Bharat Good Agricultural Practices (GAP)

What is Good Agricultural Practices (GAP)

Good Agricultural Practices are defined as "practices that aimed at improving the quality, safety, and sustainability of food and agricultural products while maintaining environmental, economic, and social sustainability.

How GAP is implemented

Good Agricultural Practices provides a set of guidelines and standards, which on implementation in farm production process ensures the safety and quality of agricultural products throughout the entire production process, from farm and soil management to harvest and delivery of food to consumers. GAP is a globally recognized concept that aims to promote sustainable and responsible farming methods, while minimizing potential risks to food safety, hygiene, produce quality, human health and the environment.

Principles of Bharat GAP

Bharat Good Agricultural Practices are based on 4 core principles:

1. **Economic viability** – Farming systems are managed in such a way that entire production process is profitable to farmers, while ensuring safe and healthy food with judicious use of available resources.

2. **Environment sustainability** – Practices are designed in way to sustain and enrich natural resources including soil, air, water and life forms. Environment sustainable practices include:
    a. Soil health is maintained and consistently improved.
    b. Farming practices are suitable to the soil type and pose no threat to the resources and environment
    c. Chemical inputs are used in a way to maximise the productivity but without any adverse impact on soil health, resources, biodiversity, environment, farm workers and quality of food.
    d. Water to managed judiciously without any wastage or excessive use
    e. Farm practices are managed to minimize waste generation and farm wastes (if any) including crop residues and animal waste is effectively recycled and reused for resource generation and environment preservation.
    f. All farm workers shall be trained in farming operations to ensure that workers' safety is not compromised.

3. **Social acceptability** – All farming practices shall meet social expectations of society ensuring protection of farm, farming operations and workers from hazards, maintain safety protocols, while applying hazardous chemical and handling machine and tools. Do not promote exploitation of resources meant for the entire locality and society.

4. **Food safety and quality** – All farming practices shall integrate practices that lead to optimum productivity with produce safety, quality and hygiene. Elements of food safety and quality includes:
    a. Documentation of site history and mitigation of any carry forward risk,
    b. Production plan while taking all factors and resource in mind,
    c. Seeds and planting material is suitable to the location and season and is disease/ pest free,
    d. Fertilizers and soil additives such as fertilizers, lime, gypsum, soil amendments, organic manures and biostimulants etc are used in recommended quantity at predetermined crop stages and through recommended application methodology to ensure that their application ensure effective utilization without any impact on soil and environment,
    e. Water resources are identified with water quality. Only potable quality water is used in just enough quantities to maintain productivity,
    f. Plant protection chemicals are used in way not to affect the quality of produce and not to leave any residues in food,
    g. Harvesting to be done in a way to protect their integrity, maintain high level of hygiene and no scope for any contamination,
    h. End-to-end process documentation is managed to ensure traceability,
    i. All farm workers are adequately trained in safe food production and handling,
    j. Continuously review the operation and look for deficiencies/ shortcomings and integrate improvements.

How farmers can implement Bharat GAP protocols in farming operations and food production?

Farmers need to implement Bharat Good Agricultural Practices (Bharat GAP) through a range of measures and protocols. These measures are implemented at various stages of farming operations. Brief requirements for implementation of GAP protocols are as follows:

1. **General requirements in farming operations**
    a. Documentation – Farms shall maintain documents detailing farm history, at least for last 12 months, details and timing of different farming operations, and input and output records including sales and purchases and economics of operation. Records are also necessary to demonstrate traceability.

    b. Self-assessment - Farmers need to undertake frequent self-assessment against the GAP checklist to detect any shortcomings/ deficiencies/ non-compliances

    c. Continuous improvement plan – Based on self-assessment and deficiency/ non-compliance determination, plan for improvements, implement corrective actions and document them

    d. Maintain literature and recommended package of practices – Farmers need to collect and keep available recommended package of practices for crops being grown, issued from time to time by Local Agriculture Department, ICAR institutes, State Agricultural universities and Krishi Vigyan Kendra.

e. Participation in training – Farmers and its workers should participate in training programmes being conducted by local institutions on GAP standards, selection and application of inputs, protection and preventive methods in farming operations and keep record of such trainings with name of persons attended.

f. Supervision on contracted operations – All contracted operations should be under the supervision of farmer owner. It also to be ensured that workers of contractor are trained in operations and follow all preventive practices.

g. Parallel production – In cases where farmers are producing GAP crops in one part of their farm and non-GAP crops in another part, then a clear separation is to be maintained in all operations from inputs use, storage, implements, harvesting, handling and sales including separate documentations of two operations.

h. Non-conforming products – In cases where some batch or lot is found non-conforming then the same shall be identified and removed from GAP facilities. Such batch need to be disposed-off in a way that the lot/ batch do not contaminate the GAP compliant produce.

i. Lab testing – In cases where there is risk of getting produce contaminated or are likely to have higher pesticide residues then collect the sample and get tested in laboratory.

j. Hygiene management – Farmers shall evaluate the process to ensure that the risks of contamination is avoided. Contamination risks include, physical contamination with non-GAP produce, contamination of soil with hazardous items, contamination of inputs with non-permissible chemicals, contamination from human activity, human waste, animal waste etc. farm shall have facilities for cleaning, washing, first aid etc.

   In case of large farms where many workers are employed, the farm shall have proper toilets and washing facilities.

   Animals are kept away from production fields

k. Workers health, safety and welfare – All farm workers are trained in handling the machines and aware about the hazards while using chemicals. First aid and mitigation kits shall be maintained in case of emergencies.

   All workers shall be provided with necessary protective gears such as protective clothing, hand gloves, nose and mouth masks, shoes and caps while applying hazardous chemicals or handling electrical operations.

l. Site management – Ensure that the site is not contaminated and has not been used for any hazardous activity or is away from contamination sources such as sewage lines, contaminated water streams etc

2. Environment sustainability

a. Soil health improvement – Annual soil testing to be done and recorded,

b. Crop residue is not burnt and recycled through composting or mulching

c. Trees and bushes are maintained for diversity and sustenance of farm life

d. Biodiversity – Biodiversity to be managed and enhanced through maintenance of hedgerows, trees, intercropping, multi-cropping and integration of insect trapping crops.

e. Energy efficiency – Efforts need to be integrated in phased manner to use machines and practices that save energy such as low weight machines, solar energy etc.

f. Waste management – All efforts to be put in place to prevent waste generation and effectively manage the waste. Non-degradable waste to be avoided and farms are kept clean. Organic wastes including food waste managed to avoid contamination in field and are recycled through composting,

3. Plant/ crop Production

3.1 Seed and planting material

a. Ensure that only recommended varieties are used

b. Seeds and planting material shall be disease free

c. Seed treatment – In case if seed and planting treatment is used then use only recommended chemicals in recommended dose and application methods. If chemical is purchased then keep their bills and labels.

3.2 Soil and substrate

a. Farm and soil quality map to be prepared and maintained

b. Soil health management plan as per recommended practices to be followed with crop based nutrient applications

c. Crop rotations, intercropping and multi-cropping should be implemented and recorded,

d. In case if soil is treated with any chemical fumigant or solarization or steam etc it is to be recorded. Details of chemical with dose, application methods, bills and labels to be recorded

e. In case if any artificial substrate is used then record their source and quality.

f. In case if artificial substrate is sterilized or treated with chemicals then same may be recorded.

3.3 Fertilizers and Biostimulants

a. Fertilizers to be used as per recommendations in quantity and quality

b. Record name of fertilizers, nutrient status and quantity. Also maintain their bills and labels

c. Record details how and where these fertilizers are stored. Fertilizers are to be stored separately in storages away from other chemicals and farm produce.

d. Organic fertilizers shall be used. Record their quantity and quality, bills, labels etc (if any),

e. Human sewage, sludge or human waste shall not be used in any form

3.4 Water management

a. Water should be of potable quality

b. Water testing shall be maintained at least once a year

c. Contaminated water or water with high salt concentration shall not be used

d. Record source of water, how much irrigation done, quantity of water used, and method of irrigation,

e. Irrigation equipment and methods to be recorded and kept in proper condition

f. Efforts should be made to harvest and/ or store rainwater

3.5 Integrated pest management

a. Recommended practices to be used. Keep recommended package of practices (from State Agriculture Department, ICAR, SAUs and KVKs)

b. All workers are trained and aware about prevailing pests, diseases, weeds and IPM practices about their control

c. In case if any beneficial insects or biological agents are used then record their use, type and quantity used

d. Record if any IPM preventive practices used such as light trap, pheromone trap, sticky colour plates etc

e. Keep a record/ literature of prevailing pests and diseases and their control/ management measures, how to identify them and determine ETL.

3.6 Plant protection Product (PPP) management

a. Maintain list of approved and banned pesticides. Also keep literature for recommended chemicals

b. Only approved and recommended pesticides to be used. Generally only the pesticides having label claim for that particular crop and pest be used but in cases where label claims are not available then pesticides recommended by research institutes to be used. Maintain the record of recommendations

c. Banned and prohibited chemicals shall not be used

d. Persons who decide about chemical use, make their formulation shall be trained and well aware about application methodology

e. Records shall be maintained for:
   i. Brand name and active ingredient
   ii. Production sites and plot no. where used,
   iii. Application date,
   iv. Person who applied/ sprayed
   v. Name of the pest against which application is intended,
   vi. Quantity or dose applied,
   vii. No of applications done,
   viii. Machinery or equipment used for application

f. Ensure that recommended pre-harvest interval is maintained. Record pre-harvest interval as per label claim or research institution recommendation and what was interval between last use and harvest

3.7 Application equipment

All application equipment to be maintained for safe use and serviced/ calibrated and repaired at least once a year. Ensure that farmer has proper measuring tools for application mix

3.8 Disposal of used containers and leftover application mix

a. Surplus/ unused application mix to be disposed-off safely as per label or research institution recommendations

b. All empty containers of PPP should be washed 3-4 time and then disposed-off by crushing and sent for hazardous waste collection

3.9 Storage of PPP

a. All PPP to be stored separately and kept under lock and key. Products not recommended under GAP shall not be stored

b. Storage conditions shall meet label recommendations

3.10 Mixing, handling and application

a. All workers involved with the PPP applications shall be subject to health checks, healthy and with no illness symptoms

b. First-aid and mitigation kits shall be available for emergencies

c. Details of nearby hospital, doctors, ambulances should be displayed at prominent places

d. PPP shall be transported in safe containers, their purchase bills, label etc to be maintained

3.11 Postharvest handling

a. All harvested products are stored in clean and ventilated godowns to minimize the risk of contamination and hygiene risks

b. All storage and handling area shall be cleaned and washed at repeated intervals. All precautions to be observed to ensure hygiene,

c. All handling containers, machines and tools are cleaned, disinfected and hygienic, Cleaning and maintenance records to be maintained including the cleaning operations

d. All packaging material including reusable crates be washed, disinfected and kept clean, All packaging material to be kept away from certified product storage,

e. All cleaning equipment are maintained in good working condition and regularly cleaned. All cleaning agents, lubricants and disinfectants to be stored away from certified goods store and handling area

f. While handling the postharvest produce all efforts to be made that produce do not get contaminated with foreign materials such as stone, sand, insects, glass, plastic, debris etc.

g. Storage conditions such as temperature, humidity, modified storage environment etc to be maintained and recorded,

h. All efforts to be made to keep storage and handling area free from pests, rodents etc