

Annex 3.4: One-page summary response to on Scoping Exercise: Climate Change and Development, Consultation on Key Researchable Issues

Climate Change Impacts on Fisheries: an under-represented issue

El Nino and related weather patterns have direct impacts on fish productivity off the coasts of Chile and Peru. We are already seeing a shift in the distribution of fish stocks in the North Sea. However research has been focused on developed countries. What information is available on the fishing sector in developing countries that have less capacity to adjust? What will the impacts be on poor fisher-folk reliant on fisheries for their livelihoods? What will be the impacts on the economies of countries that have fish as a key export commodity?

Global risk analysis

A global analysis of the vulnerability of fisher-folk to climate change has found that the fisheries of West, East and Central Africa are among the most at risk. The risk was analysed as a combination of the number of poor fishermen, the economic dependency on the fishery, adaptive capacity and projected climate change.

| Region | Top 20 countries at risk | Example Fisheries | |
|-----------------------|--|---|---|
| West Africa | Senegal Angola Mali Mauritania Morocco Niger Sierra Leone Bukina Faso | Coastal and floodplain fisheries in Senegal. Provides 7% to GDP. | <p>Index of poorest fisherfolk</p> <p>Countries likely to have the highest number of poor fisherfolk (number of fisherfolk related to GDP/Capita)</p> <p>Index of Poorest Fisherfolk</p> <p>0-250 250-500 500-750 750-1000 1000-1250</p> <p>Index of Economic dependency on Fisheries sector</p> <p>Index constructed to comprise export dependency / fisheries exports as % of total exports, importance of fisherfolk in labour force (%EAP) and reliance on stock (total catch in tons).</p> <p>Index of Economic Dependency on Fisheries sector</p> <p>0-10 10-20 20-30 30-40 40-50</p> |
| East & Central Africa | Zimbabwe Congo Dem Rep Mozambique Botswana Zambia Burundi | Shrimp fishery in Mozambique providing considerable export revenues. | |
| Latin America | Peru | Up-welling coastal fisheries, e.g. anchovy fishery. Peru produces 9% of the world's capture fishery production. | |
| Developed countries | Russia | Inland lake and floodplain fisheries, e.g. sturgeon fishery | |

Why do fisheries matter?

Employment: Fisheries resources are essential to the lives and livelihoods of about 51 million people, 98% of whom are from developing countries.

Macro-economic development: The fisheries sector contributes to GDPs e.g. 7.5% of the GDP in Namibia, Uganda 6%, and Ghana 7%, Senegal 7%.

Nutrition: Fish forms at least 50% of the essential animal protein and mineral intake for 400 million people from African and South Asian Countries

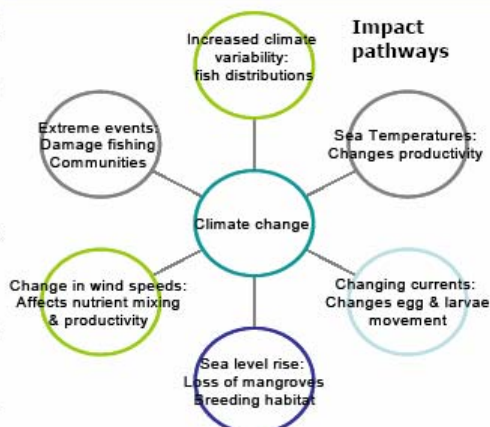
Export: The value of fish annually exported has increased from \$15 billion in 1980 to \$58 in 2002.

Issues to Consider

- What are the projected climate changes on a national scale, including changes in rainfall patterns?
- How can we understand the vulnerabilities of fisher folk and fishing communities?
- What are the adaptation limits of the fisheries sector?
- What are the economic costs of impacts on fisheries?
- What are the linkages with other sectors e.g. conflict of water between river/lakes fisheries and irrigation or energy generation?
- Is fisheries management (and co-management) adaptable to climate change?

Have links been established?

- Inland lakes: relationship between lake levels and production in Africa, related to rainfall
- Coral reefs: population growth and climate change will reduce productivity by 14-20%
- River fisheries: dry season flows critical



Comments on Scoping Exercise: Climate Change and Development, Consultation on Key Researchable Issues

1. Fisheries under-represented.

- Low representation of people consulted working within fisheries. Fisheries not selected as a main sector within regional reports– was it included within agriculture?
- Narrow view of coastal zone management: the food production element of fisheries is not considered, and the fact that fishing communities are most likely to live in these area so most vulnerable (double-exposure) e.g. 10% population growth expected within coastal area of Tanzania.
- Small island states not considered yet among the most vulnerable owing to reliance on coral reef systems for protection and food security.
- Lack of information on fisheries and climate change rather than a lack of risks.

Why are fisheries being over-looked?

- Uncertainty of results – need a greater detail on temperature, rainfall and changes in currents, as well as a measure of uncertainty
- Climate variation has been an issue for years and fisheries management is already adapted to deal with this – what about the long-term shifts/changes; what about increasing frequency of variation. Flood every 50 years – but how about floods every 2?
- Not considered a significant sector – however more understanding of its contribution to economies, livelihoods and nutrition. Inclusion in PEAPs as a sector with the potential to reduce poverty.

- Knowledge is poor but some examples (page 8)
 - South Asia: Flood plain fisheries (e.g. Mekong). If discharge rates of rivers slow and flooded areas decrease there can be a decrease in production. Dry season flows are found to be a major predictor of productivity of the majority of river fish species. In most African river basins discharge rates are anticipated to decline => yields may fall (e.g. Nile Basin).
 - East Africa: In-land lakes: for example there is a relationship between fish production and lakes levels e.g. Lake Chilwa in Malawi, Lake Chad – discharges from major rivers have been declining since the late seventies with a corresponding decline in fisheries production. A small peak in 1987 showed the benefits of higher discharges on fish production levels.

2. Fisheries should be considered an important sector

I. Poverty reduction potential of fisheries sector

- 38 million fishers employed by the sector;
- Contribution to GDP ranges from 0.5 to 2.5% e.g. Senegal 7%, Uganda 6%.
- Fisheries provides 100 million tonnes of fish for food – a per capita supply of 16.3kg
- Fish contributes 16% of the world's protein
- Export value of fish has increased from \$15 billion in 1980 to \$58 in 2002

II. Linkages with Water and Fisheries

- Water is ranked second overall with the sectors most affected by climate change.
- There is a critical link between water and fisheries. Increasing pressure on water resources will have an impact on the quality and quantity of aquatic habitat. Too

little water can prevent spawning, too much water (flooding) can wash away eggs to unsuitable habitats. The downstream linkages to fisheries mean that there are likely water conflicts with changes in climate. This includes linkages with agriculture, forestry, and hydro-power (energy).

- The nature of this conflict has not been explored.

III. Fisheries included as a MDG Target:

- Countries agreed to reverse the trend in biodiversity loss by 2010 and to restore collapsed fish stocks by 2015. is also under-threat by climate change:

IV. Fisheries has implications for food security

- Impacts on coral reefs: 25% less food in 15 years time.
- In Ghana reduction in fish production linked to an increase in hunting for bush meat – protein requirements

V. Fishing communities highly vulnerable

- High levels of poverty, low levels of social and physical infrastructure
- Low adaptive capacity e.g. considered more vulnerable to HIV and AIDS as low education levels for diversification, limited opportunities for saving, migratory patterns can lead to low social cohesion and support

VI. Sensitive ecosystems

- Can include coral reefs, flood-plains and inland lakes.

VII. Fisheries will be one of the areas affected by the priority issues (Table 1). All the following issues will affect fisheries:

- Impacts of sea level rise on coastal areas
- Impacts of climate change on wetlands
- Community based natural resource management: e.g. in Uganda provides livelihoods for 1.2 million people

3. **Geographic focus** is also supported by the work done on Climate change. The most sensitive areas by the global risk analysis are illustrated in the table below along with other important areas to consider [table unfinished but illustrates the sort of information we could provide].

| Region | Counties in the top 10 | Example Fisheries | Importance |
|-------------|--|--|---|
| West Africa | Senegal Angola Mali Mauritania Niger | E.g. coastal and flood-plain fisheries in Senegal Mali inland fisheries along Niger | In Senegal: <ul style="list-style-type: none"> • 100,000 direct jobs as fishers (90% small-scale) • 7% contribution to GDP • EU agreed to pay 12-16 million Euros/year in 2002 for access to fishery In Mali: <ul style="list-style-type: none"> • 70,000 employed |
| South Asia | Indonesia, | Inland | High index of poverty, |

| | | | |
|--------------------------------|--|---|---|
| | Vietnam, Bangladesh, Philippines, Cambodia | fisheries, estuarine and coral reef | high economic dependence on fisheries |
| Latin America | Peru | Up-welling coastal fisheries | Peru: <ul style="list-style-type: none"> Fisheries exports worth 1 billion in 2002 |
| East Africa | Nile basin, In-land lakes, Coastal fisheries Mozambique, Tanzania, Kenya etc | Lake livelihoods Artisanal coastal fisheries | Uganda: <ul style="list-style-type: none"> 6% GDP |
| Small island developing states | Pacific, Caribbean | Artisanal coastal fisheries | |

4. **Knowledge gaps** are not addressed in the report. For fisheries these include:

- Impacts on poverty reduction
 - Distributional impacts – are the poor always worse affected?
 - How will impacts of climate change on fisheries affect poverty reduction
 - How will impacts of climate change on fisheries affect food security
- Geographic/Regional focus: Impact pathways on the poor in a range of fisheries ecosystems and regions
 - West Africa –high level of poverty and high number of people reliant on fisheries
 - South East Asia – huge number of people reliant on fisheries
 - Small-islands states – double exposure
- Fisheries focus (several issues for further research highlighted within report)
 - Small pelagic up-welling fisheries e.g. Peru, Purse seine fleets of South Asian coastal fisheries and pirogue fisheries of West Africa. How do the socio-economic systems adapt?
 - Coral reef fisheries: Tens of millions in ~100 countries depend on reefs for food and livelihoods
 - In-land lake fisheries
 - River and flood-plain fisheries e.g. Nile Basin, Mekong and other South Asian rivers
- Cross-sector inter-linkages:
 - The nature of conflicts in water use with climate change e.g. forestry, agriculture, energy, fisheries
- Reduce uncertainty in vulnerability assessments of fishing communities:
 - Better understanding of the hazard i.e. climate changes including precipitation and sea-level rise and how these affect fishing communities [potential to link up with the Hadley Centre and other climate change modelling].

- More in-depth understanding of the poverty levels and adaptive capacity within fishing communities.
- Increased understanding on the interaction between the hazard (climate variability and climate change) and socio-economic conditions taking into account other stresses.
- Adaptation options within fisheries sector:
 - An understanding of the historic impacts of climate variation on fisheries and approaches to adaptation (e.g. flood-plain fisheries, coral reef fisheries)
 - General adaptation and adaptive fisheries management: For example, what is the adaptive capacity of coral reef fisher-folk in terms of fish production, aquaculture and trade?
 - Limits of adaptation within fisheries communities

