Impact of Agricultural Practices on Environment with Special References to Biodiversity and National and International Policies

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Abstract : It is well known that about one third of the world's land surface is under agriculture. Environment has a direct influence on existence and sustainability of agriculture as it depends upon theuse of natural resources. Undoubtedly, agriculture has a greater environmental impact on Earth than any other single human activity. Conventional agricultural farming practices will not provide the food and fibre needed by burgeoning population in the future. In general, the question arises, can we develop and adopt the agriculture farming practices that can produce the food needed to feed an increasing population and simultaneously sustain our environment on long term basis. Under most systems of agricultural production at this time, it is not a question of if, but rather when, virtually all of the natural habitat on the planet will become degraded to the point that it is no longer productive and then abandoned for future generations to find ways to rehabilitate and repair. Farmers are beginning to invent, adapt and adopt a wide range of new technologies and approaches but most of them are not environment friendly. Hence, this paper reviews the linkage between environment and agriculture and the resultant impact of agriculture on environment.

Key words : Conventional agriculture, Environment, Natural resources and sustainability

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Introduction:

Growing demands on agricultural land for food, fibre, and fuel are predicted to rapidly increase in coming decades with continued population growth (Bommarco et al., 2013). Agricultural land occupies 5 billion hectare of the land surface on earth and increases annually by 13 million hectare (FAO, 2002).

Globally environment is changing day by day and now it has become a challenge to living forms due to the very ugly fact that every nation is trying to develop without taking into consideration the environmental impact of degradation and pollution of agricultural lands. People are using plastic bags, which are environmentally dangerous products, for their daily needs mainly for shopping purposes as a result of which, the environment and agricultural lands are thereby being polluted. However, both the business sector and the individual consumers have important roles to play in reducing the environmental and agricultural land pollutions. Over the years, while the business sector has strictly reduced its environmental and agricultural land pollution, such as, waste water and solid waste discharges and energy use, consumers have increased environmental and agricultural land pollution. However, the negative environmental impacts and agricultural land pollution have raised the concern of the global community and the caring media around the world.

Environment and Agriculture:

There is good evidence that delaying and reducing the rates of fertilizer application can reduce overall costs and pollution without hurting yields (Tilman et al., 2002). From the mid nineteenth century to the middle of the 1990s some 150 years, humans converted close to 1 billion hectares of forests, grasslands, and wetlands to farmlands. Almost in every instance, soil erosion rates increased many times from what they had been in the natural habitats. Since, 1950 about a third of U.S. cropland has been abandoned due to erosion (Hawken et al., 1999). Soil erosion rates in the United States pale by comparison to those in Asia, Africa, and South America, where losses average 30 to 40 metric tons per hectare per year (Pimentel et al., 1995). Since 1945, moderate, severe, or extreme soil degradation has affected 1.2 billion hectares of agricultural land globally, an area the size of China and India combined. Some 80 per cent of this degradation has taken place in developing countries (Hawken et al., 1999).

The Food and Agriculture Organization of the United Nations (FAO) estimates that in developing countries alone at least 13 million hectares of forest are lost to agriculture each year. A recent study in Europe concluded that agriculture was the main cause of phosphorus pollution in the coastal zones of Mediterranean countries (Ongley, 1996). Globally, the area of irrigated agriculture has increased steadily from 47.3 million hectares in 1930 to 254 million hectares in 1995 (Kirda, 1999; Shiklomanov, 1998). About 40 per cent of the world's food is produced on the 16 percent of agricultural land that is irrigated (Tilman et al., 2002). Three crops account for 58 per cent of all irrigated land: rice (34 per cent), wheat (17 per cent), and cotton (7 per cent). The efficiency of water use varies from region to region and from crop to crop (Gleick 2000).

Much of the planet's methane (CH4) emissions come from the production of livestock and continuously flooded rice paddies (Wassman et al., 2000). One estimate places total methane emissions from rice at some 10 to 15 per cent of total global me hane emissions (Wang et al., 2000). Increasing the concentration of carbon dioxide causes partial closure of plant stomata (the small openings in plant leaves that control the flow of air), which in turn decreases evaporative cooling and can cause leaf temperatures to exceed air temperature (Shafr, 2002).

Linkage between Agriculture and the Environment:

Environmental impacts are the result of intensification of agriculture which signifies unsustainable resource use and use of modern inputs such as chemicals and machinery. Water, soil, air and biodiversity are the common domains for all agricultural practices and any environmental impact resulting from agriculture would reflect in these domains. Thus, environmental impacts arising from agriculture are presented under these domains of impact (Air, Bio-diversity, Soil and Water). Emeka (2008) concluded that climate change was among the major global environmental problems threatening the survival of the entire human race. It was one of the global threats with serious implication on agriculture, natural ecosystem, water supply, health, soil and atmosphere, the elements which constitute the support for long term sustainability of life on earth. Crop yield is affected by many factors associated with climate change which include temperature, rainfall, and other extreme weather events. Similarly, Farauta et al. (2011) concluded that climate change was a contributing factor to food price crises, and its impacts on agriculture in developing countries is expected to get more serious.

Agriculture's impacts on the environment:

Agriculture can either sustain or degrade the environment (Millennium Ecosystem Assessment, 2005) has documented agriculture's main negative effects on land and freshwater, as well as the importance of agricultural landscapes in providing products for human sustenance, supporting biodiversity and maintaining ecosystem services. Negative impacts such as conversion of forests, grasslands and other habitats for agricultural use, degradation of soil quality (20 per cent of African soils are seriously degraded), pollution of soil and surface water, aquifers and coastal wetlands through excessive or inappropriate use of pesticides and fertilisers, significant loss of crop and livestock genetic diversity through the spread of industrial monocultures, reducing resilience in the face of climate and other changes.

Many agricultural activities can have environmental impacts on land, water, and air. These environmental impacts will differ based on the farm location, farm type, and the specific farming and land management practices used as well as the timing of these practices (i.e., season of fertilizer application). For instance, nutrients and pesticides can run off agricultural fields into surface water bodies or leach into groundwater. Increased phosphorus loading from agriculture is one of several factors that have resulted in algal blooms in both Lake Erie and Lake Winnipeg (Michalak et al., 2013; Schindler et al., 2012). The effects of climate change on agricultural production vary from one region to another depending on the prevailing climate of the region, hence affects agricultural productivity differently. Nigeria, like all other countries of sub-Saharan Africa, is highly vulne- rable to the impact of climate change (Obioha, 2009; Muhammed et al., 2011). Aluko et al., (2008) was of the opinion that climate change has significant impact on fragile soil and traditional farming systems.

Negative Effects of Agriculture on our environment :

The practice of agriculture has been around for hundreds of years and has become a basic way of life for a majority of the world. Gradually over the years, agricultural processes have flourished and become more efficient. However, now with new research and technological developments, scientists have found the negative effects that farms have had on the environment. For world's total anthropogenic carbon dioxide emissions, agricultural activity is responsible for 20% of the total (Litterman et al., 2003). Modern agricultural techniques were typically wasteful in their use of fertilizers. Often, many farmers add large amounts of fertilizer or manure at the time of sowing in order to cover and protect the young plants. This technique was inefficient, since the young plants were unable to absorb most of the nitrogen. Therefore, much of the nitrogen was lost to the environment in a number of ways. This action causes a disruption in the pH of the soil, which affects plant growth. If the soil pH was high enough, then the equilibrium will be driven towards ammonia, a volatile gas. This release of ammonia into the atmosphere will eventually result in the return of ammonia to the earth through rain (Litterman et al., 2003; Trautmann and Porter, 1998). Phosphate based fertilizers was also used in addition to nitrogen based fertilizers. Unfortunately, as with nitrogen based fertilizers, there are negative environmental consequences. The increasing use of phosphate fertilizers has led to the accumulation of phosphorus in soils. This causes problems because the means by which phos- phorus was immobilized cannot accommodate for the additional phosphorus that fertilizers add to soils. Consequently, high concentrations of phosphorus flow away with agricultural runoff. The toxic effects of phosphorus become noticeable when agricultural runoff was deposited in lakes, streams and other water sources because excessive amount of phosphorus leads to eutrophication (Litterman et al., 2003, Karr et al., 2003; Trautmann, 1998).

National and International Policies:

(i) **Strengthen local rights and security of tenure:-** Sustainable agriculture and the alleviation of hunger require agrarian reform and an equitable redistribution of rights to access resources such as land, water, forests and seeds. Such reforms need to distinguish between territory and land, and consider the rights of indigenous people to autonomy in their territories. Policies will need to balance the diverse needs of these and other groups, including farmers, pastoralists, forest dwellers, fisher folk and people who settle on marginal lands such as those with poor soils (ICARRD, 2006).

(ii) **Encourage national policies for sustainable agriculture:-** Global food security relies on sustaining the environment and the ecological processes that underpin agriculture. National policies are needed to ensure political commitment, incentives, and to build educational and institutional capacities to promote sustainable agriculture. Approaches include integrated pest, crop, nutrient and soil management, as well as land-use planning. The current over emphasis on genetic engineering techniques must be balanced by approaches that are based on agro-ecology and landscape ecology as well as cultural and biological diversity.

(iii) **Reform trade policies, markets and economic Incentives:**-The mainstreaming of environmental sustainability into food and agriculture will require systematic reforms of trade policies, markets, taxation, subsidies and economic incentives. These must reinforce the UN Convention on Biological Diversity, the UN Framework Convention on Climate Change, Agenda 21, the Millennium Ecosystem Assessment and the FAO's Right to Food Guidelines of 2004 (www.fao.org).

(iv) **Extension strategy**:- For any programme to be successful the participation of extension workers is of utmost importance. The derelict lands can be restored by various ways depending upon the resources available for amelioration. The accurate procedure for successful reclamation to agriculture will be dependent on local conditions and practice, as related to regions,

nations and continents. Extension workers create awareness among the masses regarding the productivity and sustainability of the land by holding frontline demonstrations or method demonstration.

Conclusion:

India is a developing country, so, it should take more serious action related to environment and agriculture. Policies are needed, particularly, for improving agricultural infrastructure, strengthening research and development of new technologies. Establishment and implementation of new laws and regulations should be enhanced for the development and transfer of new technologies in the field of agriculture which are environment friendly.

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