gold, cash or bank deposits) and regular inflows of money [such as income, pensions, remittances and other transfers from the state (e.g., welfare monies)]. Financial capital is the attribute that is likely to be least available to the poor. The economic conditions operating in the wetland and the access to markets are also taken into consideration here.

Institutional, policy and legislation related attributes all help shape natural resource uses and livelihoods in the wetland system. Local institutions governing the utilization and access to natural resources in the wetland, operational rules, tenure rights, the roles of legislation and law enforcement in relation to the use of resources in the wetland are all covered under here.

Patterns of interaction in our framework are the combination of different attributes associated with the wetland and how they interact, which in turn determine an outcome. For instance there are livelihood strategies that may be adopted (through the interaction of different attributes found in the wetland) that create a change in terms of the overall conservation and livelihood outcomes. In Output 1 (Lessons Learned Report) we attempt to illustrate the interactions between the different attributes both in terms of how they give rise to the issues which the project seeks to resolve, the nature of project interventions and their outcomes. To help illustrate these patterns of interaction, each case study was summarized in a matrix that attempts to track the role of various attributes in determining issues and shaping interventions (see Annex 2. link with the matrix and use some of these examples issues such as different problems faced by the local people in the wetland as well as the various management interventions).

Desired change

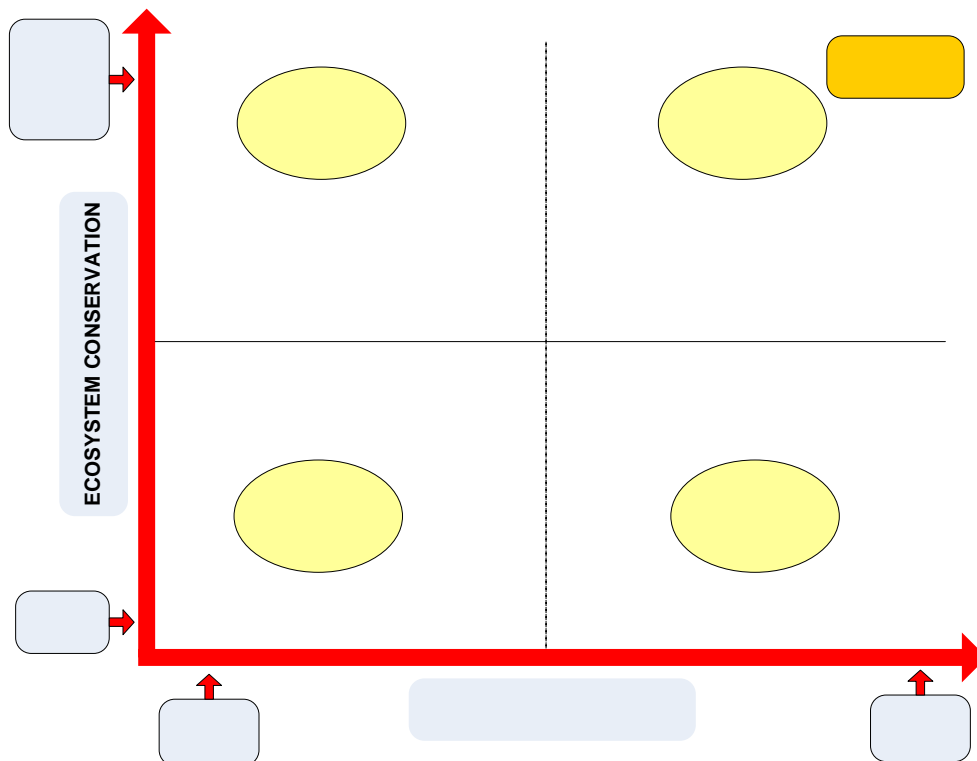
In our conceptual framework desired change refers to simply the change that is hoped to be brought about to the outcome by influencing patterns of interaction. For example, in the case of a wetland management initiative the desired change that is being sought in the wetland would

be to achieve a positive overall outcome in terms of environmental sustainability and livelihood sustainability. The desired change can therefore be achieved through project interventions or strategies that are brought about through the alteration of the patterns of interaction of particular attributes.

Outcomes

As indicated above, outcomes are determined by the situation of attributes associated with the wetland system and the patterns of interaction that occur. We consider a **successful outcome** to be one where both conservation and poverty reduction has been achieved within a particular wetland system. We take into consideration that there will invariably be varying degrees of success in terms of achieving this particular outcome and this could take on a number of different computations as shown in Figure 2. These different scenarios would result in various trade-offs between achieving optimal conservation and poverty reduction within a wetland. For example, there could be high levels of conservation achieved but no poverty reduction within a wetland, or the opposite scenario, where poverty reduction and development objectives are achieved but the ecosystem is degraded. In the case of our review, we measure levels of success by assessing how well *both* conservation and poverty reduction were achieved within a site. Therefore a case study that illustrates high conservation success, but has not addressed poverty issues would be considered unsuccessful in the context of our study.

Figure 2. Various Outcomes in terms of achieving conservation and poverty reduction objectives in a wetland



Lessons Learned

According to our analytical framework, the lessons learned from achieving a certain outcome through a particular pattern of interaction would feed back in an adaptive manner to the situational attributes and create a new situation. In Output 1 of our work, we adopt the framework to identify lessons learned and include the following research questions: a) What do the outcomes tell us about an intervention? b) What worked, what did not & why? c) What do these lessons tell us about the role of the different Attributes & their interactions? d) How sustainable are the new situations that lead to conservation and poverty reduction?

Externalities

In our conceptual framework, all elements are shown to operate within the context of externalities. This includes the external factors such as trends and shocks in terms of the physical, economic and socio-political environment over which local communities have limited or no control since these processes may be acting beyond the level of the local people, at the meso or macro scale. These externalities may directly affect wetland attributes, patterns of interaction and outcomes. External factors may include natural events such as flooding and droughts) or economic factors (such as globalization and foreign debt) and socio-political factors (such as conflicts and war).

Other points of consideration

Overall, while the conceptual framework helps organize the key issues, drivers, interventions, outcomes and lessons learned in a logical manner, we cannot lose sight of the fact that the range of spatial and temporal scales that operate within a wetland with a number of dynamic processes taking place in terms of both the ecosystem processes of the wetland and also the poverty dynamics and drivers, our conceptual framework should not act as a “static” tool.

Annex 2: Terms of Reference

Learning from Agriculture - Wetland Interactions in Jiangsu Yancheng Wetlands, China

1. Provide a Preliminary Report on Land cover/use changes illustrating the influence of agriculture and aquaculture on the natural wetland over time and emerging livelihoods and policy implications. The report shall also indicate the sites selected for further investigation of emerging issues in and around the two Protected Areas (PAs), with rationales for their selection.

Preparation of this draft Report is to involve the following activities:

- a) Conduct a literature review of existing information relevant to wetland management, agriculture, aquaculture and other development policy and regulatory frameworks and livelihoods in the study sites. Particular emphasis should be given to the contributions/impacts of wetland ecosystem services and agriculture and aquaculture to local livelihoods. Key sources for such a review will include scientific journals and other technical reports including those generated by past or ongoing projects in the selected sites.
- b) Liaise with the team of consultants developing the GEF proposal to ensure that the outputs of this research complements and supports the overall objectives of the GEF project, and to explore the possibility of sharing secondary as well as any baseline data that may be collected by the GEF initiative.
- c) Liaise with the focal point at the ADB in acquiring the GIS/Remote Sensing (RS) images necessary to conduct the spatial analysis at the landscape (Land Sat images multi-spectral) and community (Aster / SPOT /ALOS/ IKONOS) scales.
- d) Conduct ground truthing to collect information on land cover patterns using GPS as part of the study of the spatial and temporal dynamics of the wetland.
- e) Using the spatial analysis and a set of criteria relevant to the focus of the research, identify the communities to be included as survey samples in each study site, giving reasons for their selection.
- f) Identify and briefly describe the methodologies to be used in the field surveys to be undertaken under item 2 of this ToR

The Preliminary Report is to be submitted by 31 December 2008.

2. Submit the Final Report addressing the following:
 - The spatial delineation of the impacts of agriculture and aquaculture on land cover/ use through mapping process of key agriculture-wetland interactions such as land cover/ use change
 - Their contributions to local livelihoods and their relative importance in the context of

other ecosystem services;

- Their impacts on the natural wetland system and resulting influence on other ecosystem services;
- Key site-level and external drivers (e.g. national/provincial policies; upstream agriculture; poverty/lack of livelihood alternatives) that underlie the above interactions with the natural wetland and associated livelihoods, based on the application of the integrated analytical framework developed by IWMI;
- Potential tradeoffs between agriculture and aquaculture and meeting the project's conservation and poverty reduction objectives, based on the application of the integrated analytical framework developed by IWMI;
- Options for minimizing these tradeoffs, and
- Implications of the learning at the project sites for national wetland management, agriculture, aquaculture and other development policies in China

This will include the following activities in addition to those detailed in item 1 above:

- a) Subject to the availability of necessary on-site resources, conduct livelihoods-related socio-economic and policy-institutional data collection through a field survey in each study site;
- b) Analysis of livelihoods-related socio-economic and policy-institutional data gathered through the field surveys, and
- c) Synthesis of the final report linking the spatial and temporal environmental changes, socio-economic and policy-legal dimensions.

The Final Report is to be submitted by 30 June 2009.

3. Ensure close links with the ADB focal point as well as the team of consultants working with the ADB in planning the Yancheng Wetlands Protection Project to ensure the relevance of the proposed research to this project's objectives are maintained.
4. Maintain all financial records as required by the ADB and provide the financial reports as requested and stipulated in the agreement with the ADB.

Note on the study's scope:

The scope of the study will encompass the various natural wetland types found within the two Protected Areas in the context of interactions these natural wetland types may have with the man-made agriculture and aquaculture wetlands.