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NATIONAL PLANT PROTECTION CENTRE
DEPARTMENT of AGRICULTURE
MINISTRY of AGRICULTURE & LIVESTOCK
SEMTOKHA



Guideline Framework to the National Plant Protection Program Vision Document 2040

National Plant Protection Center
Semtokha, 2023

“ If I were to wish for anything, I should not wish for wealth and power, but for the passionate sense of the potential, for the eye which, ever young and ardent, sees the possible. Pleasure disappoints, possibility never. And what wine is so sparkling, what so fragrant, what so intoxicating, as possibility! ”

– Soren Kierkegaard

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MESSAGE: DIRECTOR, DEPARTMENT OF AGRICULTURE

It is a delight to extend my deepest appreciation to NPPC for coming up with the implementation Guideline Framework to the National Plant Protection Program Vision Document 2040, 2022. Through this document, the NPPC has identified six core components that are common to all the seven programs under the NPPC. Within the overall six core components, the actionable areas are presented vividly with the roles and responsibilities of key stakeholders. The guideline framework also provides a platform for the stakeholders identified to cooperate and collaborate to learn from and contribute in their specific roles.

Such initiatives could indeed spark new ideas and open up new opportunities and possibilities in the delivery of agriculture development services. In this light and towards delivering agri-development services, in this case, plant protection services, I urge all the incumbents concerned to deliver in the roles and take responsibility sincerely. Through this note, I would like to encourage all our colleagues in the agri-profession to communicate any concern and/ or issue to the department that challenges the delivery of our agri-development service, so that necessary actions could be taken at the appropriate time and forum for sorting out our development challenges.

Thank you.

TASHI DELEK!



YONTEN GYAMTSO
(DIRECTOR)
Department of Agriculture
Ministry of Agriculture and Livestock

MESSAGE: PROGRAM DIRECTOR, NPPC

With a sense of pride and achievement, I present this Guideline framework to the National Plant Protection Program Vision Document 2022. This important document is attempted to for three pertinent reasons. First and foremost, it is targeted for bringing a common understanding of the national plant protection program and its planning and implementation processes at the NPPC level. The expected outcome falls within the domains of harmonization of all plant protection activities and quality improvement in the standards of plant protection products and services.

The two documents (*Vision Document and the Guideline Framework to the Vision Document*) will also serve as a platform for the NPPC to communicate to the wider world about plant protection services and the processes that have gotten us here for advocating and implementing IPM as a pest management tool – from policy levels to implementation at the field level. As a result, this initiative is expected to facilitate cooperation and collaboration with other institutions and professionals, within the country, in the region, and globally.

Through the presentation of six core areas for collaboration, outlining broad tasks, and specifying the roles and responsibilities of the key stakeholders, the NPPC strives to engage development partners in their specific areas of expertise and profession. This will allow us to depend on each other and permit the development processes to function smoothly. The impact that will be made within the plant protection service network and across allied sectors will be, let's say, “Enormous” for now. I earnestly hope that together, we will be able to make good of our aspirations, visions and missions.

Thank you.

TASHI DELEK



YESHEY DEMA
(PROGRAM DIRECTOR)
NPPC, SEMTOKHA

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Guideline Framework to the National Plant Protection Program Vision Document 2040

I. Introduction

In any developing economy, the growth and development of agrarian industry is vital for ensuring and sustaining a reasonable standard of living. In general, it has been reported that growth arising from agriculture, could reduce poverty by about two to four folds more than growth arising from other sectors of growth (Robert F. Townsend, 2015). It has also been reported that, “Globally, 30 percent of all workers are employed in primary agriculture. As economies grow, the economic size of agribusiness (*agricultural input supplying and output processing subsectors*) relative to farming increases. Agriculture and the broader food system thus is a key part of the jobs agenda. Rural non-farm employment is also a significant source of jobs and incomes (Robert F. Townsend, 2015).”

In Bhutan agriculture is the highest employer of labour accounting for about 43.5% (LFSR, 2022) of total employment and contributing about 19.23% to the GDP, with crop sector’s contribution standing at 10.88% (NAS, 2021). This entails not only protection of preventable losses to pest organisms is vital, but ensuring safe food (*aligning with food safety protocols of Codex Alimentarius*) for contributing to human health and for establishing a brand that is trade worthy (*WTO SPS and Brand Bhutan in perspective*).

For meeting these national aspirations, the quality of plant protection services provided and implementation of IPM (Integrated Pest Management) approaches and technologies in the field must meet the highest standards possible. Towards ensuring these goals, identification of key action areas, engagement and involvement of not only the plant protection professionals and farmers, but other key stakeholders as identified under the vision document (*Section VIII: National Plant Protection Program and Stakeholders*) are deemed critical.

For actively engaging these stakeholders, clear statement and adoption of their roles and responsibilities are vital – *leading to support and facilitation of credible plant protection services and their implementation at the field levels*. Therefore, the main aim of this guideline framework has been to identify the common and core components of plant protection program, highlight on the key tasks that are required to be performed under those core components, and present broad role and responsibilities of each stakeholder clearly for enhancing, sustaining and advancing the plant protection services.

II. The Core Components of Plant Protection Program Services

Drawing from lessons of past in strengthening plant protection institutions and services in the country, six core areas have been identified in this guideline framework that are common across all the seven technical programs under NPPC and within the overall plant protection program activities (*refer to Section IX: Organizational structure of the Vision Document*). These six core components are identified as actionable areas for developing a robust plant protection program that will deliver quality plant protection services for meeting the challenges of crop protection in the country. This means plant protection professionals and institutions (*local, regional and national levels*) capable of networking with national, regional or international bodies (*like IPPC, APPPC, WTO SPS, trading partners – countries or business bodies, and so on*) at the standards that are acceptable at the global levels. These six core areas are:

a. Institutional development

This component is most vital for developing and establishing NPPC as a national apex plant protection body and to strengthen professional competencies accordingly to fulfill their roles with professionalism. This is vital for overseeing all plant protection activities with confidence, conforming to standards and globally accepted norms, and to support trade and commerce activities (*aligning with WTO SPS and Codex Alimentarius*) in the growing economy (*agri-business*). This will also help in accreditation of NPPC for strengthening the plant protection services in the country and as a result contribute to promotion of investments (*national and international*) in agri-food industry in the long run.

b. Management Coordination

A critically important element is coordination of planning and implementation of plant protection activities: including, but not limited to: Pest Information, R&D, Training and education, budgeting and resources allocation, monitoring and supporting, review and reporting progresses (*with a perspective of enhancing and improving quality standards*) and so forth. A coordination mechanism to provide a platform for facilitating and harmonizing activities with proper protocols to effectively utilize resources in the process of development and delivery of plant protection services is vital. Such initiatives will support the goal of sustaining growth of agri-food industry in the long term.

c. Training and Education

Human capital is quintessential need for developing and delivering quality services and products. Therefore, professional competencies and institutional capacities are fundamental for generating technologies and driving innovation to bring appropriate solutions to challenges of the time. In plant protection services, this translates into being able to undertake plant protection activities with confidence - from survey and surveillance; diagnostics and pest identification; and the whole gamut of R&D activities including communication skills, to mention a few. At the field level, it means ensuring adequate capability and competence of Extension personnel (*and farmers*) to facilitate adoption and application of plant protection measures in right time and quantity to reduce crop losses to pest organisms. In this regard,

training and education component ensures the dynamic improvement and sustenance of plant protection program activities.

d. Information Management System

A reliable information is vital for making any well informed good decision. Likewise, a quality pest and/or PP product information is vital for making good pest management decisions – from farmers’ level and extension service decisions to all decisions up the value chain of plant protection services. This will include prioritization of pests according to their economic importance by geography (*local, regional and national level*) in priority crops; identifying appropriate PP product(s) for assessment; undertaking any R&D or extension activity according to priority established; communicating decisions on rapid response pest management actions during epidemic situations; PRA and PFA activities for driving investment decisions and so on. An information management system actively engaged in upgrading, updating and communicating is at the heart of delivering any quality plant protection activity. It is therefore a vital decision making tool for policy makers, planners and other decision makers in the crop production/protection value chain.

e. IPM R&D and Technology Generation

IPM technology generation involves and engages all the seven technical programs (*refer to Section IX: Organizational structure of the Vision Document*). The common ground and confluence of all the PP activities are the two activities of pest information management and IPM R&D activities (*Section XCiii, figure 10 of the Vision Document*). These two activities are in a constant state of flux in the process of IPM technology generation (*technical like processes, protocols, standards and so on*), driving each other and as a result keeping the rest of the plant protection activities (*non-technical like all aspects of management actions including communication and coordination*) in a dynamic state of progress and development. As a result these two activities are central to all plant protection activities. Focus in these two areas are necessary and inevitable for constantly improving and enhancing the quality of plant protection services in general, and that of IPM technologies in particular. Implied implicitly within the overall IPM technology generation process is the dissemination of the technologies, an integral part of plant protection service delivery. Therefore, as much as development of IPM technologies are important, equally important is the dissemination activities of IPM technologies for reducing crop losses to pest organisms. The two activities of development and dissemination of IPM technologies are guided by the framework of IPM pyramid approach (*Section IB – IPM Approach of the Vision Document*).

f. IPM Technology Dissemination

Following the value chain of plant protection activities, based on the information from the field (*on pest(s) and / or PP product(s)*), specific IPM technologies are generated through the IPM R&D, adhering to the protocols, standards and procedures (*section XCi of Vision Document*). After having tested the efficacy and adoptability of IPM technologies in the field (*implying on-station, greenhouse and laboratory R&D activities*), implementation at a wider scale is the next step

- through IPM technology dissemination programs. As with other agriculture services, IPM technologies are disseminated through the NES (*National Extension System*) after following the protocols for endorsement from NPPC level (*section XCi of Vision Document*), followed by approval and endorsement by the Technology Release Committee (TRC) of the Department of Agriculture.

III. Guideline Framework to the Vision Document

The general guideline framework (Figure 1) to NPPC's vision document highlight broadly on the functional requirements of the six core components of plant protection program. It then identifies actionable areas and elucidates on the roles and responsible of agencies, institutions, or bodies for strengthening and advancing the plant protection services for ensuring adoption of IPM approaches and technologies in the field. The aspiration and goal of these complementary efforts and actions are to elicit a combined effect that will not only, result into reduction of crop loss to pest organisms, and appreciation of environmental and biodiversity concerns, but as a result receive high dividends in terms of adoption of agri-development services and technologies in future.

The vision document commits to reduce crop losses to pest organisms to 15% by 2040. This is a tall order for everyone working in agriculture development services, particularly for all the plant protection professionals including BFDA, Extension personnel and farmers without the support and other critically important players (*section VIII A&B*) in the agri-food value chain (*including the Department of Marketing and Cooperatives*). Therefore, the commitment to deliver in the roles and responsibilities specified under each of the stakeholder, but not limited to, is of prime importance. This will entail planning on crop loss reduction plans and implementation targets with committed resources, reviews and progress reporting, monitoring and evaluation, and take appropriate timely actions as and when issues arise.

a. Figure 1. General Guideline Framework to the Vision Document

GUIDELINE FRAMEWORK TO THE VISION DOCUMENT		
FRAMEWORK COMPONENTS	SPECIFIC TASKS	RESPONSIBLE AGENCIES/INSTITUTIONS AND SPECIFIC ROLES
I. Institutional development With increasing agricultural enterprises venturing into value addition and focus on commodities for export, the need for institutional development to strengthen human resources and infrastructure to meet the requirements of services and standards of export or import (WTO SPS, Codex Alimentarius) has become much more critical. Hence, the specific tasks are outlined for action.	a. Longer term institutional development policies, action plans with resource commitment. In particular, on Capacity & infrastructure developments (<i>with a vision of meeting acceptable quality standards</i>). This will imply longer term planning & resource commitment. b. International collaborations and linkages across allied disciplines in the agri-food industry. c. Intra-institutional collaboration within agri-sector.	Within the overall perspective of the guideline framework, the specific roles and responsibilities of responsible agencies/authorities/organizations or institutions are highlighted for engendering quality plant protection (PP) services within the overall context of agri-food industry development. ➤ Department of Agriculture, MoAL – Develop and implement institutional development policies with resources committed including policies on collaborations, cooperation and linkages with relevant institutions within the country, in the region and across the world within the context of achieving an institutional standard that is competent at the global level. ➤ NPPC – Prepare and submit proposals and projections for capacity and institutional development, keeping in mind the need for accreditation to function at a standard that is credible while working or collaborating with regional and global institutions. Accordingly, implement the activities enshrined within the policies and plans of Department and Ministry for institutional and human resource development. ➤ Agriculture Research and Development Center - ARDCs (<i>for PP Personnel</i>) – Prepare five year plan for capacity and institutional development for the region in collaboration with DAE and NPPC in accordance with guidelines from NPPC for streamlining resource use. ➤ BFDA - Bhutan Food and Drug Authority (<i>Plant Quarantine</i>) – Assess the capacity and institutional gaps and needs for functioning independently with confidence while collaborating and / or working with national or international counter-parts in matters of quarantine (<i>WTO SPS</i>). ➤ DAE Services – Reflecting on the field requirements from value chain perspective, assess the capacity and institutional development requirement for the five years and submit

		proposals where relevant for sourcing resource support - mainly through Dzongkhag five year plan budget; then Department of Agriculture, NPPC and ARDCs.
II. Coordination Mechanisms We have often witnessed duplication of activities leading to erratic misuse of resources – both human and financial. Given the constraint in both the areas of finance and human capital, it is vitally important to establish a mechanism of collaboration and cooperation between and within agencies for aligning and harmonizing activities.	a. Establish a formal coordination (<i>platform with protocols</i>) for harmonizing all plant protection activities: from planning and budgeting to developing pest information, carrying out R&D, training and education, resources allocation, monitoring and supporting, and review and reporting progresses (<i>In reference to Section X of Vision Document</i>)	Within the National Plant Protection Program, for delivering an effective quality PP services, the roles and responsibilities of the key service providers are highlighted: ➤ NPPC – recognizing NPPC as the national apex and technically competent authority in matters of PP activities, will coordinate and lead all plant protection activities in the country with all stakeholders, in particular with National Extension and Research (<i>agriculture</i>) Services. For realizing this goal, the NPPC will establish a platform for coordination and harmonization of PP activities with regional PP personnel (<i>at ARDCs</i>) and Dzongkhag Agriculture Extension - DAE (<i>Section XCi of Vision Document</i>). This will include activities like planning, endorsement, review, reporting, monitoring and implementation of IPM activities. ○ Specific programs under NPPC will initiate coordination of specific activities with DAE and ARDCs before endorsement by the Technical Team (TT) and the Program Management (PM) Team followed by final approval by the Management Administration (MA) (<i>according to Section XCi on procedure for implementation of pp activities of vision document</i>). ○ NPPC – establish a formal system of collaboration with BFDA, NEC, Department of Public Health (DoPH) and Royal Center for Disease Control (RCDC) for addressing issues of public health and environment. ➤ ARDCs: following the NPPC model (<i>Section XCi of Vision Document</i>) work out a mechanism or platform for collaboration and harmonization with Dzongkhags, and where necessary implement IPM activities in collaboration with NPPC and DAE. ○ The regional PP personnel will coordinate all IPM activities in the region in collaboration with DAE and specific programs of NPPC. Some key activities will include pest

		information; locally specific IPM R&D; IPM technology demonstration and dissemination; training and education of growers and farmers; and quarantine pest control and epidemic pest management. ➤ BFDA (<i>Plant Quarantine</i>) – establish a formal system of collaboration and cooperation in all PP activities with the national plant protection program, in particular with NPPC, ARDCs (<i>regional PP personnel</i>) and DAE Services. ➤ DAE – establish a platforms with Gewog Agriculture Extension (GAE) for coordination and harmonization of all IPM activities in the Dzongkhag. These activities will include demonstration and dissemination of IPM technologies; regular pest & PP products surveillance and monitoring; training and education of growers and farmers; quarantine pest control and epidemic pest management to mention a few, in collaboration with and with support from regional PP personnel, NPPC and BFDA.
III. Training and Education Training and education from time to time on general concepts and advancements in IPM, pest identity, phenology and epidemiology are indispensable part of establishing a human resource capacity for rendering quality pp services. Knowledge and skills developed and experience gained becomes the backbone of gathering quality pest information, carrying out IPM R&D, leading to generation of quality IPM technology that has not only socio-economic and	a. Identify training gaps and needs through surveys or capacity reviews. b. Identify best ways to develop capacities within the context of challenges and limitations (<i>budget constraints or restrictions of any sort</i>) and deliver need-based appropriate training program. c. Establish platforms to render support or mentoring and also to monitor progresses.	Within the overall perspective of building a robust agri-food industry, national plant protection program stakeholders need to assess gaps and needs for capacity development (<i>targeting specific tasks</i>) for implementing activities highlighted for the five year plans in specific areas. Based on the review, allocate resources and implement with priority. For instance, where required, plan for a training requirement in specific areas of PP services. ➤ NPPC – Review gaps and need on capacity development for the five years, allocate resources and provide need-based training. For instance, assess the capacities of Extension personnel in specific areas of PP activities, prioritize these trainings, and provide resources, technical backups or training in areas identified. These could include field diagnostics; monitoring and surveillance; early warning and management of pests and /or PP products – specific IPM technology dissemination activities. Allow provisions for a few important ad hoc trainings. ➤ BFDA – Review five year capacity gaps and needs for plant quarantine activities, from local to

environmental relevance but answers priority concerns of a specific geography - local, regional or national levels.	d. Through the NPPC management structure conduct regular reviews and reporting.	national levels, allocate resources and implement on priority basis – for instance, monitoring & surveillance, regulations and control of pest organisms and /or PP products. Keep provisions to cover for a few specific unplanned ad hoc important capacity development activities. ➤ ARDCs (<i>PP personnel</i>) – Assess the five year plan capacity gaps and needs for the region, allocate resource and incorporate in five year plan – mainly ARDCs, then DoA and NPPC. Coordinate and implement capacity development activities accordingly. Incorporate provisions to cover for a few specific capacity development activities. ➤ DAE – In collaboration with GAE, regional PP personnel and NPPC, identify priority areas for capacity development and incorporate in five year plan – mainly Dzongkhag then DoA and NPPC. Implement the capacity development activities accordingly. Provide allowance to include a few ad hoc capacity development activities to mitigate unforeseen risks from pests and / or PP products or to take on the opportunities.
IV. Information Management System A reliable pest information becomes the basis for taking any decision in pest management activities. Information management system is vital for executing every plant protection activity (<i>from policy and planning decisions to technical and management decisions, to field level implementation decisions</i>) under the plant protection program. It includes communication of and prioritization of crop specific, geographically limited pest status; supporting	a. Undertake pest and/or PP product monitoring and surveillance activities for updating and upgrading information. This includes planned regular survey and surveillance activities (<i>mainly through Pest surveillance and PP product programs</i>) and specific surveys (<i>through all technical programs</i>). b. Support data collection through trainings and sharing information by all technical programs.	Pest Surveillance Program and PP Product Program are responsible for managing the information on pests and PP products respectively. Both information services are administered from the NPPC for better administration and quality management for effecting better pest management decisions. ➤ NPPC (<i>Pest Surveillance and PP Products Programs</i>) – Reflect information system management activities on pests and PP products in five year plan. Share relevant information with concerned institutions, authorities or bodies (<i>like Pesticide Board, Technology Release Committee, BFDA, ARDCs, DAE and so on</i>) for facilitating appropriate actions. Provide capacity development and technical backup services, and wherever relevant render financial resource support to ARDCs and DAE. Establish a national level mechanism for information management (<i>reviews and updating</i>) for harmonization and standardization. ➤ BFDA – Within the context of the formal coordination mechanism, share information of pests and/ or PP products for facilitating

the development of a robust IPM R&D, which also includes PP products' R&D for generating IPM technologies; regular dissemination and implementation of IPM measures; addressing immediate and urgent epidemic pest outbreaks; risk assessments (<i>PRA & PFA</i>) for trade and commerce (<i>including investments in crop sector</i>) and many more. On the other side, information management system is also vital for addressing issues related to biodiversity and environment.	c. Update and communicate pest and/or PP product information on a regular basis and share with concerned professionals, technical programs and management. For instance with DAE, ARDC PP personnel, specific NPPC technical program and management for effecting necessary actions in time. d. Based on field information provide advisory services, such as early warning (<i>in case of pests</i>) or risk assessment (<i>in case of PP products</i>) report or findings.	appropriate actions by the concerned institutions, authorities or bodies. ➤ ARDCs PP personnel – support capacity development and quality maintenance of information from field. Render financial and technical support wherever relevant and possible. For reducing risks arising from PP products and pest organisms, coordinate and communicate on regional status of monitoring and surveillance activities of pests and PP products according to five year plan targets. Establish a regional level mechanism for information management with DAE. ➤ DAE – Regular monitoring and reporting of information (<i>of PP products and pests</i>) from field up the value chain and dissemination of management actions down the value chain according to the five year plan targets. This includes administrative and resource support, capacity development, and other necessary technical supports to the GAE (<i>Genog Agriculture Extension</i>). Establish a Dzongkhag level (<i>which includes the Genogs</i>) mechanism for harmonization and standardization of information management activities in the field. ➤ GAE – According to the five year plan targets, undertake survey, surveillance and monitoring activities of pests and PP products; and communicate on the pests and/ or PP product status to farmers and concerned plant protection institutions (ARDCs, BFDA or NPPC levels) for facilitating necessary actions. Where necessary, seek support from ARDCs and NPPC.
V. IPM R&D & Technology Generation IPM research agendas are set (<i>section XCi of Vision Document</i>) based on information from the field or collected through plant protection activities, from regular survey and surveillance activities to	a. Identify IPM R&D priority needs for the five year plan based on “Procedure for Implementation of plant protection activities” (<i>section XCi of Vision Document</i>). The sources of information could include the NPPC information management system, specific	Quality research products (<i>IPM technologies</i>) for pest management could be advanced through improving the IPM R&D based on accurate and geographically specific (<i>Genog, Dzongkhag, regional and national levels</i>), pest and/ or PP products' information. For addressing this challenge a system of coordination and harmonization is necessary (<i>Section XCi of Vision Document</i>) for all plant protection activities, led by IPM R&D activities. This could then lead to: a) promotion of effective resource use by mitigating possibility of duplication; b) circumvent the chances of getting the priorities incorrect; and c) improve R&D capacities. ➤ NPPC – as the apex national referral body, liaise with institutions and professionals across agencies

R&D and extension activities. Towards brining solutions to the challenges of pests and/or PP products, the seamless collaboration and cooperation of all the six components are critical - IPM R&D being central in generation of IPM technologies. For addressing geographically specific (<i>regional and local levels</i>) pest and/or PP products, harmonization of IPM R&D activities and forging strong collaboration and cooperation are vital with ARDCs and Dzongkhags.	Technical Program experiences, and information from field – Gewog, Dzongkhag, regional PP personnel or BFDA. b. Based on identified priorities, through the same processes (<i>section XCi of Vision Document</i>), harmonize all IPM R&D activities with region (<i>ARDCs</i>) and Dzongkhags by planning and reviewing together (<i>section XCi of Vision Document</i>). Then, implement the IPM R&D agenda accordingly. c. Share research protocols (<i>for quality maintenance and improvement</i>), and research (<i>for future reference and research advancement</i>) outputs between NPPC, region, and Dzongkhags. d. Review and report on support required (<i>in terms of administrative or policy</i>) for facilitation of collaboration and cooperation activities, with institutions and professionals, within and across agencies and	and institutions within the country and internationally in matter relating to plant protection, in particular for advancing IPM R&D. ➤ NPPC – as technically competent authority in plant protection and as a lead agency of the Plant Protection Program in the country, lead coordination and planning of all IPM R&D activities for the five year plan, from local to national levels in collaboration with Dzongkhags (<i>DAOs and EAs</i>) and regional research centers (<i>ARDCs PP personnel</i>). NPPC will review, approve and endorse all IPM R&D activities for the five years – both research agenda(s) and product(s). ➤ NPPC, ARDCs and DAE - present the five year plan on national plant protection program IPM R&D agenda during the regional Agriculture Planning and Review (APR) forum for commodity development. ➤ NPPC – In collaboration with Department of Public Health (DoPH) and Royal Center for Disease Control (RCDC) prioritize IPM R&D activities for the five year plan period and implement accordingly. ➤ BFDA – within the context of formal collaboration, identify areas of cooperation in the fields of IPM R&D for the five years and implementation accordingly. Provision for addressing priority ad hoc IPM R&D activities will be important. ➤ ARDCs (<i>PP personnel</i>) – Following the five year planning format of NPPC, prepare IPM R&D protocol(s) for the region (<i>with Dzongkhags including Dzongkhag and Gewog specific IPM R&D activities</i>), and review during national planning and review meet (<i>subject to revision and finalization during the national plant protection program meets</i>) with NPPC for support, endorsement and for inclusion in NPPC work plan. ➤ Dzongkhag Extension – In accordance with NPPC planning format and with support from NPPC (<i>specific Programs</i>) and regional PP personnel, prepare and submit locally specific five year plan for IPM R&D activity (<i>Dzongkhag or Gewog level</i>) to regional PP personnel and/ or NPPC for review
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	internationally for advancing IPM R&D.	and technical support, endorsement and for inclusion in ARDC, and NPPC work plan.
VI. IPM Technology Dissemination The overall goal of plant protection program is to generate and disseminate IPM technologies to farmers for enabling them to produce crops safely (<i>for human and animal health & the environment</i>) and profitably by managing pest organisms below the economic injury level. Towards achieving this goal: capacities; support and facilitation; collaborations and communications; and adequate financial resources are required to effectively implement IPM technologies in the field. For delivering on these agendas, the key stakeholders in the plant protection program (<i>Section VIII of Vision Document</i>) need to deliver in their roles and take responsibilities and be accountable.	a. Following approval and endorsement of an IPM technology, develop dissemination friendly resources for use by farmers and National Agriculture Extension Services (NAES). b. Demonstrate in farmer field for technology refinement and adoptability, where found necessary. c. Scale-up for wider adoption to reduce crop losses to the pest organism(s) or to reduce risk associated with PP product use.	Dissemination of IPM technologies and their adoption in the field requires more than a linear approach to IPM technology implementation through training or informing (<i>through advisory services</i>) farmers. IPM technology dissemination leading to adoption requires, besides training and education, application of complementary supports and services. These include, but not limited to: confidence building, surveillance and monitoring pests and/ or PP product situations and providing early warning support, administrative support and facilitation of pest and /or PP product management (<i>facilitation in the areas of information, resources, coordination and so on</i>), to mention a few for addressing situations arising out of pest and/ or PP products use or abuse. ➤ NPPC – as technically competent authority in plant protection and as a lead agency of the Plant Protection Program in the country, lead coordination and planning of all IPM technology dissemination activities, from local to national levels in collaboration with Dzongkhags (<i>DAOs and EAs</i>) and regional research centers (<i>ARDCs PP personnel</i>). NPPC will review, approve and endorse all IPM technologies for dissemination for the five year period according to plans and priorities (<i>as per Section XCI of Vision Document</i>). ➤ NPPC - Provide feedback and information on the implementation status of activities planned for the five years during either during regular reviews (<i>as per Section XCI of Vision Document</i>), as issues arises for support, during information sharing or while progress reporting. ➤ NPPC – Ensure technological, technical, and information support to the regional PP personnel and Dzongkhags. Wherever possible provide resources support. In collaboration with ARDCs (<i>PP personnel</i>) and DAE, monitor on pest occurrences through regular pest monitoring and surveillance activities and early warn for undertaking necessary action at national, regional, and local levels respectively – in particular for managing epidemics. ➤ ARDCs (<i>PP personnel</i>) – In Collaboration with Dzongkhags in the region and NPPC, prepare plan for the five year IPM technology

		dissemination. Facilitate implementation of the IPM technology dissemination for the five year plan. Provide technical backup, coordination and resources support to Dzongkhags in the region. Wherever possible facilitate IPM technology dissemination through facilitation and coordination among Dzongkhags. ➤ DAE – Prepare plan for IPM technology dissemination for the five years in collaboration with regional PP personnel and NPPC. Organize implementation of IPM technology dissemination in collaboration with GAE. Provide technical, administrative and resources support to the GAE. Through the coordination mechanism, organize and facilitate regular communication, reporting and monitoring with GAE (<i>besides the Dzongkhag level planned meets - monthly, biannual, and annual or midterm meets</i>). ➤ GAE – In collaboration with DAE prepare five year plan for IPM technology dissemination. Lead in implementation of IPM technology dissemination activities. Provide feedback on the challenges to IPM technology dissemination to DAE, regional PP personnel and NPPC; and seek resource or technical support from the above collaborators wherever deemed necessary for facilitating or implementation of the IPM activities.
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IV. References

1. National Plant Protection Program Vision Document 2040
2. Labour Force Survey Report of Bhutan (LFSR), 2022.
<file:///C:/Users/PC/Downloads/LFSReport-2022-WEB-version.pdf>
3. National Accounts Statistics (NAS), 2021.
[file:///C:/Users/PC/Downloads/NAS-2022%20\(1\).pdf](file:///C:/Users/PC/Downloads/NAS-2022%20(1).pdf)
4. Townsend, Robert (2015). Ending poverty and hunger by 2030: an agenda for the global food system (English). Washington, D.C.: World Bank Group (2015).
<http://documents.worldbank.org/curated/en/700061468334490682/Ending-poverty-and-hunger-by-2030-an-agenda-for-the-global-food-system>

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