Chapter 22
Organic Farming: Challenge for Chemical Pollution in Aquatic Ecosystem

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ABSTRACT

Agriculture is one of the significant factors contributing to the economic growth of India. In order to reap a better harvest, farmers inoculate the soil with fertilizers. These fertilizers include pesticides, herbicides, insecticides, fungicides, etc., and are broadly used to control pests and pest-induced diseases. Increasingly high inputs of chemical fertilizers have not only left soils degraded, but it has also increased the adverse effect on aquatic life and other environmental hazards. Organic farming methods would crack these issues and make the ecosystem healthier. Bio-fertilizers and bio-pesticides form a link between the biotic and abiotic factors and can be used to supplement the expensive chemical fertilizers. This chapter focuses on agricultural chemicals (fertilizers and pesticides) that impact the aquatic environment. The aim of the chapter is to improve ecological sustainability and to minimize the effects of pesticides on aquatic ecosystems. In addition, the authors attempt to reveal almost all positive aspects of organic farming in special reference to aquatic pollution.

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INTRODUCTION

Agriculture is the noteworthy factors contributing to the economic growth of developing countries like, India. In order to reap improved agricultural practices, farmers inoculate the soil with pesticides and chemical fertilizers, which is causing perilous effect on aquatic ecosystem. It would be overcome if the constituent activities of agriculture could be natural and free from chemical ingredients. This would be an impressive model for designing incentive schemes to optimize agricultural practice and for minimizing environmental consequences. Agricultural show complex relationship with freshwater systems and effect the aquatic ecosystem in many dimensions. The entire land surface, much of which is agricultural, forms the catchment area for one or other river system and almost anything that happens on the catchment has an effect on the aquatic ecosystem (Moss, 2008).

Agriculture contributes about 70 percent of water abstractions worldwide and plays a chief role in water pollution. Farms discharge large quantities of pesticides, herbicides, insecticides, fungicides, etc. as they are broadly used to control pests and pest-induced diseases and are drainage into water bodies. Increasingly high inputs of chemical fertilizers and pesticides have not only left soils degraded but also increases adverse effect on aquatic life. The resultant water pollution poses demonstrated risks to aquatic ecosystems, human health and productive activities (UNEP, 2016). Agriculture discharge has direct negative impacts not only on aquatic flora and fauna but also on human health. Pesticide and fertilizers accumulation coming from agricultural field, in water bodies and the food chain, led to acute and likely chronic health effects. Water-quality degradation arising from agricultural practices may also have severe and direct impacts on productive, quality and quantity of agriculture itself.

Population growth and changes in consumption patterns, including new dietary preferences require the production of more and diverse food. This, in turn, is driving agricultural expansion and intensification and bringing new environmental externalities, including impacts on water quality (UNDESA, 2017). To overcome these challenges regenerative agriculture is the most excellent way, that leads to healthy soil, high quality and nutrient dense food, concurrently, it improves, rather than degrading land, and ultimately leading to productive farms and healthy communities and economies. An organic farming practice play a significant role in increasing food production, farmers' income and topsoil but also help in controlling and plummeting the chemical pollution in aquatic ecosystem.

This review focuses on agricultural chemicals (fertilizers and pesticides etc) that impact the aquatic environment. To overcome this dangerous issue, alternate source of bio nutrients supply will open new avenues for era of next-generation biofertilizer/biopesticides from nature and will also be useful in organic production of agriculture.

BACKGROUND

The global growth of crop production has been achieved largely through the intensive use of inputs such as pesticides and chemical fertilizers. India's utilize about 76 per cent of pesticides, against the world average of 44 per cent. However, the use in agriculture is less than 350 gm a hectare as against the world average of 500 gm a hectare. In India pesticides production was started in 1952 with the establishment of a plant for the production of BHC near Calcutta, and now India is the second largest manufacturer of pesticides in Asia after China and hold twelfth position globally (Mathur, 1999). The trend has been