



Quality food production by integration of good agricultural practices (GAPs) in organic agriculture

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India's basic strength lies in agriculture but its vast potential has not been fully exploited. The market potential can appreciate by reforming agriculture and making its produce internationally competitive in terms of quality and safety of food. Producing internationally competitive, quality farm produce per se requires competitive innovative farming practices and comprehending the concept of globally accepted Good Agricultural Practices (GAPs) within the framework of commercial agricultural production for long term improvement and sustainability is important. Implementation of GAPs would promote optimum utilization of resources such as pesticides, fertilizers, water and eco-friendly agriculture. It also takes care in integrating pre and post-harvest handling and other logistics. Good Agricultural Practices (GAPs) is important in the areas where appropriated control measures need to be strengthened and farms producing raw materials to ensure sustained supply of produce of their desirable quality. Good Agricultural Practices (GAPs) based farming, Integrated Nutrient Management and Integrated Pest Management (IPM) with more emphasis on biological methods of control, soil test based nutrient application, increasing nutrient use efficiency, adoption of precision farming technologies and use of pest and disease resistant varieties, etc. seems to be a viable solution. It has the potential to address the concerns of different stakeholders (governments, food retailing industries, farmers and consumers) about food production and security, food safety and quality and the environmental sustainability of agriculture.

Concept of Good Agricultural Practices (GAPs): According to the *FAO*, Good Agricultural Practices (GAP) is the application of available knowledge to addressing

environmental, economic and social sustainability for on-farm production and post-production processes resulting in safe and healthy food and non-food agricultural products. It is used to refer to private, voluntary and non-regulatory applications that are being developed in a number of forms by the private sector, civil society organizations and governments to meet farmers' and consumers' needs and specific requirements in the food production chain. It



is also formally recognized in international regulatory framework and associated codes of practice to minimize or prevent the contamination of food. Good Agricultural Practices should be economically viable, environmentally sustainable and socially acceptable; inclusive of food safety and quality dimensions.

Organic farming: Organic agriculture often attempts to protect soil fertility which includes crop rotation, intercropping, polyculture, cover crops and mulching. Organic

agriculture relies on a number of farming practices based on ecological cycles and aims at minimizing the environmental impact of the food industry, preserving the long term sustainability of soil and reducing to a minimum the use of non-renewable resources. In relation to environment, organic agriculture refers to a farming system that enhance soil fertility through maximizing the efficient use of local resources, while foregoing the use of agrochemicals, the use of Genetic Modified Organisms (GMO), as well as that of many synthetic compounds used as food additives.

Why organic food? The soil organic carbon has been reduced to very low and inadequate levels due to the inadequate application of organic manures and non-recycling of crop residues. A rice-wheat sequence that yields 7 t ha⁻¹ of rice and 4 t ha⁻¹ of wheat removes more

than 300 kg of nitrogen, 30 kg of phosphorus and 300 kg of potassium per hectare from the soil. Another study estimates that a 10 t ha⁻¹ crop yield removes 730 kg NPK from the soil. The burning of crop stubble in open fields has adverse impact on the fertility of the soil, eroding the amount of nutrients present in the soil. Burning also kills soil borne deleterious pests and pathogens. Organic food is made without the use of synthetic fertilizers and pesticides, genetic engineering, sewage sludge, radiation and preservatives. The content of certain vitamins, minerals and secondary nutrients (e.g., *Antioxidants*) are found higher in certain organically grown produce. Some organically grown vegetables retained more of particular nutrients after a period of storage than conventionally grown produce. These higher levels of vitamins, minerals and secondary nutrients may be a result of organic soil management through practices such as the application of organic (as opposed to synthetic) fertilizer.

Why there is need of GAPs?

The cumulative effects of ongoing synthetic fertilizer and pesticides applications to the soil might affect the food grown in it. Good Agricultural Practices (GAPs) is formally recognized terminology used in the international regulatory framework and associated codes of practice to minimize or prevent the contamination of food. Good Agriculture Practices (GAPs) are practices that address environmental, economic and social sustainability for on-farm processes, and result in safe and quality food and non-food agricultural products. The GAPs is extremely essential for safety of consumer health. It requires certifying care throughout the food chain and it must be compulsory transparent not only from the table but also upstream (e.g. fertilizers, plant protection, animal feed). Good Agricultural Practices (GAPs) mainly focus on prevention, redundant and reductions and guide to minimize microbial food safety hazards for fresh fruit and vegetables.

Key points for Good Agricultural Practices (GAPs):

- Prevention of problems before they occur
- Risk assessment
- Commitment to food safety at level

- Mandatory employee education programme at the operational level
- Field equipment
- Integrated pest management
- Integrated nutrient management
- Oversight and enforcement
- Communication throughout the production chain
- Verification through independent, third-party audits

Good Agricultural Practices (GAPs) and certain agricultural components:

Soil: The aim of Good Agricultural Practices (GAPs) in soil is to maintain and improve the productivity of soil by selection of proper crop rotations, manure application, crop residue management and pasture management. Including successful technologies can be used in conservation tillage systems like no tillage methods (Zero tillage) and minimum tillage system etc.

Water: Management of water resources and its efficient use for rainfed crops for irrigation purpose by most efficient water delivery system to ensure the best use of water viz., drip irrigation, sprinkler irrigation and using



hydroponic production.

Crop and fodder production: It involves the selection of annual or seasonal, perennial crops and grasses (like Napier grass, Para grass stylo grass etc.) and their cultivars/varieties according to the appropriateness to the farmers and which can survive in different locations, crop rotation and for the management of soil fertility, pests and diseases and their response to available inputs.

Crop protection: Protection of crops against pests, diseases, and weeds must be achieved using appropriate control measures. For this crop producer must use IPM, INM, resistant varieties and maintain regular assessment of the balance status between pests and diseases and beneficial organisms of all crops.

Animal production: All those practices should be avoided which may even cause small harm to the livestock and must avoid biological, chemical, and physical impurity of feed, water and the atmosphere where they are living.

Harvest and on farm processing and storage: The quality of any product depends upon application of GAP for harvesting (time and methods), storage place and

processing offfarm products. Crops must be harvested in a manner to minimize contamination of foreign material.

Energy and waste management: Good practices related to energy and waste management will include all those practices that establish input-output plans for farm energy nutrients and agrochemicals to safe use and disposal. Fertilizers and agrochemicals must be stored at a place where no chance of outer disturbance and must be established to minimize the risk of pollution.

Benefits of Good Agricultural Practices (GAPs):

- Promotes sustainable production
- On-farm management improvement
- Value addition of products
- Development of basic infrastructure at the field level,
- Build up culture for good agricultural practices by the farmers,
- Uniform approach across farms regardless of their sizes
- Increased awareness among the farmers as well as the consumers about the need for consumption of good

quality and safe food

- Traceability through complete integration of food chain,
- Improvement in the environment as well as soil fertility
- Integrity of global accreditation system
- Market access for small holders
- Harmonize buyer requirements.

Conclusion: Good Agricultural Practices (GAPs) as one of the most important approaches was developed to provide sustainability in agricultural production. Scientifically fine-tuned agriculture has long term applications for agricultural sustainability as the basic premise of modern scientific agriculture is to address shortcomings through science and there is scope for continuous improvement. Increase public awareness on organic farming with good agricultural practices and the need for safe food and prepare short and long-term plans for organic agriculture movement and identification of problems and proposed solutions.

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