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THE ECONOMIC COST OF AGRICULTURAL LAND DEGRADATION IN TAJIKISTAN

It is estimated that 97% of agricultural land in Tajikistan has some level of erosion. Land degradation caused from erosion due to overgrazing is estimated to affect approximately 3 million hectares, or 85% of pastures (Asian Development Bank, 2004)[1]. Agriculture is the main employer as majority of the population depends on agriculture for their livelihood. A recent UNEP-UNDP Poverty-Environment Initiative (PEI) study estimates the economic cost of land degradation associated with foregone production on degraded and unused agricultural land to be in the order of 1,946 million Somoni (US$442 million) – 7.8% of Tajikistan's GDP (2010). However, the actual cost is likely to be much higher than this as it does not take into account the off-site costs of land degradation, such as damage to infrastructure. If the value of this foregone production was evenly distributed among rural households, this would result in a benefit of US$583 per household per year (based on an estimate of 757,608 rural households)[2].

This PEI study is the first attempt to present the importance of understanding the full range of costs of current land management practices. It supports further efforts to determine the economic benefit of adopting alternative sustainable land management (SLM) policies across Tajikistan.

The link between land degradation and poverty alleviation

Tajikistan's GDP per capita is the lowest among all Commonwealth of Independent States (CIS) countries and approximately 43% of the rural population lives on less than US$2.15 per day (TajStat, 2010). There is a close nexus between land degradation and poverty. Agriculture accounted for more than one-third of the overall economic growth between 1998 and 2004 (PEI brief), and it provided approximately 18% of GDP in 2010 (Statistic Committee). Furthermore, 18% of export revenue is attributable to agriculture, with cotton being the key export crop (Statistics Committee). Agriculture is the country's main employer and the sector employs 1,471,000 people (60% of the workforce). Moreover, approximately 5.5 million people, 80% of the population, depend directly or indirectly on agriculture (Statistics Committee). Land degradation is a key factor leading to low agricultural productivity and consequently low economic returns, as well as reduced incomes for farmers. Improved land management and agricultural performance is therefore the bases for improving local livelihoods and tackling poverty.

Agricultural output depends on the quality and quantity of Tajikistan's land. Land degradation results in significant costs on the economy through reduced agricultural productivity and/or higher production costs, and hampers poverty reduction.

The economic cost of land degradation

Agricultural land degradation results in impacts (costs) both on-site and off-site. On-site effects are those directly related to the land and properties where the erosion takes place. Off-site impacts, by comparison, are impact processes and activities outside of the agricultural area of the land degradation. These

1 In 2010 the total area of agricultural land was 3,746,000 hectares, with the cultivated area comprising 859,500 hectares (22%) of this total area (Statistics Committee)
2 Standard of Living Survey TAJSTAT

processes are largely due to sedimentation and deposition. Off-site effects can include damage to infrastructure and sedimentation of reservoirs used for irrigation and hydro-power. Both on-site and off-site costs should be considered in the economic assessment.

At the **national level** the on-site costs of land degradation associated with lost crop productivity and declines in milk production is estimated at **US$ 442 million per year – 7.8% of GDP.** While this initial estimate of the cost of land degradation to the economy may be considered an overestimate given that it is a gross, rather than a net value (that is the costs of production have not been deducted), there are a number of reasons why it may in fact be an underestimate. These reasons include:

- Many crops in Tajikistan have **low average production levels** relative to international standards, this may be partly due to land degradation and so losses in production across all crop types relative to potential sustainable levels may be relevant;
- Farmers may be undertaking **additional expenditures** on fertiliser to offset declines in soil fertility. These additional expenditures reflect part of the total cost attributable to land degradation.
- No estimates have been made of the **off-site costs** of agricultural land degradation – these include the contribution of degraded pastures to floods and landslides which have imposed significant costs to land, property and human life over the past decade. These are set to increase together with the cost of treating siltation of reservoirs used for irrigation and electricity production. These off-site costs could be significantly greater than the on-site losses associated with foregone productivity. For example a study has estimated that the costs of future disasters could be as high as 70% of Tajikistan's GDP; a proportion of this cost would be attributable to the contribution of land degradation (especially of pastures) to floods and mudslides.

Policy recommendations

Key recommendations for more progress on the work on the economics of land degradation in Tajikistan are:

Improved data management and coordination between Government Institutes. At present no public authority in Tajikistan regularly collects data on soil quality and land degradation. Further data on land degradation and agriculture is held by a number of Government Institutions making it difficult to collate and to establish an overview of the land degradation problem.

Generation of key physical data. Economic analysis of environmental impacts is dependent on good physical data. Missing information for Tajikistan include: the rate of soil loss across the country and factors contributing to this soil loss; the relationship between soil loss and crop productivity; soil fertility levels and predictions of how crop productivity will fall based on these levels (and how to compensate through increased use of fertilizers); information on the carbon sequestration rates of different soils and under different management practices; the bio-physical impacts of soil erosion and sedimentation, such as the proportion of flood damage costs that can be directly attributed to soil erosion; and, the carrying capacity of different types of pasture.

Determining marginal benefits. Information on the current cost of land degradation is important to demonstrate the range and scale of the costs. However, of greater use to policy makers is an understanding of the marginal benefits of moving from the current situation to an alternative, which reduces land degradation. This involves comparing the net benefits of current practices with the net benefits of alternative SLM practices.

Analysis for agro-ecologic regions / types of land degradation. Further site specific pilot studies should be undertaken to build up the evidence of the costs of specific types of land degradation across representative areas of the country. This could be based on an assessment of the impacts of land degradation and how this could be mitigated through SLM across different agro-ecologic zones. Pilot studies undertaken for each zone could then be extrapolated to similar agro-ecologic zones across the country.

Pasture as a priority issue. The majority of agricultural land in Tajikistan is under pasture, the livestock population is growing rapidly, and continued pasture degradation is likely to be an important contributing factor to potential future disasters such as floods and landslides. A priority topic for future analysis is therefore the affect of degraded pastures on the agricultural sector and the economy at large.

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