

## ENVIRONMENTAL CONCERN IN NEPALESE AGRICULTURE

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### ABSTRACT

*Semi traditional to early commercial agriculture system of Nepal has now its economic move in transition from agricultural to early industrial track of economic development. An attempt has been made to assess the relationship between the emerging modern agriculture practices and environmental depletion. Some of the developmental challenges of Nepal like small land holdings, weather dependent farming systems, low per capita income, underdeveloped physical infrastructures and inefficient bureaucratic procedures are associated with comparatively higher cost of agricultural production. Natural disasters and human induced environmental degradation are closely associated with improved farming systems. Nepal has preferential ways of producing niche agricultural products by exploiting its inherent diversified climate to cope with the global open market challenges. Competitive agribusinesses along with the adoption of environmental protection measures keeping the strategy of import substitution and export promotion are the ways for sustainable agriculture development in the country.*

**Key Words:** Competitive agri-business, development infrastructures, environmental depletion, open-global market, sustainable development

### INTRODUCTION

Agricultural businesses, eco-tourism, industry, hydro-electricity and services by semi skilled human resources abroad are the major contributing factors for the development of the Nepalese economy. Current contributions of these areas to the national GDP are 33, 8, 8, 4 and 41 percent respectively (NPC, 2007). Remaining 6% is contributed by other sectors. Average per capita income in the country is US\$ 294, where 31 percent population lives under poverty line (MOF, 2007a). Agriculture is main base of Nepalese economy. Nepal has 21 percent of its total land cultivable, 32 percent of which is irrigated. Nepal, with its diverse climatic, biological and other natural resources and agro-based economy, has to achieve significant industrial development. However, in the current days, Nepal has been facing a number of economic challenges in its course of overall economic development such as low economic growth and per capita income, high degree of income poverty, poor social indicators and physical infrastructure, high cost of production and inefficient, cumbersome and circumventing bureaucratic procedures (MOF, 2005b). Land ownership is not only a factor as production asset but also a broader indicator of socioeconomic status. The pattern of land ownership in Nepal is asymmetric, and its distribution is highly skewed. Small and scattered production scale, weather based production systems, decreasing (by 25%, from 0.88 hectares to 0.66 hectare during 1995/96 - 2003/04) size of average holding (CBS, 2004) and relatively low use of production inputs as compared to South Asian average (SAWTEE, 2008) are other problems in Nepalese agriculture resulting in low productivity.

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In such context, Nepal has entered World Trade Organization (WTO), regional free trade agreements like South Asian Free Trade Area (SAFTA) and Bay of Bengal Initiatives for Multisectoral Economic and Technical Cooperation (BIMSTEC) and bilateral free trade agreements with 13 different countries across the world. Being signatory of these multilateral, regional and bilateral trade agreements, Nepal should enhance its competitiveness to cope with the challenge for Nepalese products in the global open market regime. Indo-Nepal bilateral trade agreement is based on Most Favored Nation treatment, and more than two third of Nepalese trade has been with India. Unsubsidized agri-business products in Nepal have to compete with heavily subsidized Indian products for their export market (SAWTEE, 2008). Besides, Nepalese agriculture has been facing colossal environment degradation resulting in remarkable annual loss of fertile land due to soil erosion and floods and environmental pollution due to haphazard and unbalanced use of agrochemicals.

Viewing the situations of Nepalese agriculture, an analysis of the system based on review of pertinent literatures was done to visualize the relationships between modern agricultural practices and environmental depletions and its implications on sustainability of commercial agriculture.

#### **NEPALESE AGRICULTURE AND ENVIRONMENTAL DEGRADATION**

Two third of Nepalese people are involved in farming business exploiting only 21% of cultivable land for their livelihood. Majority of the farm families are semi-literate or illiterate and scattered in rural settlements. An increase in population by 2.2% annually is producing additional labor force in the national labor market. Average size of land holding is small (0.5 ha) fragmented in scattered parcels of three thus limiting agriculture commercialization. Forty five percent of the farmers, having less than 0.5 ha, share only 13% of total land (CBS, 2004). Owing to modern sophistications and ever-increasing population, meeting people's increasing and changing needs and aspirations, on one hand, is a major burden to the country. On the other, crop profitability (particularly on cereals) is declining due to aforementioned agri-business related challenges. The consequence is over exploitation of natural and land resources.

Such resulted in degradation of environment deeply connected with permanent loss, depletion or pollution of natural resources, adverse weather, changing microclimates and unbalanced situations in the components of inherent chain in the ecosystems. Excluding adverse physiographical, ecological, geological and meteorological factors resulting in common natural hazards such as floods, earthquakes, droughts, cold and hot waves, hailstones, windstorm and cyclone, landslides, disease epidemics, glacial lake outburst flood (GLOF), avalanches, thunderbolt and fires, the environmental degradations are basically caused by human intervention in various aspects of modern technology adoptions. Ever increasing surplus labor forces are compelled in general to cultivate mountain slopes and other marginal lands in the country in meeting their employment and day-to-day basic needs. The consequence of such practice in long run is land resources and environmental degradation. There is a high and increasing pressure on the forest area because of rapidly growing population and their dependence on fuel wood for major share (77%) of energy required. Besides, encroachment of forest area for cultivation and settlements and thus human induced landslides, floods and water erosion have resulted in massive depletion of forest and agricultural land (NPC, 2007). The annual deforestation rate is highest in Nepal (1.8%) among the South Asian Countries, and more than 100 thousand hectares of forest were reported deforested within a short period of 1997 to 2000 (DFRS, 1998). However, forest

regeneration to an appreciable level is reported recently upon coming of community forest user groups (CFUGs) into forest management.

In the areas of semi-commercialized agriculture, farmers are injudiciously using various pesticides for an increased productivity and risk mitigation in crop production, even though an average application rate of 142 g/ha (Adhikari, 2002) and annual consumption of 176mt a.i. (Palikhe, 2002) of pesticides in Nepal is not considered high. According to Palikhe (2006), more than 60% of the applied pesticide remains in the soil materials polluting soil environment as a risk to terrestrial as well as aquatic biosphere. The residual effects of some of the chlorinated hydrocarbons like Chlorodane, BHC, DDT and aldrin remain in soil for a period of more than nine years (DOA, 2001). Imprudent disposal of obsolete pesticides is also of serious concern as a considerable quantity of persistent organic pollutants (POPs) stored in different warehouses would be detrimental to the prevailing ecosystem in the locality.

Average application rate of fertilizers in Nepal is relatively low. It is estimated in Nepalese situation that a general pattern of major cereals removed 310kg of plant nutrients from soil annually on a hectare basis. Since, on an average, only 29 kg of plant nutrients per hectare is added to soil through various fertilizers, net loss of plant nutrients from the inherent fertility reserve in the soil alarming (MOAC, 2007).

Likewise, various types of agricultural operations and hazardous effluents from agro-industries and processing plants, slaughter houses and veterinary hospitals and clinics, when not collected and disposed safely (Haung, 2004), are subject to water, air and land pollution in the country. Despite being the second richest country in water resources in the world, chronic shortages of water at various places of the country is a common problem. Impurities in water increase with its scarcity and introduction into water sources of various pollutants because of agricultural operations such as drainage from agricultural lands and processing units. Deforestation, agricultural mechanization, processing plants and crop production such as paddy are responsible for emitting air polluting suspended particles such as CO<sub>2</sub> into the atmosphere. Carbon dioxide (CO<sub>2</sub>) is considered as a very important green house gas (GHG), increasing concentration of which in the air is the threat to maintaining the country with Low Carbon Economy (LCE). The aim of a LCE is to integrate all aspects of manufacturing, agriculture, transportation and power-generation with technologies that produce energy and materials with little GHG emission. Recently, most of the scientific and public opinions have concluded that there is an unreasonable accumulation of GHGs (especially CO<sub>2</sub>) in the atmosphere; over-concentrations of which in the atmosphere would fundamentally change the earth's climate adversely affecting resource bases and lives in the foreseeable future. For which only humankind is blamed, and LCE is globally proposed as a mean to avoid catastrophic climate change and as a precursor to an ideal zero-carbon economy to maintain everlasting cycle of nature. Therefore, LCE is now considered as the necessary condition for modern agriculture as well.

## **STRATEGIES TOWARDS ENVIRONMENT FRIENDLY AGRICULTURE**

Nepal, a country of villages and townships, is a dwelling of people making their livelihood largely from agriculture. Having a mountainous geography, very little area is cultivable with poor farming facilities. Because of the economic challenges Nepal is facing, its products cannot compete directly with the commodities of the international trading partners mentioned above. Presence of plenty of resources with great diversities can be valuable assets to the country for producing agricultural unique products to exploit markets in the

international trading arena. In view of the agricultural development situations in the country and environmental concerns aforesaid, Nepal can strategize its agri-businesses promotion and environmental protection through harnessing comparative advantages of diversified agro-ecological areas and microclimate there in producing niche products for the potential niche markets especially in India, China and other south Asian countries. Organic products, popular products associated with specific geography and the products with distinct uniqueness are the possible areas of production promotion for export markets (MoF, 2005b). Some commodities such as honey, cardamom, tea, coffee, zinger, vegetable seeds, off season fresh vegetables and citrus fruit (especially mandarin) are the areas where Nepalese farmers can exploit the opportunity. In such view, Nepal has agri-business promotion policy with import substitution and export promotion instruments (MOAC, 2004). However, agriculture sector in Nepal, though mentioned getting top priority in each of the periodic plans and fiscal years, is subject to low budgetary disbursement (Annex 1). Actual budgetary disbursement does not indicate the above stated scenarios. The state has provided the sector with less than 4% of its total annual budget in any year, while the sector is contributing more than 33% to national GDP. This does not coincide with the mission of attaining high economic growth through the intensive and accelerated growth in agriculture sector.

Niche products identification, promotion of such productions in value chain approach and quality assurance and certification are prerequisites for an assured international market of such unique products. In the value chain management, quality standards, timely and sizeable supply and competitive prices are also important as basic requirements of the products' movement into the global market system. Regular production of such products and their competitive disposal in the export markets also needs maintenance of consumer-friendly environment, and assurance of no or low creation of environmental (air, water, soil and/or other) pollution in their production and processing, and thus necessitates very low emission of carbon into the surrounding biosphere. Quality concerns of them are also connected with good agricultural/manufacturing/hygienic practices (GAP/GMP/GHP), sanitary and phytosanitary requirements and good record keeping of such practices for the products' quality assurance and proving them free of pesticides and other harmful chemicals residues, certification by an internationally accredited laboratory and free movement to trans-border markets.

Thus farming with no or low use of agrochemicals becomes a strategic destination towards achieving sustainable development of Nepalese agri-businesses. Such would help to create low carbon economy in the country. Promotion of alternative energy sources like biogas, improved cooking stoves and solar energy from photovoltaic system is important also in achieving environment friendly agriculture development. The Alternative Energy Promotion Centre has been working on such promotions through a twenty-year master plan to reduce pressures on forest resources mainly due to fuel wood supply (G.C., 2003). Peoples and different devices in use can utilize the energy sources efficiently and recycle the wastes in a way to have a minimal GHGs output. Furthermore, it has been proposed that to make the transition to an LCE economically viable, we should cost on GHGs production through an approach such as emissions trading and carbon taxation based on natural and social justice.

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## ANNEX

Annex 1 Actual expenditure on Agricultural Extension and Research (Rs '000000)

Years	2001	2002	2003	2004	2005	2006	2007
Total Budget	99792	96125	102400	111689	126885	143912	168995
Ag sector budget	3928	2424	2473	2692	3365	3516	4177
% of Total budget on agriculture Research	3.94	2.52	2.41	2.41	2.65	2.44	2.47
% of Ag-Share to GDP at current price	577.7	297.7	300.5	311.2	295.0	66.2	347.7
% of Ag-Share to GDP at constant price	37.40	36.49	35.93	35.19	33.87	33.07	33.0
	37.53	37.49	37.38	37.57	36.78	36.11	36.03

Source : MoF, 2001; MoF, 2002; MoF, 2003; MoF, 2004; MoF, 2005a; MoF, 2006; MoF 2007b.