

AGRICULTURAL PRACTICES AND ITS NEGATIVE IMPACTS ON ENVIRONMENT

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Abstract:

The paper provides an overview of the impacts of agricultural technologies and practices on ecosystem services such as soil fertility, water, biodiversity, air, and climate. Intensification allows farmers to obtain greater yields per unit time and area by planting more crops each year, specializing in repetitive cultivation of modern varieties, and using higher amounts of external inputs. At present some 11 percent (1.5 billion ha) of the globe's land surface (13.4 billion ha) is used in crop production (arable land and land under permanent crops). This area represents slightly over a third (36 percent) of the land estimated to be to some degree suitable for crop production. The fact that there remain some 2.7 billion ha with crop production potential suggests that there is still scope for further expansion of agricultural land. However, there is also a perception, at least in some quarters, that there is no more, or very little, land to bring under cultivation.

The following points highlight the five main impacts of agriculture on the environment. The impacts are:-

1. Degradation of Land

Due to agricultural practices 80% of land degradation have taken place in developing countries like India & China. (Hawken et al., 1999). Continuous practice of growing the same crop i.e. Monoculture System affects soil composition & abundance of biodiversity, which is possible in polyculture farmlands. The agents of pollination such as bees, moths, birds, pests are also less as in lands with diversity. By reducing planned biodiversity to include only one crop, monoculture affects the composition and abundance of associated biodiversity. For example, the balance of plant pests and their natural enemies that may exist in polyculture fields can be disrupted in

monoculture systems, which provide habitat for a narrower range of insects. Populations of bees, flies, moths, bats, and birds, which provide important pollinating and pest pressure services to crops, also tend to be lower in monocultures than in fields containing diverse forage and nesting sites.

Continuous farming has replaced crop rotation practice. Which undoubtedly resolved the food supply problem to much extent but also resulted in land quality degradation as the soil nutrient value is decreased. As the plant grows the minerals like phosphorus, potassium, nitrogen, calcium are lost which then supplied through fertilizers for leguminous plants. Intensive crop cultivation like rice have shown the deficiency in soil micronutrients & thus effecting soil organic matter & microbial activity.

Tillage is another cause for land degradation as it loosens the soil. Tillage causes detrimental changes in soil structure and fertility and greenhouse gas emissions.

Impacts on Soils: Tillage reduces soil organic matter, making soils less able to absorb and retain water and more prone to erosion and run-off.

Soil Erosion and Land Degradation

Category	Area (million ha)	% of geographical area
1. Total geographical area	328.7	100.0
2. Area Subject to water and wind erosion Area degraded through special problems	141.3	43.0
3. Water logged area	8.5	2.6
4. Alkali Soils	3.6	1.1
5. Acidic Soils	4.5	1.4
6. Saline soils including coastal sandy areas	5.5	1.7
7. Ravine and Gullies	4.0	1.2
8. Area subject to shifting cultivation	4.9	1.5
9. Riverine and Torrents	2.7	0.8
Total 3 to 9	33.7	10.3

Three crops account for 58 percent 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).

2. Deforestation:

There has not been much change in forest land area but the purpose of forest land use has changed. Most of the land used for other purposes has been compensated by afforestation.

As the population increases the increase in fuel wood demand also increased & so is the use of forest land as farm land.

Indiscriminate use of forest land has been much for various developments such as change in markets, policy interventions & growth in technology for agricultural practices.

There has been loss in forest land due to forest fire which accounts for 19%-33% of the total area.

Forest Cover 1990-2010

Region	Total Forest Cover		
	1990	2000	2010
	Million Hectares		
Africa	749	709	674
Asia	576	570	593
Europe	989	998	1,005
North and Central America	708	705	705
Oceania	199	198	191
South America	946	904	864
World	4,168	4,085	4,033

Source: Compiled by Earth Policy Institute from U.N. Food and Agriculture Organization, **Forest Resources Assessment 2010: Global Tables** (Rome, 2010), www.fao.org/forestry/fra/fra2010/en/.

3. Biodiversity:

Recent technological advances have vastly increased scientists' ability to manipulate plants' genes. For example, hybrid seeds combine the genetic sequences of two or more crop strains to achieve higher yields. Through genetic engineering, scientists have been able to splice genes from a variety of organisms into plant genomes. These transgenic seeds

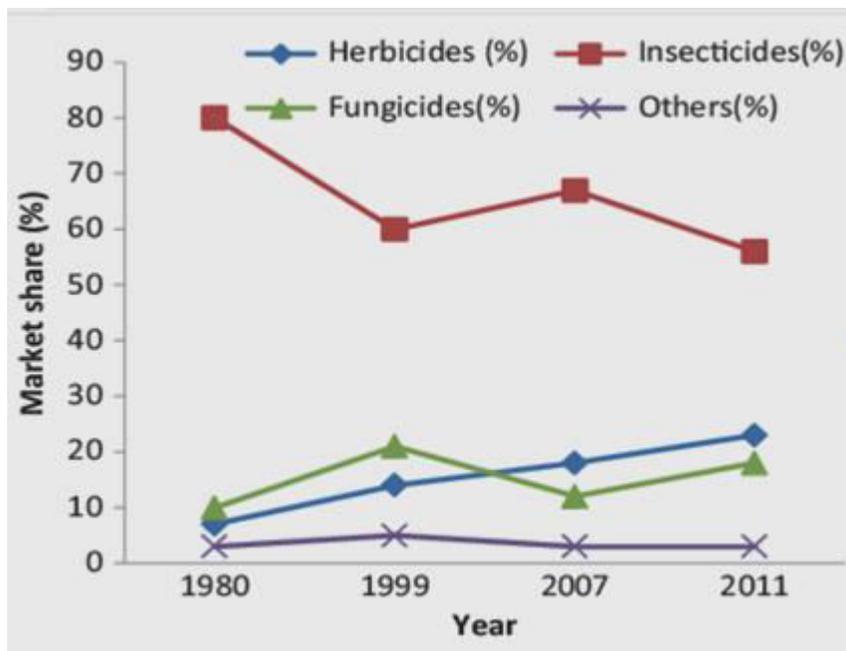
can contain coding for a number of desirable characteristics, such as herbicide resistance or frost tolerance.

In Asia 75% of rice variety cultivated is improved semi dwarf variety while the wheat grown is 80% of genetically modified. These varieties which are high yielding are also herbicide tolerant. To spray the herbicides farmers may use broad spectrum herbicides over conventional herbicides. These herbicides might leech in the soil & negatively affect the soil, water quality ,plants& animals of the ecosystem.

4. Pest Problem:

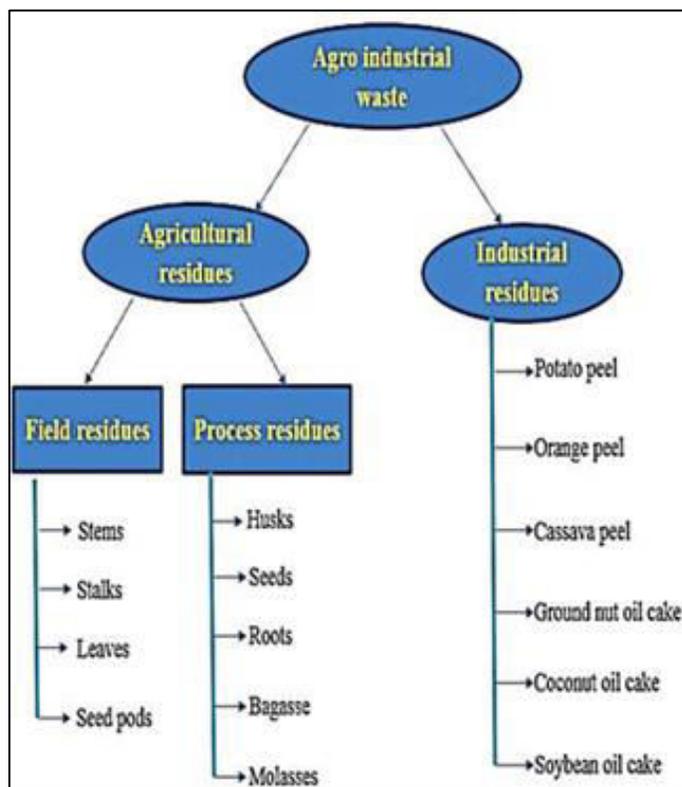
More than 500 different pesticide formulations are being used in our environment, mostly in agriculture. In the past decades, pesticide usages have been increased aiming for better food quantity and quality. However, due to their usage with increasing amounts, the concern about their harmful effects on nontarget organisms, including human beings, has also been growing. Nontarget pesticide poisoning has been reported from fish, birds, and humans. Although it is estimated that less than 0.1% of pesticide applied to crops actually reaches the target, the rest of it enters the environment. Additionally, many pesticides and insecticides can persist for long periods in an ecosystem. In the food chain, they meet with nontarget organisms, including mankind. They accumulate in the body tissues of organisms and cause a number of health problems.

Pollution due to the uncontrolled use of pesticides has become one of the most alarming challenges when pursuing sustainable development. Although pesticides are directly applied in soils and plants, only 1% of pesticide sprayed is delivered to the intended target. An accidental release of pesticides due to leaking pipes, spills, waste dumps, underground storage tanks, and groundwater may lead to their persistence in the environment for a long time. For proper management of pesticides, one needs to accurately assess the status of their contamination in soil, water, and air.



Use of Pesticides, Herbicides, Fungicides & Other Chemicals in agriculture.

5. Disposal of Industrial & Agricultural Wastes.



As a result of agricultural activities there are many waste release like insecticide, pesticides, fertilizers, silage plastics, herbicides medicines used for pests that affect soil, air & water. Herbicides & insecticides are used to control pests but when persistently applied these chemicals these chemicals harm beneficial microbes and pollinators. They leach in soil as most of the pesticides, herbicides, insecticides are water soluble thus result in water pollution of underground water. Many fungicides contains mercury as an important content which affect nervous system of human beings. Pesticides can also kill non targeted plants, birds, and other wildlife and have a large impact in the quality and fertility of the soil.

Fertilizers contain important elements like P,K,N for plant growth but these chemicals when flow in rivers or sea (due to rains) cause aquatic pollution to eutrophication. Industries related to the agriculture sector generate a lot of waste in the form of peels, seeds, whey, waste liquid, molasses, bagasse, and so on. The generated waste is not only biodegradable in nature but also rich in nutrient components (carbohydrates, proteins, fibers, minerals, vitamins, etc.) depending upon source. Hence these wastes can be classified as agricultural residue and industrial residue though they are all byproduct of Agricultural Waste.

Conclusion:

Global food security relies on sustaining the environment and the ecological processes that underpin agriculture. Unintended environmental consequences of intensive agricultural practices and inputs are varied and potentially severe. In some cases, sustaining or increasing agricultural productivity depends upon reducing impacts to the environment, such as maintaining productive soils and preventing water pollution by avoiding extensive use of chemicals in any form.

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