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Draft Indian Standard

INTEGRATED PEST MANAGEMENT – REQUIREMENTS

ICS 65.020.99

Agricultural Systems and Management
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FOREWORD

(Formal clause will be added later)

Insect pests, diseases and weeds inflict enormous losses to the potential agricultural production. Anecdotal evidences also indicate rise in the losses, despite increasing use of chemical pesticides. At the same time, there is a rising public concern about the potential adverse effects of chemical pesticides on the human health, environment and biodiversity. These negative externalities, though, cannot be eliminated altogether, however, their intensity can be minimized through development, dissemination and promotion of alternative technologies such as biopesticides and bioagents as well as good agronomic practices rather relying solely on chemical pesticides. India has a vast flora and fauna that have the potential for developing into commercial plant protection technologies. A few have been standardized for commercial application, and are claimed to provide better pest control and crop economics than the conventional chemical control, when used in conjunction with other pest control measures. The strategy is often referred to as ‘Integrated Pest Management’.

Integrated Pest Management (IPM) involves careful consideration of all available pest control techniques and the subsequent integration of appropriate measures that discourage the development of pest populations, and keeps plant protection products and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM is an integral part of Good Agricultural Practices (GAP).

Considering the above, this standard has been developed in order to provide required guidance to the farming community and all concerned stakeholders regarding integrated pest management.

In this document, integrated pest management aspect has been detailed covering the requirements for plant protection products, application equipment, residue analysis, storage and handling of plant protection

products, handling of plant protection products, measuring and mixing equipment etc. This standard will provide recommendations through IPM requirements and related compliance criteria for various aspects of IPM practices.

In reporting the result of a test made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'.

1 SCOPE

1.1 This standard covers the integrated pest management (IPM) requirements and compliance criteria necessary to be followed by the producers (individual growers and/or members of a grower group) of crops for implementation of integrated pest management.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
IS 10500: 2012	Drinking Water - Specification (<i>second revision</i>)
IS 11624: 2019	Quality of Irrigation Water - Guidelines (<i>first revision</i>)
IS/ISO/IEC 17025: 2017	General requirements for the competence of testing and calibration laboratories (<i>second revision</i>)

3 DEFINITIONS

3.1 Active ingredient

The component of a pesticide formulation that affects or kills the target pest or performs the pesticide's function.

3.2 Agro Eco System Analysis (AESA)

An approach, which can be gainfully employed by extension functionaries and farmers to analyse field situations with regard to pests, defenders, soil conditions, plant health, the influence of climatic factors and their inter-relationship for growing healthy crop.

3.3 Alternate host

One of two kinds of plant required by a heteroecious rust fungus to complete its life cycle; sometimes used as a general term for the aecial host, or for the economically less important host.

3.4 Antagonist

An organism that releases toxins or otherwise changes conditions in a way that reduces the activity or growth of other organisms (especially pests).

3.5 Beneficial organism

A living thing that provides benefits to humans—for example, a predatory insect that reduces pests by feeding on them.

3.6 Biocide

A compound toxic to all forms of life

3.7 Biological control

The reduction of an organism's abundance or damage due to a natural enemy, such as a predator consuming (killing) prey. Biological control may occur naturally in the field or result from introduction or manipulation of natural enemies by human intervention.

3.8 Broad-spectrum pesticide

A pesticide that kills a wide variety of unrelated species.

3.9 Crop Rotation

The practice of growing different crops in succession on the same land according to pre-defined plan.

3.10 Disease

An unhealthy condition (e.g., that caused by a pathogenic bacteria, fungus, or virus) that impairs the function or performance of an organism. In the case of crops, disease impairs a plant's economic value. Any deviation in the general health, or physiology or function of plant or plant parts, is recognized as a disease.

3.11 Dose

The amount of a toxic substance taken into the body over a given period of time. Used to monitor exposure levels.

3.12 Drift

The aerial dispersal of a substance, such as a pesticide, beyond the intended application area.

3.13 Ecological Engineering

A new paradigm to enhance the natural enemies of pests in an agro ecosystem and is being considered an important strategy for promoting Bio intensive Integrated Pest Management (BIPM).

3.14 Economic threshold

The point at which a pest has become numerous or damaging enough to require a management action (e.g., pesticide application) to prevent intolerable economic loss. It is also the point at which the damage caused by a pest exceeds the cost of taking a management action to reduce the pest's abundance or subsequent damage. May also be called action threshold or treatment threshold.

3.15 Ecosystem

The combination of living (plants, insects, birds, animals) and nonliving (air, water, mineral, weather) components of an environment.

3.16 Endemic

An organism is said to be endemic if it is only found in one specific location in the world.

3.17 Good Agricultural Practices

Practices that address environmental, economic and social sustainability for on-farm processes, and result in safe and quality food and non-food agricultural products.

3.18 Hazard

A biological, chemical, physical agent in, or condition of, food with the potential to cause an adverse health effect.

3.19 Individual Grower

A person/organization legally responsible for on farm production, who retains ownership of all the produce covered under IPM practices.

3.20 Inspection

An examination of all agricultural practices in order to verify compliance to requirements specified in this standard.

3.21 Integrated pest management (IPM)

A pest management strategy that focuses on long-term prevention or suppression of pests or their damage through a combination of techniques, such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines if available, and treatments are made with the goal of removing only the target organism or preventing its damage. Pesticides are selected and applied in a manner that minimizes risks to human health, non-target organisms, and the environment.

3.22 Natural enemy

An organism (e.g., a parasite, pathogen, or predator) that attacks and kills one or more pests. These organisms provide biological control.

3.23 Non-target organism

Any organism that is affected by a control measure but is not the intended target.

3.24 NPV

Nuclear Polyhedrosis Virus is host specific for *Spodoptera litura* and *Helicoverpa armigera*. NPV is effective when it is ingested by the larvae

3.25 Parasite

An organism that derives its food from the body of another organism without killing the host directly. In integrated pest management, this term also encompasses parasitoids.

3.26 Pathogen

A disease-producing organism or biotic agent

3.27 Pest

An organism (e.g. insect, mite, disease, nematode, weed, vertebrate, microbe, etc.) which causes a problem to crops.

Note - A pest in one environment can be very beneficial in another environment.

3.28 Pest: Defender ratio (P: D ratio)

The ratio of number of pests and beneficial insects, which helps the farmers to make appropriate pest management decisions. Methods such as use of sweep net or visual counts can be adopted to arrive at the numbers of pests and defenders.

3.29 Pesticide

Plant protection products such as insecticides, fungicides, weedicides, etc.

3.30 Pheromone trap

A pheromone trap is a type of insect trap that uses pheromones to lure insects. Sex pheromones and aggregating pheromones are the most common types used.

3.31 Produce

The material recovered from harvesting of a crop.

3.32 Product

Processed and value-added produce.

3.33 Record

Document showing objective evidence of the tasks performed and results achieved.

3.34 Solarization

A disease control practice in which soil is covered with polyethylene sheeting and exposed to sunlight, thereby heating the soil and inhibiting or killing soilborne plant pathogens.

3.35 Sticky trap

Glue-based traps frequently used in pest control to catch and monitor insects and other pests. These traps consist of sticky cards having a sticky glue layer mounted on a piece of cardboard that is folded into a tent-structure to protect the sticky surface.

3.36 Trap crop

A crop or portion of a crop intended to attract pests so they can be destroyed by treating a relatively small area or by destroying the trap crop and the pests together.

3.37 Water, Irrigation

Water which is applied in the process of irrigation and conforms to IS 11624. It does not include precipitation.

3.38 Water, Potable

Water intended for human consumption for drinking and cooking purposes from any source which conforms to IS 10500. It includes water (treated or untreated) supplied by any means for human consumption.

3.39 Worker

Any person on the farm that has been contracted to carry out a task. This includes farm owners and managers.

4 IPM REQUIREMENTS AND COMPLIANCE CRITERIA

4.1 IPM requirements and compliance criteria required to be followed by the applicant producer (individual grower and/or member of a grower group) as well as by the certification body for independent verification of the agricultural practices related to integrated pest management that have gone into the production of the produce are given in Annex A.

4.2 These criteria are marked as ‘Major’ or ‘Minor’ or ‘Reco’. The criteria marked as ‘Major’ have a definite effect on the safety and effectiveness of the IPM practice and shall, therefore, be complied with, or shall give adequate assurance about the safety and effectiveness of the IPM practices. The criteria marked as ‘Minor’, though have a bearing on effectiveness, are those which, if implemented, would provide an advantage to the successful implementation of integrated pest management. The criteria marked as ‘Reco’, are those, which though may not have direct bearing on safety and effectiveness of IPM practice but may have other benefits to the producer and are recommended for implementation and are advisory in nature.

4.3 In addition to IPM requirements and compliance criteria given under Annex A, the producer (individual grower and/or member of a grower group) shall demonstrate compliance with all other applicable statutory and regulatory requirements.

ANNEX A
(Clause 4.1)

IPM REQUIREMENTS AND COMPLIANCE CRITERIA

Sl. No.	Item	Level	IPM Requirements	Compliance Criteria
(1)	(2)	(3)	(4)	(5)
A-1	Make/Implement IPM as a National policy	Major	Legislation which obliges all professional users to apply the general IPM principles	Establishment of a legal entity and follow up system
A-2	Survey and surveillance for major pests and their proper identification	Major	Insect pests, diseases and weeds shall be monitored with adequate methodology and tools to determine when to apply management measures in order to minimise environmental impacts.	Verify whether field monitoring of pest incidence and severity was carried out by field sampling, installing traps such as light, sticky and pheromone traps etc. and pests are identified. Diseases incidence should be monitored. Records to be kept for the same.
A-3	Forewarning and early diagnosis for pest identification	Major	As a preventive measure, reliable forewarning, methodology and early diagnosis systems shall be followed to forewarn stakeholders about crop pests and weeds along with bio-control agents population build up wherever available (P:D ratio).	Verify whether scientifically sound forewarning models and early diagnosis systems are available with adequate information tools such as sound warning, advice from professionally qualified advisers, internet, texting etc. Verify whether National Plant Protection Organization (NPPO), India is in frequent contact with International Plant Protection Convention (IPPC) in retrieving latest information on pests; Verify whether website of NPPO is being updated based on the advisories of IPPC; Verify whether plant protection policies (pesticide, biopesticide, drones etc.) are readily available in website
A-4	Preventive IPM Measures	Major	The recommended preventive IPM practices for endemic pests and diseases shall be followed based on pest and disease monitoring system to take up preventive measures at right time.	Verify, if the grower is aware of IPM practices suggested by SAUs/NRCs/State Departments/other Government organizations/Government approved organizations. If she/he is aware, verify the records for action taken. Verify whether resistant/

				tolerant varieties/pest-free rootstock, crop rotation, proper sowing time followed. Whether balanced fertilization, irrigation practices, protection and infrastructures to enhance natural enemies through crop mosaics is followed. Susceptible varieties should not be promoted among farming community.
A-5	Soil/Seed treatment	Major	Soil/Seed treatment, suggested by SAUs/NRCs/the State Departments/other Government organizations/Government approved organizations, for endemic pests and diseases shall be followed. Organic amendments including biopesticides / mycorrhiza shall be preferred.	<p>Verify that summer ploughing and destruction of crop residues, proper crop rotation as per the pre-defined plan or any other suggested practices like soil solarization for nursery beds, use of organic amendments in field, etc., are followed.</p> <p>Seed treatment with Registration Committee (RC) approved pesticides should be encouraged in crop where seed treatment is major component in plant protection measures</p> <p>Seed treatment with Biopesticides viz., Trichoderma, Pseudomonas and other biopesticides should be made routine practice.</p>
A-6	Cultural practices	Minor	Crop production practices shall be manipulated in a variety of ways that make crop environment less susceptible to pests and favorable to natural enemies. These broadly includes fallowing, crop rotation, manipulation of planting dates, plant and row spacing and harvesting dates, inter/trap crops, and destruction of crop debris. Planting of cover/mulch crops to prevent soil	<p>Verify, if recommended intercrops, catch crops, trap crops, etc, were raised. Verify, if pheromone traps and other suggested preventive measures including ploughing, crop rotations, use of resistant varieties, proper spacing, removal of alternate host, rouging, proper irrigation and nutrient management, etc, were adopted. Verify, if soil biocides were used. Verify, whether Ecological Engineering practices for pest management are adopted in the</p>

			erosion and suppress weeds, nectar producing plants and inter-planting of different crops to provide habitat diversity to beneficial insects shall also be followed. These measures are location-specific, crop and pest specific and must be designed to suit local practices and customs. In other words, the concept of Ecological Engineering should be promoted and adopted.	field.
A-7	IPM Control Practices with priority on non-chemical method approach	Major	The recommended IPM control practices shall be followed. As chemical methods are often not sustainable and create more pest problems, non-chemical methods shall be preferred which are more sustainable with less biological and environmental hazards. Biological control agents such as predators, parasites, microbial bioagents, barrier crops, mechanical devices, traps and lures, bio-pesticides shall be given priority. Use of bio-rationales and indigenous technologies need to be encouraged	Verify the records demonstrating that the grower is following the IPM practices suggested by SAUs/NRCs/ State Departments/ other Government organizations/ Government approved organizations. The use of chemical pesticides can be a preferred if economically viable non-chemical pest control techniques are not available or fail to control the pest.
A-8	Farmer Field School (FFS) to enrich knowledge on various components of IPM	Minor	Farmers shall learn from field observation and experimentation imparting knowledge through training/demonstrations etc. on various components of IPM including pest prognosis and early warning	Verify whether training on various components of IPM is imparted. Verify training on identification of pests, weeds, diseases and crop disorders, proper choice and use of any crop protection measures were conducted and farmers participated.

	through participatory/ adaptive research trials		conducted by SAUs/NRCs/State Departments/ other Government organizations/Government approved organizations. Long-term and sustainable adoption of IPM by farmers shall occur when they get information on IPM along with tools and technologies to implement it	Verify whether Farmer FIRST Programme (FFP), MGGM, SCSP, TSP, NEH, incubators and start-ups, Agri-clinics, Plant Health Centres etc., are working efficiently to enrich knowledge on IPM among stakeholders. Verify whether IPM plots are maintained.
A-9	Use of mechanical methods	Minor	The recommended mechanical methods for control of pests and diseases shall be followed. Wherever, possible, drone should be used for pesticide application.	Verify, if mechanical collection of different conspicuous stages of insects, removal of affected plant parts, beating and hooking insect pests hiding in holes or cracks of host, shaking and jarring, use of traps, bagging of fruits, poison baiting, creation of barrier trenches for the crop undertaken.
A-10	Use of biological methods	Major	The biological methods and biocontrol measures as recommended by the SAUs /NRCs/State Departments/ other Government organizations/Government approved organizations shall be followed. Awareness and adoption of Agro Eco System Analysis (AESAs) based IPM practices shall be promoted through a cadre of trained officers.	Verify, if bird perches, use of plant-based products, predators, parasites, Nuclear Polyhedrosis Virus (NPV) and similar bio-control measures including antagonistic fungi and plant growth promoter regulating substances (PGPR's) are adopted. Registered products like bio stimulants certified by agencies only need to be used. Verify whether awareness of stakeholders towards the biologicals is sufficient for adoption. Verify whether biocontrol agents especially microbial biopesticides are readily available in open markets Verify whether the present registration protocol is supportive for quick registration of microbial biopesticides. Verify whether the crop pest specific / location specific biopesticides of the appropriate strain suggested are used.

A-11	Conservation of Natural Enemies of specific crop pests	Major	Adoption of pest management agronomic/ Ecological Engineering practices that augment natural enemies shall be followed. Diverse Agro-ecosystem for build-up of various natural enemies for plant pests shall be maintained. Blanket sprays of chemical pesticides shall be avoided and natural enemies shall be artificially released timed with proper pest stage.	Verify if farmers plant nectar rich plants, take up inundative and inoculative release of natural enemies timed with pest stage, promote bio-pesticides and keep surveillance on build-up of crop pests and their natural enemies. Also verify whether broad spectrum pesticides are avoided wherever possible and use reduced risk pesticides.
A-12	Educate Farmers 'How to conserve natural enemies in their crop fields'	Minor	Efforts shall be made to educate farmers about role of predators and natural enemies in crop ecosystem through field demonstrations. Farmers shall be encouraged for habitat management of hedges, nesting sites etc for build-up of natural enemies. Farmers shall be made aware of Agro Ecosystem (AESAs) based pest management including insect zoo study.	Verify whether efforts were made to educate farmers by concerned local Govt. institutes/Govt. recognised NGO. Verify whether farmers were educated on conservation of natural enemies.
A-13	Raising awareness on good agricultural practices	Minor	Awareness actions by SAUs/NRCs/the State Departments/other Government organizations like NIPHM, ICAR Institutes/Government approved organizations on good agricultural practices shall be taken up.	Verify whether advisory activities under good agricultural practices attended by the grower and brochures, practical guide etc. are provided. Verify whether available comprehensive information on GAP is sufficient to address the farmers.
A-14	Economic threshold level (ETL) as a basis for decision making for	Major	The concept of "economic threshold level" shall be followed for need based chemical pesticides which are selective against target pests but safer to natural	Verify that blanket sprays of pesticides are not followed and farmers follow less risky methods such as biopesticides at first to manage pests subsequently using less targeted pesticides at later stage.

	need based application of pesticides		<p>enemies and pollinators. Discourage farmer's initiating chemical sprays soon with first occurrence of the pests rather than following the threshold concept.</p> <p>However, farmers must be made aware of 'Pest Defender (P : D) ratio and accordingly decision should be made for pest control measures.</p>	Calendar based spraying in various crops should be stopped.
A-15	Use of CIB approved chemicals	Major	<p>Chemicals cleared for use by the Central Insecticides Board or recommended by Government owned crop specific NRCs or SAU actively involved in these products shall be applied. Specified pre-harvest (waiting period) intervals shall be followed.</p>	<p>Verify the record of plant protection chemicals sprayed, their dosage, date and time of application. Verify records pertaining to date of manufacture and expiry for chemicals used and spore load for bio-control agents. Verify that no banned pesticides were used. Verify that pre-harvest intervals are followed as per label on the chemicals purchased or as recommended by Government owned crop specific NRCs or SAUs/ other Government organizations/Government approved organizations. Verify whether the chemicals recommended meet the label claim requirements.</p>
A-16	Target-specificity and minimization of side effects	Minor	<p>Only those chemical pesticides and application techniques shall be used that do not harm beneficial organisms, people and the environment. Use of pesticides in sensitive and water catchment areas shall be restricted</p>	<p>Verify whether pesticides used are as specific as possible for the target pest and possess least threat to natural enemies, pollinators, humans and environment</p>
A-17	Application of pesticide resistance management	Minor	<p>Strategies which avoid pest resistance to fungicides, insecticides and herbicides shall be followed which</p>	<p>Verify whether recommended dose is used and whether risk of pest resistance is known and repeated application of same pesticide has not</p>

	(PRM)		include pest population monitoring for pesticide resistance, treatment application only when economic threshold level (ETL) is reached. Alternating crop protection products with different modes of action and rotating different modes of action shall be followed	been done. Verify whether pesticides that have different mode of action applied at different times and also verify whether regional organisations provided clear recommendations for an anti-resistance strategy.
A-18	Records, monitoring, documentation and evaluation of success of IPM	Minor	All crop protection measures with waiting periods shall be made and recorded. Safe disposal of empty containers and post-harvest treatments in stored grains shall also be recorded wherever applicable	Verify whether accurate records of agrochemical use are maintained.
A-19	Use of drones for spraying pesticides	Minor	Standard operating procedures (SOP) for use of drones shall be followed	Check whether permission for aerial spraying has been procured. Verify whether allocated drones by GOI have been purchased or not. Verify whether trained drone operators with passport are available in India. Verify whether, drone is used by an operator trained by a recognized training institute.
A-20	Spray-free buffer zones to water areas and prevent contamination of areas outside the field by wind drift	Minor	Appropriate actions shall be taken to avoid adverse effects to hedges, water-courses and other field boundaries	Evaluate whether farmers use pesticides professionally and prevent contamination of areas outside the field by wind drift and maintain proper buffer zones to prevent contamination.
A-21	Address the issue of farmers dependency on pesticide dealers for plant	Major	Farmers should contact local extension personnel for approved pesticides, concentrations, timings, and precautionary information	Check and avoid farmers depending on dealer advise with due credit facility hampering the credibility of the knowledge that has been generated.

	protection advice			<p>Verify whether enough extension personnel are available to address the farmers.</p> <p>Verify whether the existing field level workers are visiting periodically to resolve farmers' problems.</p>
A-22	<p>Plant Protection Products</p> <p>In situations where pest attack will adversely affect the economic value of a crop, it may be necessary to intervene with specific pest control methods, including Plant Protection Products (PPP). The correct use, handling and storage of plant protection in products are essential.</p>			
A-22.1	Appropriateness of Chemical	Minor	The plant protection chemical applied shall be appropriate for the target pest/disease. The current list of approved chemicals for the crop shall be available with the grower.	Verify that the chemical applied against target pest/disease is as per the recommendation of the label/ SAUs/ NRCs/ other Government organizations/ Government approved organizations concerned with the crop. Verify that the current list of approved chemicals for the crop is available with the grower. Avoid use of indiscriminate use of chemicals. Registered agro-chemicals/bio-stimulants approved by NPOP should be used.
A-22.2	Awareness of Banned Chemicals	Major	The farmer shall be aware of the banned chemicals. Awareness amongst farmers on safe and judicious use of chemical pesticides and to follow label claims and instructions on dose and use as approved by CIB&RC shall be made	Verify that the documented plant protection product application records confirm that no banned plant protection product have been used within the last 12 months on the crops grown.
A-22.3	Appropriate Dosage	Major	Correct doses shall be applied at appropriate stage of pest/disease	Verify the label recommendation for the product to justify the dosage adopted.
A-22.4	Anti-resistance Label Recommendation	Minor	Anti-resistance label recommendations shall be followed to maintain the effectiveness of available plant protection products	When the level of a pest, disease or weed requires repeated controls in the crops, verify that there is evidence that anti-resistance recommendations (where legal and effective alternatives are available) are followed, if specified by the product label.

A-22.5	Label Instructions on Mixing of Plant Protection products	Minor	Cocktails of pesticides shall be avoided unless advised by manufacturers or are inherent in a formulation. When mixing plant protection products, the correct handling and filling procedures shall be followed as stated on the label	Facilities, including appropriate measuring equipment, shall be adequate for mixing plant protection products, so that the correct handling and filling procedures, as stated on the label, can be followed. Preference should be given for green label chemicals. Avoid use of same group of chemicals.
A-22.6	Competence of the Grower	Minor	The grower shall demonstrate competence to determine the type, active ingredient of the pesticide and quantity of crop protection chemicals being used and its application	Verify documentation demonstrating awareness of the grower in the application and management of crop protection chemicals.
A-22.7	Method of Application	Major	Appropriate method and timings of application shall be followed.	Verify whether granular applications to soil were made or foliar sprays or dusts applied on the crop. Verify that the method and timings of application is appropriate for the stage of the crop and the target pest/disease against which it was applied.
A-22.8	Pre-harvest Intervals (Waiting Period)	Major	The pre-harvest intervals prescribed by Central Insecticide Board (CIB) or post-harvest intervals approved by relevant Government agencies shall be observed. Harvest shall not take place within the pre-harvest interval	The producer shall demonstrate that all pre-harvest intervals have been observed for plant protection products applied to the crops, through the use of clear documented procedures such as plant protection product application records and crop harvest dates from treated locations. Specifically in continuous harvesting situations, verify that systems are in place in the field, orchard or greenhouse, for example warning signs, time of application, etc, to ensure compliance with all pre-harvest intervals.
A-22.9	Record of Applications	Major	All chemical pesticides applied shall be correctly	Verify the record of chemical pesticides applied on the crop, the

			recorded	date of application, mode of application, the location of application, the dose, the application equipment and operator.
A-22.10	Disposal of Surplus Application Mix	Minor	Surplus application mix or tank washings shall be disposed of according to national or local law, where it exists.	Verify that surplus application mix or tank washings are disposed of according to the national or local legislation. NOTE: This refers to disposal of surplus of any spray material left after use. This clause requires compliance of any national/regional requirements of disposal. In its absence, the material may be disposed by applying over untreated part of the crop subject not exceeding the recommended dose or to designated fallow land, wherever legally permissible.
A-23	Application Equipment			
A-23.1	Equipment Used	Major	The appropriate equipment shall be used for spraying, dusting, soil application to achieve desired droplet size, uniformity and application rate	Verify that proper sprayers or applicators are used depending on the stage and size of crop and target pest. Verify that the sprayers and application equipment are properly marked for identification.
A-23.2	Condition of the Equipment	Major	The plant protection equipment used for spraying and dusting crops shall be maintained in good state/condition and shall be verified and calibrated as per requirements or the manufacturer's guidelines. Spray equipment shall be cleaned before and after application of pesticides. Spraying equipment is inspected on a regular basis	Verify that the nozzles and emitters are in good condition to obtain desired droplet size in spray of the pesticides. Do not blow with your mouth to clean the nozzle. Look into the equipment maintenance records and verify its operation in the field. Verify the calibration records.
A-23.3	Storage of Crop Protection Equipment	Reco	Crop protection equipment should be properly stored in secure areas	Verify that the plant protection equipment used for spraying and dusting crops are maintained and stored in appropriate and secure condition recommended by the manufacturer.
A-24	Plant Protection Product Residue Analysis			

A-24.1	Residue Analysis	Major	A residue analysis for the applied plant protection product shall be made on the produce at the time of harvest. Verify that residue analysis was done The correct sampling documentary procedures shall be followed	Verify that residue analysis was done on crop samples before harvest, as per the applicable / recommended method of sampling and analysis. The relevant records need to be verified. Verify that the documentary evidence exists demonstrating compliance with Sampling can be carried out by the laboratory approved by National Accreditation Board for Testing and Calibration Laboratories (NABL) or by the grower provided the procedure is adhered to.
A-24.2	Knowledge of MRL of Target Market	Major	The producer/ producers shall be able to demonstrate information regarding the market where producer is intending to trade produce, and the Maximum Residue Level (MRL) of that market	The producer or the producer's customer shall have available a list of current applicable MRLs for the market (s) where produce is intended to be traded in whether domestic or international.
A-24.3	Maximum Residue Level (MRL)	Major	The maximum residue levels should follow label instructions and action shall be taken to meet the MRLs of the market the producer is intending to trade his produce. In event of residues exceeding specified MRL values, a pre-harvest plan shall be in place to control it	Where the MRLs of the market the producer is intending to trade his produce in are stricter than those of the country of production, verify that the producer or the producer's customer can demonstrate that during the production cycle these MRLs have been taken into account (that is Modification where necessary of plant protection product application regime and /or use of produce residues testing results). Look for a documented procedure and planned action to be taken where the residue levels have exceeded the MRL value for vegetables, the pesticides should be of shorter duration.
A-24.4	Lab Accreditation	Major	The laboratory conducting the residue analysis shall be an accredited one	Verify that the laboratory is accredited/recognized by a national body for compliance as per IS/ISO/IEC 17025 or equivalent standard covering National Accreditation Board for Testing and Calibration Laboratories (NABL)

				accreditation for the applicable scope of testing. Verify valid accreditation/recognition certificates.
A-25	Storage of crop protection products	Major	Crop protection products shall be securely and separately stored as per applicable regulations or as per labelled instructions including the wearing of protective clothing. Only the authorized competent personnel shall manage the storage areas.	Verify that the crop protection products are stored separately in a well-lit, fire resistant, well-ventilated locked room on non-absorbent shelving in a sound, secure and protected area away from dwellings, cattle sheds and farm produce storage areas and all others biological materials, with appropriate sign boards in appropriate languages. Verify relevant records and labels. Verify that all the plant protection products that are liquid formulations are stored on shelving, which is never above those products that are powder or granular formulations. All crop protection products must be securely and separately stored and handled according to regulations and label instructions, this also applies to empty containers and surplus products before disposal.
A-26	Inventory records	Minor	The plant protection product inventory shall be documented and shall be readily available.	Verify that a stock inventory which indicates the contents (type and quantity) of the store is available and it is updated at least every 3 months. Quantity refers to how many bags, bottles, etc, not on milligram or centilitre basis.
A-27	Packaging	Major	All plant protection products shall be stored in their original package.	Verify that all the plant protection products that are currently in the store are kept in the original containers and packs, in the case of breakage only, the new package shall contain all the information of the original label.
A-28	Handling of Plant Protection Products			
A-28.1	Handling	Major	The crop protection products shall be handled	Verify that the person handling the plant protection products is trained

			appropriately and as per standard norms controlling spillage hazards and contamination during mixing and filling. Only the authorized personnel shall handle the chemicals	and that he has all the necessary gadgets to wear while handling them. Verify that documented procedure is in place and followed to handle spillage and suitable chemicals and equipment are provided at appropriate places. Verify whether all farmers using pesticides take precautions to minimize the risk of leakage to surface or ground water. Verify whether pictorial literature on safe use of plant protection products, appliances, Do's and Don'ts etc. are available with professional spray men and pesticide dealers.
A-28.2	Health check of workers	Reco	All workers who have contact with plant protection products should be submitted voluntarily to annual health checks. (Verifying farmers those who are using pesticides is a big task. Mostly farmers are relying on professional spray men who are the right persons to provide any kind of training. An inventory of spray men at block level across the country may be developed to monitor them effectively)	Verify that all workers who are in contact with plant protection products are voluntarily submitted to health checks annually. These health checks should comply with national, regional or local codes of practice and use of results respect the legality of disclosure of personal data. Verify whether an inventory of spray men is available to monitor at Tehsil or block level.
A-28.3	Precautions for safe use of pesticides	Minor	Do's and don'ts shall be followed for safe use of pesticides. Pesticide operators shall be familiar with all aspects on the safe use and application of pesticides	Verify whether farmers follow do's such as : pesticides stored under lock & key; keep out of reach of children; pesticides bought in original packing from authentic plant protection shops; measured correctly and used only recommended quantity/dose of pesticides; used funnel and filled without spillage; mixed thoroughly in water using a paddle of stick and sprayed along the wind; fixed warning board in treatment area;

				<p>after pesticide application washes thoroughly the clothes and body part; washed hand and mouth before eating, drinking or smoking</p> <p>Verify whether farmers follow dont's such as : Do not allow children to spray; keep food stuff near the site of application; use empty pesticides containers for food or water storage; blow with mouth to clean the nozzle; smoke, drink or eat while spraying; use leaky or damaged sprayer</p>
A-28.4	Emergency action plan	Minor	An action plan shall be in place to deal with emergencies, accidents, poisoning, spillage, improper handling	Verify whether such facility is in place.
A-28.5	Procedur es for re-entry of persons	Major	Procedures shall be therefore dealing with re-entry of persons on the farm after application of plant protection products. Have the recommended re-entry times monitored.	Verify that there are clear documented procedures, which regulate all the re- entry intervals of persons after plant protection products are applied to the crops according to the label instructions. Where no re-entry information is available on the label, there are no specific requirements.
A-28.6	Training on safer handling of pesticides	Reco	Training shall be provided for farmers and farm workers carrying out pesticide spraying professionally. Advice and information concerning the use of pesticides and the risks associated shall be provided by local extension officers	Verify whether farmers are receiving training on safer handling of pesticides.
A-28.7	Training for license systems to pesticide dealers	Reco	Training requirements for license systems to pesticide dealers allowing selling and using pesticides shall be carried out.	Verify whether such training has been carried out by the concerned institutes.
A-28.8	Encourage rural unemployed	Reco	Training to potential entrepreneurs shall be provided by the concerned	Considering the role of biopesticides in ecological conservation and safety to human health, registration

	and educated youths to establish small-scale biopesticide production units at village or block level.		institutes. Extension functionaries / farmers shall be trained in use of bio inputs. Officers and farmers shall be encouraged for farm level production of bio inputs including biocontrol agents, biopesticides, biofertilizers, etc.	requirements should be relaxed, without compromising the quality standards in order to encourage eco-friendly approaches for the benefit of environment and health. Verify whether, farm level production of bio inputs is carried out under the supervision of a trained officers / farmer.
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