Poverty-Environment Indicators for Pakistan's Poverty Reduction Strategy II

Indus For All Programme, WWF - Pakistan

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I. A glance at the
Indus for All Programme

The World Wide Fund for Nature Pakistan (WWF-P) has been actively involved in nature conservation initiatives since the 1970s. WWF-P is currently implementing a number of programmes and projects that vary in focus and scope across Pakistan. The organisation is part of the world-wide WWF family that includes 30 National Organisations and Associates, 26 Programme Offices, a coordinating International Secretariat located in Gland, Switzerland, and over 5.3 million individual members globally.

One of the significant initiatives of WWF-P in the Sindh Province is the Indus for All Programme. Supported by the Embassy of the Kingdom of the Netherlands, the first 5 year phase of this Programme (2007-2012) is currently active in four ecological priority sites in 3 districts: Keti Bunder and Keenjhar Lake in District Thatta; Pai Forest in District Shaheed Benazirabad (formerly Nawabshah); and Chotiari Wetlands Complex in District Sanghar. Through its small grants programme ('The Partnership Fund') the Indus for All Programme also provides grants to community based organisations, non-governmental organisations, academia and government departments for projects within the Indus Ecoregion. The Programme has four primary objectives:

I. Establishing and improving community based natural resource management;

ii. Improving natural resource use and diversifying livelihoods by mainstreaming poverty-environment linkages at policy, planning and decision-making levels;

iii. Improving institutional capacity and awareness for sustainable management; and,

iv. Strengthening collaboration and institutional relationships for stakeholder interventions.

II. WWF-Pakistan's
poverty-environment linkages study

Addressing poverty-environment (P-E) linkages is now internationally recognised as an essential ingredient in poverty reduction and environmental management. The second generation of Pakistan's Poverty Reduction Strategy (PRSP-II) itself recognises the need to mainstream environment in all sectors and themes (pp. 206-208). The PRSP-II recommends the system-wide improvement of monitoring and evaluation indicators to effectively inform policy decisions. While this recognition is significant, it is important to take it a step further by designing and investing in clear steps to measure not only the strength of the relationship between poverty and environment but also monitor trends and fluctuations in this relationship. Therefore, clear and appropriate environmental indicators must be developed, and data collected annually to measure changes in the poverty-environment nexus. The analysis of this data will lead to not only important information regarding poverty-environment trends but also suggest new avenues of economic planning and policy implementation.

Study design and implementation

Over the past year-and-a-half, the Indus for All Programme has been conducting a poverty-environmental indicators and linkages study in its four priority sites. The study was designed to analyse data from the Programme's 2008 socio-economic and ecological baselines the results of which are uniquely suited to refining the Programme's interventions at the village and household level up to 2012. The study also offers a valuable opportunity to up-scale both the indicators it tests and the prescriptions it suggests beyond the village and household level. While the results of the study are interesting for conservation and development practitioners engaged in P-E work, it is the study design which would be of interest to policy makers and researchers, particularly the extent to which the design can be adapted to further large scale action research on particular areas of interest in the future.

Prior to making prescriptions, the Programme's P-E study empirically tests a series of relevant and hypothesised mechanisms through which the underlying causes of environmental degradation are transformed into actions that degrade the environment. For example, the study points to a possible inverse relationship at Keti Bunder between poverty (as measured by average monthly income of households) and environment (the percentage of households engaged in fishing). That is, for a point in time, namely 2008, data bears out that as income increases the percentage of households dependent on fishing decreases in villages covered by the Programme's baseline, apart from two exceptions. The study examines four other linkages at Keti Bunder relating to waterborne diseases, incomes from fishing, open space toilets and thatched roofs. A total of 20 linkages (refer to table 1) are examined across all sites, with many linkages rejected on account of issues relating to the relevance or appropriateness of data.

Table 1: PE Linkages by site and component[1]

Site	Poverty	Environment	Site	Poverty	Environment
Keti Bunder	Income	% Households fishing	Pai Forest	Income	Livestock ownership
	Income	% Income from fishing		Income	Waterborne diseases
	Income	Waterborne disease		Income	% Homes by toilet type
	Income	% Home by toilet type		Income	% Thatched roofs
	Income	% Thatched roofs			
Keenjhar Lake	Income	% Households fishing	Chotiari Reservoir	Income	% Household fishing
	Income	% Income from fishing		Income	% Income from fishing
	Income	Livestock ownership		Income	Livestock ownership
	Income	% Homes by toilet type		Income	Waterborne diseases
	Income	% Thatched roofs		Income	% Homes by toilet type
				Income	% Thatched roofs

1. Poverty-Environment Linkages Study. Karachi: World Wide Fund for Nature - Pakistan, Forthcoming.

The Programme's P-E linkages study has constructed and tested a total of 14 indicators. These indicators are intended to enable responses to patterns of deterioration ahead of major breaches to natural biological cycles of environmental assets at Keti Bunder, Keenjhar Lake, Pai Forest and Chotiari Reservoir. Again, a thorough process of testing based on datasets and consultations was followed.

It should be pointed out that relevant regional and international experience, literature reviews, and case study examination informs the process of identifying indicators and proposing ways of applying them. Moreover, activities of not only the Programme but also some of our partners are dependent on these indicators. For instance, an indicator for income and harvesting of fish at Chotiari Reservoir is intended to supplement the implementation of Chotiari's livelihood plan for which work commences in 2009.

Table 2: PE Indicators by site and component[2]

Site	Poverty	Environment	Site	Poverty	Environment
Keti Bunder	Income	Fish catch	Pai Forest	Income	Agricultural land ownership
	Income	Fuelwood		Income	Rangeland use
	Income	Water quality perception		Income	Fuelwood consumption
				Income	Fuelwood collection
				Income	Waterborne disease
Keenjhar Lake	Income	Rangeland use	Chotiari Reservoir	Income	Rangeland use
	Income	Fish catch		Income	Fish catch
	Income	Fuelwood		Income	Fuelwood

Prescriptions

The study produces prescriptions that not only rely on examination of empirically tested P-E linkages but, importantly, on intensive consultations. Focus group meetings were held at all four Programme sites, also key informant meetings, as well as meetings with experienced Programme staff. The consultations were particularly useful. For example, as concerns thatched roofs, interestingly the ubiquitous presence of katcha housing (thatched huts/roofs) is explained by humid weather conditions in the delta area and bears no relationship to varying levels of household income.

An example of a prescription emerging from testing the relationship between poverty and waterborne diseases emerges in the following way. The Programme learnt that disease occurrence is high in all three income classes constructed by the study, that the source of drinking water is a common one, and that staff should review and re-plan interventions (again, usefully, in specified villages) with a view to addressing declining real income as related medical expenses rise and a decline in productivity / earnings as restricted activity and bed illness days are experienced.

[2] Ibid

III. Refining poverty-environment indicators for the PRSP-II

Since the PRSP-II has been conceived as a long-term economic planning document which aims to reduce poverty and is implementing a "stringent results-based system to monitor and evaluate the implementation of the Poverty Reduction Strategy" (pp. 8) then it must identify unambiguous, measurable indicators, a clear strategy, and concrete series of steps to improve the poverty-environment situation in Pakistan. This review is by no means an exhaustive one. It focuses on areas that are of WWF's strategic, policy interest and where the Programme has significant expertise. Moreover, given the nature of the PE linkages study (as discussed above) the series of indicators suggested in this review emerge from not only WWF's experience but also from a substantive literature review[3] that was undertaken at the time the P-E linkages studies were being planned and also when the PRSP-II was released.

Agriculture and Rangeland Management

Agriculture is a high priority sector in the PRSP-II. The agriculture sector should be assessed not only in terms of income generation but also as an integral part of the environmental and local livelihoods context. The PRSP-II recognises this link to a certain extent as it promotes water efficient agriculture; increased crop productivity through improved cultivation techniques and agricultural inputs; support for agricultural credit; and promotion of agri-business. However, these prescriptions must be taken further by explicitly linking them with reduction in environmental degradation and poverty. For example, when discussing reduction in farmer cultivation costs planners should make the link with reduction in the use of pesticides and fertilizers.

These products constitute a significant portion of the chemical run-off that pollutes ground water aquifers, freshwater lakes and rivers including the Indus and are used intensively in farming in Pakistan. The use of chemical fertilizers and pesticides also inflate farmer input costs, deplete soil fertility and reduce overall profit margins. Techniques that can reverse this trend include Better Management Practices (BMP) and Integrated Pest Management (IPM); the promotion of new agricultural technologies such as the cultivation of saline resistant crops on marginal lands; and crop varieties suited to arid and hyper-arid climates instead of water intensive crops.

Useful indicators to measure changes in agricultural patterns may include:

I. Fertiliser consumption (100 kilograms per hectare of arable land) and changes in farmer input costs;
ii. Use of agricultural pesticides and changes in farmer costs;
iii. Change in land use patterns.

The move to high value activities is a welcome one particularly with respect to its focus on developing the meat production and dairy industries. However, improved livestock rearing should not be promoted at the expense of clearing land under forest cover and exhausting existing pastures. If anything, rangelands should be carefully maintained and their use regulated to ensure that a sustainable carrying capacity is maintained. Carrying capacity, in general, refers to the "maximum number of individuals of a species that can be sustainably supported by the resources of an ecosystem for an indefinite period [of time]."[4] For livestock, carrying capacity can be interpreted as "the maximum stocking rate possible without inducing damage to vegetation or related resources such as soil, water and wildlife."[5] In its ecological assessments the Indus for All Programme compared the carrying capacity of rangelands across our priority sites in Sindh.

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[3] Readings reviewed during the literature review include: U.N. Department of Economic and Social Affairs, Division for Sustainable Development, "Indicators of Sustainable Development." Available from http://www.un.org/esa/sustdev/natlinfo/indicators/isdms2001/table_4.htm; "OECD Environmental Indicators – Development, Measurement and Use," 1-37. Environmental Data and Indicators. [Database online.]; Chilonda, P, and Otte, J, "Indicators to monitor trends in livestock production at national, regional and international levels." Livestock Research for Rural Development 8, no. 18 (2006): Livestock Research for Rural Development . [Database online], in addition to several others.

[4] Indus for All Programme, Natural Vegetation Assessment 2008. Karachi: World Wide Fund for Nature - Pakistan, 2009. Available from: http://foreverindus.org/pdf/natural_vegetation_assessment08.pdf

[5] Ibid.

While the site specific results of the scientific study cannot be applied beyond Programme sites, the trends that these results suggest can be extrapolated beyond the immediate sites. These trends suggest that due to low primary productivity, the carrying capacity of arid lands is low; therefore, any increase in the number of livestock units poses the risk of overgrazing and desertification. Carrying capacity is also affected by an increase in the number of livestock units raised in a particular area.

Consequently, increasing livestock units as an isolated activity will not have the desired result of reducing poverty by increasing household income. It may well contribute to soil erosion, desertification and depletion of pasture carrying capacity. Instead, greater attention should be focused on improving the quality of livestock units, introducing new animal husbandry techniques and providing livestock vaccinations etc. Similarly, improved rangeland management techniques should be introduced at the district level with the assistance of forest, agriculture and livestock line departments. Pastoralists should be made aware of the carrying capacity of pastures to evaluate the proper type and number of livestock in a manner where competition among domestic livestock and herbivores for food is minimized. Developing supportive infrastructure, such as milk chiller plants and collection points, will help improve market links and may result in increased earnings.

Useful indicators for tracking livestock resources may include:

I.   Density of agricultural land (land use per sq km);[6]

ii. Livestock units per 100 people in agriculture.[7]

Indicators to measure livestock production may include:

i.   Total production of meat/milk/eggs produced by species slaughtered within national boundaries expressed in metric tonnes;[8]

ii. Per capita production of meat/milk/eggs production expressed as kilograms of meat per person per year.[9]

Indicators for livestock health may include:

i.   Cases per 10,000: Number of affected animals by the disease (sick animals and animals that died from the disease) during a set time period;

ii. Deaths per 10,000: Number of animals that died from the disease during a set time period;

iii. Outbreaks of disease: Number of occurrences of the disease in question within the country during a set time period;

iv. Vaccination, total: The number of animals vaccinated against the disease in question during a set time period;

v.   Vaccination coverage: Number of animals vaccinated against the disease in question during a set time period expressed as a total of species population.

Fisheries

The fisheries sector in Pakistan can be divided into 5 categories: deep sea, marine, coastal and freshwater fisheries and aquaculture. Overall the fisheries sector suffers from a serious lack of management and recognition of its economic importance. Little investment is made in terms of developing and improving fisheries management plans, infrastructure development and sustainable fishing practices.

At the inception of the Indus for All Pakistan, WWF-Pakistan conducted a series of site specific assessments and baseline studies for all four programme sites (Keti Bunder, Keenjhar Lake, Pai Forest, and Chotiari Reservoir). These studies

[6] Chilonda, P, and Otte, J, "Indicators to monitor trends in livestock production at national, regional and international levels." Livestock Research for Rural Development 8, no. 18 (2006): Livestock Research for Rural Development . [Database online]. Available from: http://www.lrrd.org/lrrd18/8/chil18117.htm
[7] Ibid.
[8] Ibid.
[9] Ibid.

included socio-economic baselines, ecological baselines, and natural vegetation assessments. Similarly, last year, the Programme conducted an intensive year-and-a-half-long economic valuation study on five different ecosystems in Sindh. These include: riverine forests, rangelands, deltaic, and freshwater ecosystems. Of particular interest for this discussion are the total economic valuations of the deltaic/marine and freshwater ecosystems represented by Keti Bunder and Keenjhar Lake. According to WWF's study fisheries and aquaculture is an industry that generates billions of rupees annually despite the decline in fisheries resources as a consequence of over-fishing, insufficient release of fresh water in the Indus River, cutting of mangrove forests, lack of fish stock assessments and poor management of both water and fisheries resources.

Mechanisation of the fishing fleet, increased demand of seafood for export, increased domestic consumption and shift in livelihood patterns have also placed tremendous pressures on fish stocks. As a result some resources have been depleted; others are over-exploited, while still others are facing the threat of depletion. Shrimp stocks, lobsters, crabs, ivory shells and some fin-fish show distinct signs of over-exploitation. According to a fact sheet on freshwater fisheries, produced by the Indus for All Programme, community reliance on fisheries as a source of livelihood at Keenjhar Lake has declined from nearly 80-90 per cent to 30-40 per cent.[10] "Similarly, a four year comparative analysis of fish catch at Chotiari Reservoir reveals that the total fish catch of 899 metric tonnes in 2003 fell to 694 metric tonnes in 2006."[11]

The PRSP-II should address aquatic and aquaculture resources as an important contributor to national income and a significant source of local livelihood. Consequently indicators based on an extensive fish stock assessment and monitoring the status of fisheries resources, should be designed to assess the health and sustainability of the fisheries sector. From October 2009, the

Programme will be conducting fish stock assessments in 3 of its priority sites (Keti Bunder, Keenjhar Lake and Chotiari Reservoir). Indicators can include:

i. Upward or downward changes in fish population as an indicator of utilisation of fish resources and an indicator of the release of freshwater in the Indus river and annual flooding of the Indus;

ii. Use (decline or increase) of banned fish nets as a measure of the effectiveness of legislation;

iii. Improvement or decline in fish population as an indicator of increase/decrease inflow of industrial effluents.

Water and Sanitation

The PRSP-II also addresses household access to sanitation facilities. In addition to measuring the number of rural households with access to sanitation facilities, the indicators proposed by the PRSP-II could also assess:

i. The percentage of rural households that have access to solid waste management schemes instead of dumping garbage in communal spaces;

ii. The percentage of households in urban localities that have access to solid waste management programmes and the percentage of functioning waste treatment plants (both solid and liquid waste).

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[10] Indus for All Programme. "Fisheries Fact Sheet: Keenjhar Lake". Available from
http://www.foreverindus.org/pdf/awarness_material/brochures/awm_fisheries_fs_keenjhar_lake.pdf .
[11] Indus for All Programme. "Fisheries Fact Sheet: Chotiari Wetlands Complex". Available from
http://www.foreverindus.org/pdf/awareness_material/brochures

Energy

In its discussion on energy security and efficiency the PRSP-II also identifies urban and rural households that are connected to the electricity grid. However, there should also be an assessment of households that are connected to or do not have access to natural gas. Most of the communities that the Indus for All Programme works with do not have access to gas or electricity consequently they rely heavily on fuel wood and kerosene which has significant environmental, monetary and health implications. Indicators in this context can include:

i. The number (percentage) of households that rely on natural resources to meet their energy needs. This data should be disaggregated to reflect the consumption of: fuel wood, kerosene, and livestock waste;

ii. Impact on fuel wood consumption patterns with change in monthly income: indicator will measure the level of pressure being exerted on fuelwood. Monitoring this indicator over a few years (during the time of the implementation of the (PRSP-II) will provide temporal data and help measure increase or decrease in pressure on fuel wood, which can help assess the state of forests and provide planning insight into the provision of alternate energy sources;

iii. Percentage of households where women and children suffer from respiratory illness or eye problems this can be linked to excessive smoke produced by the use of fuel wood, kerosene and manure etc.

As stated earlier, the discussion in this review note is not intended to be an exhaustive review of all the indicators articulated by the PRSP-II. Instead it focuses on areas that are of particular interest to WWF Pakistan, areas that have a significant poverty-environment dimension that remain unaddressed by the PRSP-II. While the Programme acknowledges that the PRSP process has made important progress in identifying and articulating the different dimensions of poverty collapsing environment as a sub-set of these dimensions remains problematic.

Clearly articulating the relationship between poverty and environment by introducing corresponding indicators during the PRSP review process is an important method of not only mainstreaming the poverty-environment nexus but also guiding future planning and poverty alleviation measures.

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