**Strengthening Coordinated Approaches to Reduce Invasive Alien Species (IAS) Threats to Globally Significant Agrobiodiversity and Agroecosystems in China**

**(C-SAP 2) PIMS 5821**

**Pesticide Management Procedure**

**June 2023**

**Acronyms**

|  |  |
| --- | --- |
| FAO | Food and Agriculture Organization |
| GRFA | Genetic Resources for Food and Agriculture |
| IAS  IPM  IVM  MARA  SES | Invasive alien species  Integrated Pest Management  Integrated Vector Management  Ministry of Agriculture and Rural Affairs  UNDP’s Social and Environmental Standards |
| SESP | UNDP’s Social and Environmental Screening Procedure |
| WHO | World Health Organization |
| UNDP | United Nations Development Program |

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# 1. Introduction

1. This Pesticide Management Procedure was developed to address Risk 4 (Use of low volume pesticides as one of IAS prevention, control and management techniques will adversely affect plants, animals and their habitats) indicated in the Social and Environmental Screening Procedure (SESP) Checklist for the Strengthening Coordinated Approaches to Reduce Invasive Alien Species (IAS) Threats to Globally Significant Agrobiodiversity and Agroecosystems in China (C-SAP 2).
2. As of the project midterm, the reduction of IAS threats in the project’s 35,000 ha large targeted agricultural landscapes have only been partly achieved. The current project interventions as of midterm are the training of around 6,000 farmers in IAS management, which includes vegetation replacement techniques, biological control and low volume pesticides management. The use of pesticides, even if low volume can adversely affect both animals and plants and their habitats.
3. The project has institutionalized IAS management through establishment of regulatory framework and coordination mechanism at the national and provincial levels, thereby expanding protected landscapes that contribute to sustainability of GRFA production.
4. Under Output 3.1 (Farming communities, including cooperatives, agricultural enterprises and other relevant stakeholders are capacitated through training building the knowledge and skills base of all groups to work together to address IAS threats to agroecosystems), training for different stakeholder groups in Chongqing and Hainan is currently being undertaken. These expert-led trainings will serve as the foundation for long-term implementation of IAS Management techniques and interventions to be undertaken by local stakeholders in project’s targeted agricultural landscapes (Output 3.2 and 3.4), to minimize the threat from Alligator weed, Golden apple snail and Mile-a-minute in the project targeted landscapes.
5. Output 3.3 (Improved understanding of IAS distribution and impacts on agrobiodiversity, at two agricultural landscapes through targeted and management-oriented surveys and assessments) involves local stakeholders in the collection of data on the distribution of key IAS from the “First Priority” IAS species list, to ensure that IAS threats on critical habitats and environmentally sensitive areas are minimized.
6. The development of local and county level management plans, currently being undertaken is through a participatory process, and relies on latest research and expert inputs. Some of the management techniques being implemented include vegetation replacement using cash crops (e.g., hybrid elephant grass *Pennisetum sinese* and nectar producing plant *Sophora davidii);* use of IAS specific biological agents; use of local plants to control IAS in areas bordering the fields; combined vegetative replacement with biological agents and/or chemical agents (i.e., project will only use “low-chemical” techniques).
7. For the remaining timeline of the project, both expert-led and targeted and management-oriented assessments will continue to be implemented to ensure that farmers trained on IAS prevention will observe due diligence in application of IAS prevention techniques, including the application of low-volume pesticides, hence, the development of this Pesticide Management Procedure.

# 2. UNDP Social and Environmental Standards on Pesticide Use and Management and Food and Agriculture Organization International Code of Conduct on Pesticide Management

## 2.1 UNDP SES Standards on Pesticide Use and Management

1. **UNDP Social and Environmental Standard 8 requires that projects seek to anticipate, avoid, minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities and promoting more sustainable use of resources, including energy, land and water.**
2. Requirements of Standard 8 apply to projects that use, cause use of, or manage the use, storage or disposal of hazardous material and chemicals, including pesticides. UNDP seeks to avoid use of pesticides in supported activities. Integrated Pest Management (IPM) and Integrated Vector Management (IVM) approaches are to be utilized that entail coordinated use of pest and environmental information along with available pest/vector control methods, including cultural practices, biological, genetic and, as a last resort, chemical means to prevent unacceptable levels of pest damage. If after having considered such approaches recourse to pesticide use is deemed necessary, adopt safe, effective and environmentally sound pest management in accordance with the WHO/FAO International Code of Conduct on Pesticide Management[[1]](#footnote-1)for the safe labelling, packaging, handling, storage, application and disposal of pesticides. Hazards of pesticide use are to be carefully considered and the least toxic pesticides selected that are known to be effective, have minimal effects on non-target species and the environment, and minimize risks associated with development of resistance in pests and vectors. A Pest Management Plan is developed where use of a significant volume of pesticides is foreseen to demonstrate how IPM will be promoted to reduce reliance on pesticides and describes measures to minimize risks of pesticide use.
3. UNDP projects do not supply or use pesticides that contain active ingredients that are banned or restricted under applicable international treaties and agreements, or meet the criteria of carcinogenicity, mutagenicity, or reproductive toxicity as set forth by relevant international agencies. Users of any pesticides shall be trained to handle pesticides in a proper and responsible manner and utilize appropriate application equipment and adequate personal protective equipment.

## FAO International Code of Conduct on Pesticide Management

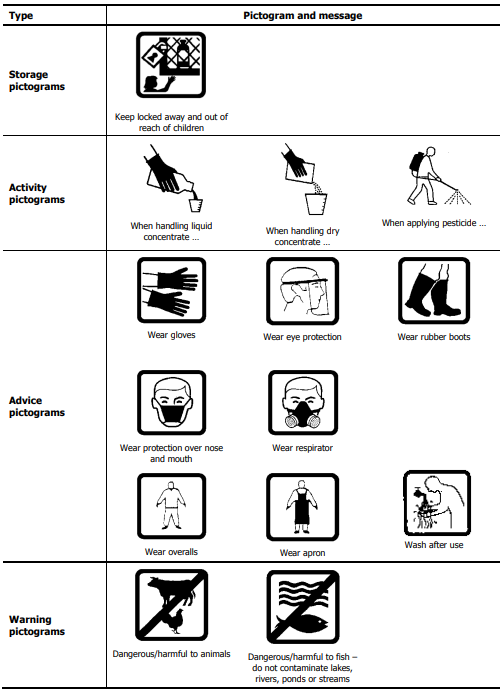
1. The following are the objectives of International Code of Conduct on Pesticide Management, which are relevant to the project:
   1. promote practices which reduce risks throughout the lifecycle of pesticides, with the aim of minimizing adverse effects on humans, animals and the environment and preventing accidental poisoning resulting from handling, storage, transport, use or disposal, as well as from the presence of pesticide residues in food and feed
   2. ensure that pesticides are used effectively and efficiently and in a manner that contributes to the sustainable improvement of agriculture, public and animal health and the environment
   3. adopt the "life-cycle” approach to management of pesticides to address all major aspects related to the development, registration, production, trade, packaging, labelling, distribution, storage, transport, handling, application, use, disposal and monitoring of pesticides and pesticide residues as well as management of pesticide waste and pesticide containers
   4. designed to promote Integrated Pest Management (IPM) and Integrated Vector Management (IVM).
2. The Code also details the responsibility of governments for regulating the availability, distribution and use of pesticides, including the allocation of adequate resources. For the project, the Ministry of Agriculture and Rural Affairs (MARA) has the following responsibilities:
   1. Provide extension services and agricultural and public health advisory services to relevant stakeholders, including farmers and farmers’ organizations on pest and/or vector management with adequate information about practical Integrated Pest Management (IPM) / Integrated Vector Management (IVM) strategies and methods, pesticide risk reduction measures, as well as the range of all methods available for use, including information on risks, hazards and mitigation measures in case of exposure or accident.
   2. Limit the availability of pesticides that are sold to the general public through non-specialized outlets, to low hazard products (WHO Class U) or low risk and ready to use products that require no dilution or other preparation, and can be applied with limited need for personal protective equipment.
   3. Require that pesticides be physically segregated from other merchandize to prevent contamination or mistaken identity and where appropriate require that pesticides are clearly marked as hazardous materials.
   4. Provide users and environmental authorities with information on appropriate remediation measures in case of spills and accidents.
   5. Promote the use of personal protective equipment which is suitable for the tasks to be carried out, appropriate to the prevailing climatic conditions and affordable.
   6. Promote safe storage of pesticides at farm level.
   7. Establish services to collect and safely dispose of used containers and small quantities of left-over pesticides
   8. Raise awareness and understanding among pesticide users about the importance and ways of protecting health and the environment from the possible adverse effects of pesticides.
   9. Develop and promote the use of IPM/IVM.

# 3. Pesticide Management Procedure

1. These guidelines were prepared by the FAO/WHO Joint Meeting on Pesticide Management (JMPM) to provide further guidance on the provisions of the FAO/WHO International Code of Conduct on Pesticide Management that are related to personal protection of pesticide users.

## Principle of Pesticide Risk Reduction

1. FAO/WHO The tiered approach developed by FAO and World Health Organization (WHO) in pesticide risk reduction, based on Guidelines for personal protection when handling and applying pesticides include:
   1. Reduce reliance on pesticides. Determine to what extent current levels of pesticide use are actually needed. Make optimum use of non-chemical pest management and eliminate unjustified pesticide use. As indicated in the FAO/WHO Guidelines on highly hazardous pesticides (HHPs) (FAO/WHO, 2016), “pest and vector management based on Integrated Pest Management (IPM) and Integrated Vector Management (IVM) would be preferred.
   2. Select pesticides with the lowest risk. If use of pesticides is deemed necessary, select products with the lowest risk to human health and the environment from the available registered products that are effective against the pest or disease. Particular attention should be given to substituting highly hazardous products as per the FAO/WHO Guidelines on HHPs (FAO/WHO, 2016).
   3. Ensure proper use of the selected products for approved applications and in compliance with international standards. Correct use includes, among other aspects, the appropriate PPE for each pesticide product in order to minimize exposure during pesticide handling and application. To ensure correct use of selected products, the following are recommended:
      1. read the label carefully to determine correct use, risks and required PPE;
      2. check the application equipment before using a pesticide to ensure that it is in good condition, with no leaks and functioning nozzles;
      3. use application equipment that is well calibrated and adapted to the use to minimise spray drift and personal exposure;
      4. after rinsing containers three times, put the rinse water back into the sprayers together with the spray mix;
      5. establish untreated buffer zones around spray areas to protect waterways and other non-target areas downwind of treated fields;
      6. do not spray in inappropriate weather conditions, that is, when it is too windy (> 3m/s), to prevent spray drift, when it is raining or > 30 °C; check wind direction before application;
      7. avoid spraying in close proximity to other people (e.g. workers harvesting or weeding) and to buildings (e.g. houses, schools);
      8. a 48-h notice period is recommended to inform bystanders and residents of forthcoming applications;
      9. avoid spilling pesticides;
      10. clean equipment away from water sources; and dispose of containers as indicated on the label.
   4. Provide training to farmers who will handle pesticides. Training should include proper use, handling, storage and disposal of pesticides, including information on risks and potential hazards associated with pesticide use. Training should also include record keeping to maintain accurate records of pesticide usage, including the type of pesticide used, quantity applied and date of application.
2. As indicated in the Guidelines on Good Labelling Practice for Pesticides (FAO/WHO, 2015), the label is the primary means of communicating information to the pesticide user. It includes precautionary statements to reduce risk, such as pictograms, samples of which are indicated in below figure.



**Figure 1. Sample of Good Labelling Practice for Pesticides**

## Guidelines for Pesticide Storage and Transportation, Applications and Use, and Collection and Disposal

1. The tiered approach developed by FAO and World Health Organization (WHO) in pesticide risk reduction, based on Guidelines for personal protection when handling and applying pesticides include the following.
   * 1. Users
2. Besides any physical protection, pesticide handlers and applicators should take care at all times. Users should be aware of the potential risks, including hazards and main routes of exposure to the materials used; know their surroundings and how they might increase exposure (e.g. no water to remove residues on hands before eating, washing contaminated clothing with family clothes); be in good health, be alert and not work with pesticides when ill, malnourished, pregnant, or breastfeeding and, above all, read and understand the label
   * 1. Storage and Transportation
3. Pesticides should always be stored securely, away from livestock, separated from food and drinks and locked away to prevent access by children and others not directly involved in their use. Pesticides should never be poured into food containers, drinking bottles or unmarked containers, as this illegal practice may result in accidental exposure of other people. Pesticide containers should be transported separately from food and drinks and be well secured in vehicles to prevent spills.
   * 1. Application and Use Specific to the Project
4. The project follows green control techniques in IAS prevention and control, as much as possible, to reduce reliance on pesticides. The current IAS prevention and control practices in the two demonstration areas include:
   1. Hainan Wenchang Demonstration Area

* Manual control, which involves uprooting of weeds manually and mechanically;
* Use of mineral oil agent for water hyacinth and biological control for coconut leaf beetle and orange fruit fly;
* Chemical control of golden apple snail, which is limited to a small area with low toxic pesticide under the Ministry of Agriculture registered list;
* Use of pesticide as baiting agent to control red fire ant. Its main component (indoxacarb茚虫威) is a newly developed and produced insecticide by DuPont, which is proven low toxic to people and domestic animals, and at the same time safe for non-target insects in the environment. It has low residues in the crops, and can be harvested on the second day after application.
  1. Chongqing Bishan Demonstration Area
* Alternative control for orchard weeds and biological control for alligator weed techniques are applied
* Use of pesticides as chemical weed control in citrus orchards twice a year, in April – May and September – October. A Ministry of Agriculture registered herbicide (30% glyphosate ammonium salt aqueous) is sprayed under orchard trees.
* Two kinds of pesticides are applied in May-August (10% Imidacloprid wettable powder or 10% chlorpyrifos emulsifiable oil to prevent citrus aphids) and June (12% chlorofluron-thiazuron suspension agent or 1.8% avermectin emulsion to prevent leaf moth,) both are registered variety under the Ministry of Agriculture.

1. All pesticide/herbicide applied in the project demonstration areas are registered as low toxicityby the Ministry of Agriculture and are available for purchase in the market. The government has detailed classification and specification for these pesticides/herbicides/chemicals, including registration number, manufacturer, name, toxicity level and labeling, ingredients, scope of application and usage, technical requirements, precautions, first aid measures for poisoning, storage and transportation, shelf life, etc.
2. When using, the project staff strictly comply with the above requirements for operation.
3. The personnel who used pesticide/herbicide are mainly the local fruit farmers or neighboring villagers working in the orchards. They have received relevant training from the local government, including village collectives and cooperatives. The employed farmers were also provided with personal protective equipment (PPE) by the cooperatives, such as gloves, work clothes and masks.
4. Users should understand that all chemical pesticides are toxic. Users should follow label directions and avoid contact or contamination of self, others, the environment, clothes, eating utensils and other surfaces. Application equipment should be maintained, checked and calibrated before each use. Any leaking, worn or damaged components should be mended or replaced before use. The appropriate protective clothing should be used as a last line of defense, with the understanding that PPE reduces exposure but does not fully prevent it, even when the correct PPE is used. Good personal hygiene should be practiced at all times. First aid directions should be available in the event of an accidental exposure.
   * 1. Collection and Disposal
5. After pesticide use, empty containers should be cleaned by triple rinsing (not in waterways), collected and disposed of in accordance with local procedures. They should not be discarded and burnt in the field or re-used as containers for storage of food or water. These steps should be taken in accordance with the disposal instructions on the label.

1. FAO/WHO[, The International Code of Conduct on Pesticide Management](https://www.fao.org/fileadmin/templates/agphome/documents/Pests_Pesticides/Code/CODE_2014Sep_ENG.pdf) (2014). [↑](#footnote-ref-1)