

Food Quality and Agriculture Sustainability: A Perspective

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Abstract

In the scenario of dwindling environment and climate change, the significance of having food security for the ever-increasing population will be more meaningful if it is achieved by keeping food quality and agriculture sustainability intact. Unhealthy food production through unhealthy agricultural practices is jeopardizing not only human and animal health but also polluting soil, water and air. In the event of fast degrading soil, polluted environment and climate change effects, efforts to ensure food quality and nutritional security is as important as the need to have food security.

Introduction

Food quality and agricultural sustainability are as important issues as food security. In context of fast growing world population and degrading environment, our effort should be to achieve food security by maintaining food quality and agricultural sustainability. Production of quality and nutritious food is as vital as production of surplus food for growing human population. Therefore, in the event of fast polluting environment and increasing human ailments, efforts to ensure food quality and nutritional security is as important as the need to have food security.

Food quality and agricultural sustainability can be achieved by safeguarding our natural ecosystem we live in. It can be safeguarded by changing from the chemical form of agriculture to organic form of agriculture. The chemical form of agriculture has deteriorated the quality of environment and thereby affecting the quality of food and life. We are all bound in a food web. Humans, animals, plants, soil, water, climate-all are interlinked and are part of food chain. Any unhealthy practices or harmful activities by humans will affect every other living organism in the food chain. Practicing chemical form of agriculture is one of the major factors of environment degradation and deteriorating quality of agricultural produce and human life. Safe healthy and sustainable methods of agricultural production will help to maintain food quality and nutritional security. There are several factors which directly or indirectly affects quality of crops. This article primarily discusses on ill-effects of chemical intensive agriculture and stress on the need to shift from chemical mode of cultivation to more environment and ecofriendly mode of organic agriculture so as to keep food quality and agriculture sustainability intact.

Need for Quality food production

Humans food consumption primarily consists of plant products such as cereals pulses, oilseeds, vegetables and

fruits and animal products like meat, milk etc. All these nature products are sources of important minerals and vitamins. The quality of this nature products get hampered or deteriorated by the way of human treatment. If we grow these nature products in chemical and pesticide laden environment, we will receive chemical and pesticide laden food. This is one of the major causes of cancer and other human ailments. Plants growing in polluted environment can accumulate toxic elements at high concentrations posing serious threat to human health.

Factors affecting quality food production

The quality of food produce alters according to the environment in which it is grown. Environmental degradation through soil, water and air pollution, destruction of natural ecosystem through deforestation, industrialization and massive urbanization, loss of biodiversity through intensive mono-cropping on large scale and loss of beneficial insects, pollinators and soil microorganism through massive pesticidal and fertilizer application are affecting food production and food quality. Crop production depends upon availability of healthy soil, water and air. Here we will be discussing on effects of environmental pollution created through soil, water and air, primarily by practicing chemical form of agriculture on food quality and agriculture sustainability.

Soil pollution- continuous use of chemical fertilizer and pesticides in a patch of land to grow crop is rendering soil poor and less productive. With every consecutive years there is need to apply more doses of chemical fertilizer and pesticides for raising the production from the same patch of land. Continuous use of chemicals in due course of time is making land unproductive and unfit for cultivation. Plant uptake of toxic elements from polluted soil is passed on to humans and animals through food chain transfer. Also with excessive use of chemical fertilizers, soil quality deteriorates in terms of water holding capacity or moisture retention capacity and in sustaining beneficial soil microorganism. Chemical and pesticide rich soil dries faster than organic (farm yard manure or cow dung rich) soil, thus demanding more water or irrigation to irrigate crops. Due to poor water holding capacity of chemical rich soil than fertile organic soil, water leached down and not sufficiently available to plants. Beneficial soil microorganisms flourish more under organic soil compared to dead soil full of chemicals. Soil pollution and soil erosion contributes to poor yield and quality.

Water pollution- Water contamination is a serious problem posing threat to food production. The water quality, therefore, is very important in any food production process (Bhagwat, 2019). Due to contaminated soil, irrigation water

also gets contaminated. Underground water gets contaminated due to deposit of toxic substances like cadmium, lead, chromium, arsenic etc and becomes unfit for use. Harmful effluents and toxic wastes from industries and factories like fertilizers, pesticide pharmaceutical, cement etc located nearby agricultural land renders water unsuitable for agriculture. Pesticidal residues get deposited in soil and contaminate ground water. Healthy Crops cannot be grown with contaminated soil and water and thus affecting both crop yield and quality. Improper disposal of garbage and hazardous waste material (eg. plastics, medical wastes, chemical laboratory waste, nuclear waste, electronic waste etc) are some of the major causes of water contamination.

Air pollution- The impact of air pollution on crop production is highlighted in research studies. Pesticides spray and smoke emanating from industries and automobiles affects quality of agricultural produce. Spread of pesticide residues through atmospheric air to other growing plants and fruit trees affects its quality. Presence of harmful gases like nitrous oxide, sulphur dioxide, carbon monoxide etc are responsible for causing acid rain and crop loss. Compared to trees, field crops are very sensitive to air pollution affecting both production and quality.

Mitigating the risks of crop contamination

Crop production should be done by taking both food safety and quality into consideration. There is need to mitigate the risk of contamination inside crop plants through several measures like regular monitoring of soil, water and air quality, implementing efficient waste management practices, adopting organic farming and promoting sustainable agricultural practices. Nevertheless several remedial measures can be adopted for ensuring food quality and safety.

Remedial measures for quality food production

Some remedial measures as discussed below that can help in ensuring quality food production and maintaining agriculture sustainability. Adopting Organic agriculture- Crops vegetables and fruits grown organically and conventionally differs in their nutritional quality. Organic crops found to have significantly higher nutritional value compared to conventional chemically grown crops. Also the shelf life or keeping quality of organically grown food crop is more compared to chemically cultivated crop. Organic farming is safe, sustainable and eco-friendly. Practicing organic farming will cut use of chemical fertilizer and pesticides. It helps soil, retain its fertility, water holding capacity, and in sustaining beneficial soil microorganism. It will help in reducing water and air pollution which otherwise occur through chemical fertilizer and pesticides. Though consumers are more than willing to consume organically grown food but its premium price is one factor which restricts consumers to go for it. If

organic farming will be practiced by every farmer or grower and organic agriculture becomes a way of production, issues of organic and non-organic food and high prices will be no more and every people will get healthy and quality food at affordable price.

Multicropping- Consideration of Cropping pattern in agriculture is an important criterion. Following multicropping instead of monocropping helps in ensuring quality food production. Taking variety of agriculture produce on small scale instead of mono crop on large scale in a plot of land is more beneficial in terms of quality, risk and market demand. Multicropping can provide security/protection from insect-pest attack or total crop failure. It can help compensate loss of one crop with the other crop. It can help in better care and monitoring of crop produce, provide healthy and variety of food, help fight market fluctuation related to market price and demand, and at the same time help in maintaining ecological balance through crop diversity, variability, sustainability of beneficial insects, microorganism and soil health. Ways can be worked out and farm technologies can be developed for producing variety of farm produce from a patch of land. Growers and farmers can make a list of crop that can be grown in a particular season. According to their available resources (land, water, soil type etc) crop selection can be made based on crop duration, cost involve, inputs required, risk taking capacity, time and situation, market availability, storage facility etc.

Growing leguminous crop- Instead of leaving land fallow, farmers should grow any leguminous crop to maintain soil fertility of the land.

Crop rotation- Growing same crop on same patch of land for several years is detrimental. Following crop rotation is one way of producing quality food production. It reduces erosion, control pests and maintains soil fertility.

Afforestation and agroforestry program should be promoted in a more intense way to reduce pollution level and obtaining quality farm produce.

Home gardening - People can make use of their available home space where sufficient sunlight reaches and can consider growing vegetables in pots, garden area or roof-tops / terrace. This will ensure getting fresh food without any chemicals.

Encouraging small and marginal farmers- Number of small and marginal farmers with small farm holdings is more. If they can be encouraged and provided with sufficient monetary help to take organic crop production, quality and quantity of farm produce can be improved. The Food and Agricultural Organization on World Food Day has also stressed on the need to improve the livelihoods of small farmers.

Awareness and training to farmers- Effort should be to done to give every farmer training regarding production of biofertilizers, biopesticide and organic manures. Cattle byproducts like use of cow dung manure should be utilized for agricultural production. Neem based formulations should be encouraged to tackle pest attack and diseases. Fodder production for cattle should also be chemical-free.

Government bodies or Municipal Corporation should persuade citizen to bifurcate household wastes into biodegradable and non-biodegradable ones. Biodegradable kitchen waste can be taken to convert it into compost.

Conclusion

Healthy food builds healthy nation. Chemically grown food affects food quality in terms of health, safety, taste, nutrition and shelf-life of the produce. Bounded by a

biological cycle, what we give, will receive back. If immediate ban on all kinds of toxic agrochemicals is implemented, still residues of chemicals persist in the biosphere for years to come. Hence it is better late than never. If we don't switch to sustainable and safe methods of agriculture, people will continue to suffer and the repercussions of which may be very silent but explosive. We are already witnessing this increase in increasing ailments and health related issues in humans. The need to understand the connection between environmental toxins and health is very important. It is therefore, advisable to switch to safe mode of agriculture. If we have to sustain human population and our agricultural ecology, we have to do away with all those dangerous agricultural practices which are not in the interest of human and environment. Shifting from a chemical form of agriculture to a more sustainable organic form of agriculture will ensure safeguarding quality and safety.
