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Subject II

Environmental Degradation and Its Correctives in Agriculture Sector

Rapporteur: K.K. Datta*

The discussion started with the presentation of one full length paper and four abstracts of the papers. The concept of externality was articulated as it was felt that there should be clarity in the conceptual position of the term. It was suggested that the externality should be quantified based on the actual price and the estimated land price to support the accuracy of the fitted model.

The *Pigouvian* effect (polluter pay principle) was spelt out and its relevance in today's context particularly the use of taxes and subsidies to internalise the externalities was explained.

It was suggested that livestock based methane and carbon dioxide production be estimated, as some concerns are raised in respect of these gases and their emissions, for milk and other livestock production systems.

The impact of agro-service centres turned out to be positive in the super cyclonic area of Orissa, and such centres could be replicated as and when the need arises for rehabilitation of disaster affected people. A methodological framework for quantifying benefit and cost of generating electricity using biomass should be developed and the economic and financial viability be established. The present method of financing such schemes is not sustainable because as and when subsidy component is withdrawn the project success may be in jeopardy. It was suggested that the causes of environmental degradation and its extent should not be allowed to overlap. It was also suggested that the private benefit may conflict with social benefit and may in fact aggravate the problem of degradation.

After a thorough interactive session and based on the rapporteur's report some key areas were identified for further investigation.

1. Natural Resource Degradation

With the fragile natural resources, and dwindling village common lands seriously upsetting ecological balance, the symbiotic relationship between agriculture and animal husbandry is disturbed and adversely impacts the economy of the poor households. The relatively resource poor households have the highest dependence on

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the natural resources for their livelihood, and therefore degradation of resources affected them most. Degradation of land manifested in a variety of ways is weakening the production base, posing serious threat to sustainable food production and food security. Efforts of land improvements have not touched even the fringe of the problem. Moreover, land improvement measures are cost intensive and not necessarily affordable by majority of the farmers given the scale of production. Impurity of water both from surface as well as groundwater sources poses another serious problem. Unplanned expansion and tardy management of irrigation resources have contributed heavily to the deterioration of the natural resource base. In the quest for sustainable development these areas deserve prior attention. There is an absence of proper land and water use policy. A lot of damage is caused because of the absence of coherent and consistent policy on the use of natural resources. Inconsistencies among various policy measures defeat the objective of sustainable use of natural resources. It is becoming clear that useable land and water resources cannot be augmented to any remarkable extent. There is need, therefore, to give high priority to demand management.

2. Environmental Refugees

Unprecedented population growth and environmental degradation forces migration of people from rural areas into cities and towns. The combination of deforestation and overgrazing, coupled with increase in rainfall run-off and soil erosion, reduces aquifer recharge and soil fertility. Due to environmental degradation, a large population which had access to livelihood becomes vulnerable and at times this vulnerability forces them to take shelter in the bigger cities in search of livelihood. The involuntary migration could also be attributed to the environmental degradation.

Demand for water is pressing against the limits of the hydrological cycle to supply irrigation water in key food growing regions. The reduction of aquifer recharge combined with the growing diversion of irrigation water to domestic and industrial uses, limits the amount of water available to produce food.

Livestock population increases more or less in proportion with the human population, eventually exceeding the carrying capacity of land. Growing human demands are pressing against the limits of fisheries to supply seafood as also rangelands to supply meat and milk. The rangelands, a major source of animal protein, are also under excessive pressure.

3. Population-driven Environmental Deterioration

Population-driven environmental deterioration has come to be accepted as business as usual. However, given the severity of the problem this issue needs public intervention to prevent this process. The inevitable consequence of this process can

be averted if security is redefined, recognising that food scarcity is the principal threat to our future. This requires a major reordering of priorities, giving priority to such issues as illiteracy and poverty, protecting soil and water resources and raising investment in agriculture.

4. *Social Disintegration*

Social disintegration, often led by rapid population growth and environmental degradation, is undermining many states and their efforts to expand food production. The highly populated regions of a state have a greater risk of social conflict. Urbanisation and industrialisation enhance such risk and highly productive croplands are sacrificed. These have a deleterious effect on the society for food production.

5. *Degradation of Genetic Resources*

Genetic variation in crops and livestock has expanded and contracted over the centuries as a consequence of human interest. The basic policy dilemma of *on-farm* conservation stems from good properties of crop genetic resources.

Conceptually, the highest benefit-cost ratio of conserving genetic resources on farm is higher *ex-situ* conservation. This is because farmers adopting this strategy derive benefits directly from it and the society is benefited from increased diversity.

6. *Absence of Markets and Land Degradation*

In an economy where markets are absent, farmers depend on such informal sources of insurance as adoption of diversified cropping pattern and their diversities to cope with the climatic risk. The economic principles suggest that as an economy changes, maintaining intra crop diversity on farms should occur to the extent that trade-offs between productivity and diversity maintenance is consistent with social preferences. In such situation, formal crop insurance should be launched to ensure that farmers continue to preserve biodiversity on farm and use income enhancement opportunities.

The social cost benefits of crop biodiversity will depend on the social preferences and relative profitability of crop- mix. Although trade offs are inevitable on the frontier, production does not always occur on the frontier. Affluent farm communities may be willing to pay for conservation if they produce more than they need; in general, the poor farmers prefer short term production gains to long-term conservation interests.

7. Conservation Agriculture

The aim of conservation agriculture is to make better use of agricultural resources through the integrated management of available resources, combined with limited external inputs. It contributes to environmental conservation and to sustainable agricultural production by maintaining a permanent or semi-permanent organic soil cover. With the vast biodiversity and knowledge pool, Indian agriculture offers great potential. The need of the hour is to make it economical, competitive yet sustainable. This requires a comprehensive plan with clear focus and war like mission to avoid derailment of Indian agriculture. Currently there is a lot of debate about the pros and cons of organic farming. The proponents of the organic farming argue that it can meet both the increasing demand for food and preserve the quality of land resource in the long run. On the other hand, critiques argue that it is not possible to up- scale organic farming to the extent which is required to meet projected demand for food, given the limited availability of biomass required for farming. In view of this what is required is a balancing of both modern agriculture practices as well as organic/traditional farming practices.