

Plant clinic in Nepal: An overview

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SUMMARY

Plant clinics play an important role in supporting farmers in growing healthy crops and achieving higher productivity in Nepal. The development and operation of plant clinics in Nepal are assessed in this study through a comprehensive analysis of the institution via literature review and interaction with key stakeholders. The plant clinic approach of the agriculture extension system started in Nepal in 2008, followed up with engagement with CABI and the Government of Nepal. Enhancement of farmers' knowledge and skill, encouraging sustainable farming methods, and ultimately increasing crop yields are the impact of plant clinics. However, there are some challenges faced during the implementation of plant clinics in the existing agricultural extension systems. In Nepal, the plant clinics are primarily operated by agricultural technicians with expertise in plant protection, as well as IPM farmer facilitators and community business facilitators after attending an intensive plant doctor's training. Plant clinics have been integrated into the agricultural extension system by agro-advisory service provider of the government of Nepal. Despite institutionalisation, policy support needs to be strengthened to ensure the sustainability of the different components of the (e.g., data management, validation, monitoring, localised content, etc.) plant clinic in Nepal.

Keywords: Agricultural extension system; Nepal; Plant clinic

INTRODUCTION

Nepal's agricultural sector continues to be in its development. Approximately, two-thirds of the people in Nepal make their living from the agricultural, forestry, and fishery sectors, which account for around 24.12% of the country's GDP (MoALD, 2023). Insufficient linkages between research, farmer, extension, and education agencies; and inadequate infrastructural facilities are major bottlenecks hindering the adoption of new agricultural technologies. As a result, agricultural products are not very competitive. The delivery of technical support to the small land-holding farmers in Nepal remains difficult and inadequate, even with the existence of several stakeholders and approaches for the extension and dissemination of agricultural technology (Adhikari et al., 2017a). A novel approach of agricultural extension services in Nepal is the plant clinic. This extension service is driven by demand, concentrates on a range of crops and technologies, reduces unnecessary application of chemical pesticides (Bentley et al., 2009), links research and extension, identifies new agricultural issues (Boa & Harling, 2008), serves as a warning system for emerging pests and diseases, supports quarantine functions (Adhikari et al., 2013), offers pest surveillance in a specific area, updates extension service providers to address technical issues raised by farmers, enhances service quality, and offers plant health extension services to small-holder farmers.

Since 2008, Nepal has executed the plant clinic, a tool for agricultural extension that deals with farmers for the plant health (Adhikari et al., 2017a; Boa, 2009). Smallholder farmers in Nepal are generally unaware of plant health concerns and do not know where they can go for the best recommendations. Plant clinics can provide these services to them face-to-face (Hema,

2020; Adhikari et al., 2017b). Consequently, farmers accepted it and it has been simply incorporated into the extension system. The Plant Protection Directorate (now Plant Quarantine and Pesticide Management Centre) under the Ministry of Agriculture and Livestock Development in Nepal works together for the plant health system in Nepal. Currently, the national plant protection program in Nepal incorporates plant clinics as part of its accepted approaches. Through the global Plantwise programme, the CAB International (CABI) supported Nepal's plant clinic and related initiatives, which are now taken forward by national and provincial institutions (departments) of the country. An analysis of the plant clinic's role in providing farmers with technical assistance is vital, so is model for a comprehensive plan for monitoring of deliverables of the results as expected under the programme. Plant clinic services and Nepal's plant health system should be strengthened by increasing their efficacy via quality monitoring and feedback. This manuscript describes the plant clinic initiatives and their status in the plant health system of Nepal.

METHODOLOGY

A combination of a literature review and interaction with key stakeholders was performed to prepare this manuscript.

RESULTS AND DISCUSSION

Development of plant clinic in Nepal

In December 2008, the Global Plant Clinic (GPC) ideated by CABI was piloted in Nepal. At that point in time, it was done in collaboration with World Vision International Nepal (WVIN) by organizing pilot plant health clinics in the Lamjung district of Nepal. The

clinics were operated by agriculturists and rural development personnel who had completed module-1 of the GPC's "How to Become a Plant Doctor?" course (Neupane and G. C., 2011; Boa and Harling, 2008). With technical guidance and support from Global Plant Clinic, the plant clinic in Nepal gained pace following its establishment by GPC. With technical assistance from the District Agriculture Development Office (DADO), the government agency responsible for agriculture development in Nepal, SECARD Nepal, a non-governmental organization (NGO), conducted plant clinics in Dhading and Kathmandu, beginning with instruction on field diagnosis and clinic operations under the training course "How to Become a Plant Doctor?" (Adhikari, 2009). Farmers' preferences increased as a result of the special agriculture extension service delivery features, such as clinics for all crops and issues that are accessible to all farmers. Thus, the Plantwise initiative, led by CABI, was started in 2011 by the Government of Nepal, MoAD, and was scaled further with a formal engagement in 2013 between the

Plant Quarantine and Pesticide Management Centre (PQPMC) erstwhile Plant Protection Directorate (PPD) and CABI. Through the Plantwise initiative, agricultural extension agents' capacity is developed by undertaking an intensive training on plant doctor modules, and they are supported with validated extension materials for farmers and plant doctors, such as factsheets and decision guides on pest management (PMDGs). The main operations of the Plantwise programme in Nepal were the regular operation of the plant clinic (a clinic session held at the same place each month) and the management of clinic data. Also, a national forum was formed to review and direct the future development of plant clinic activities in Nepal. It was administered by the Plant Protection Directorate (PPD) under the Ministry of Agriculture and Development (MoAD) of Nepal, and relevant plant health system stakeholders (CABI, 2016). *Table 1* depicts the plant clinic's historical development in Nepal.

Table 1. Major events and achievements of plant clinic in Nepal

Year	Events of plant clinic	Major activities/achievements
2008	Starting Plant Health Clinics in Nepal	Two pilot plant clinics were held in December 2008 in Lamjung district by the support of Global Plant Clinic (GPC).
2009–2010	Capacity Building and Strengthening	Nepal is the ninth country to initiate plant clinics. Training of plant doctors and clinic operation by GPC/WVIN/SECARD Nepal.
2011–2016	Plant clinic in the National Plant Health System program in Nepal, First phase Plantwise programme in Nepal	The agreement between the Plant Protection Directorate of Nepal and CAB International in December 2013 to initiate the CABI Led Plantwise plant clinic programme and Capacity development and support (factsheets and PMDG). Regular plant clinics and clinic data management (POMS). National forum led by the Ministry of Agriculture Development of Nepal, through its Plant Protection Directorate (PPD) and related stakeholders.
2017–2019	Second phase Plantwise integration in National Plant Health System	The extension of the agreement between the Plant Protection Directorate of Nepal and CAB International, Regular Plant Clinic Session and Monitoring, Cluster Meeting, National Forum Meeting, Province secretary meeting, Officer level Module 1 and 2 of plant clinic training, E-plant clinic training cum workshop, Plant health rally. Data Validation Workshop, PMDG write shop, Highly Hazardous Pesticide Workshop.
2021–22	The national policy document of plant clinic in Nepal	The need of the plant clinic guidance document was recommended by the national forum in 2021.
2023	Preparation of Policy document of plant clinic program in Nepal	The National Guidance Document of the Plant Clinic Program was prepared and submitted to the Ministry of Agriculture and Livestock Development from PQPMC for approval. With the new phase of CABI-led PlantwisePlus programme, the initiative is taken to streamline processes in the registration and trainings of Agro-input dealers' (AIDs). A need assessment was conducted across all provinces followed up with a validation of findings, and an exploration of next steps is in process. The dissemination workshop of Gender Sensitive Analysis of Women Farmers of Nepal, Issues of Access to Agro-Dealers is also part of the activities, and specific recommendations are made.

Currently, the Plant Quarantine and Pesticide Management Centre (PQPMC) (formerly Plant Protection Directorate (PPD) under the Ministry of Agriculture and Livestock Development, is a nationally responsible organization for plant quarantine and pesticide management issues in the nation as well as bear the responsibility of National Plant Protection Organization Nepal. Plant Protection Laboratories are operational for plant clinic implementation and

trainings. Agricultural offices in the districts such as Agriculture Knowledge Centers and the agriculture section of local governments are also performing plant clinic programs. In 2022, 54 plant clinics are in implementation throughout the country (CABI, 2023). The Pesticide Management Act, 2019 mandates PQPMC to implement plant health systems' programs such as plant clinics. Moreover, a national policy

guidance document for plant clinics is presently under the approval stage from the Ministry.

Plant clinic in the plant health system of Nepal

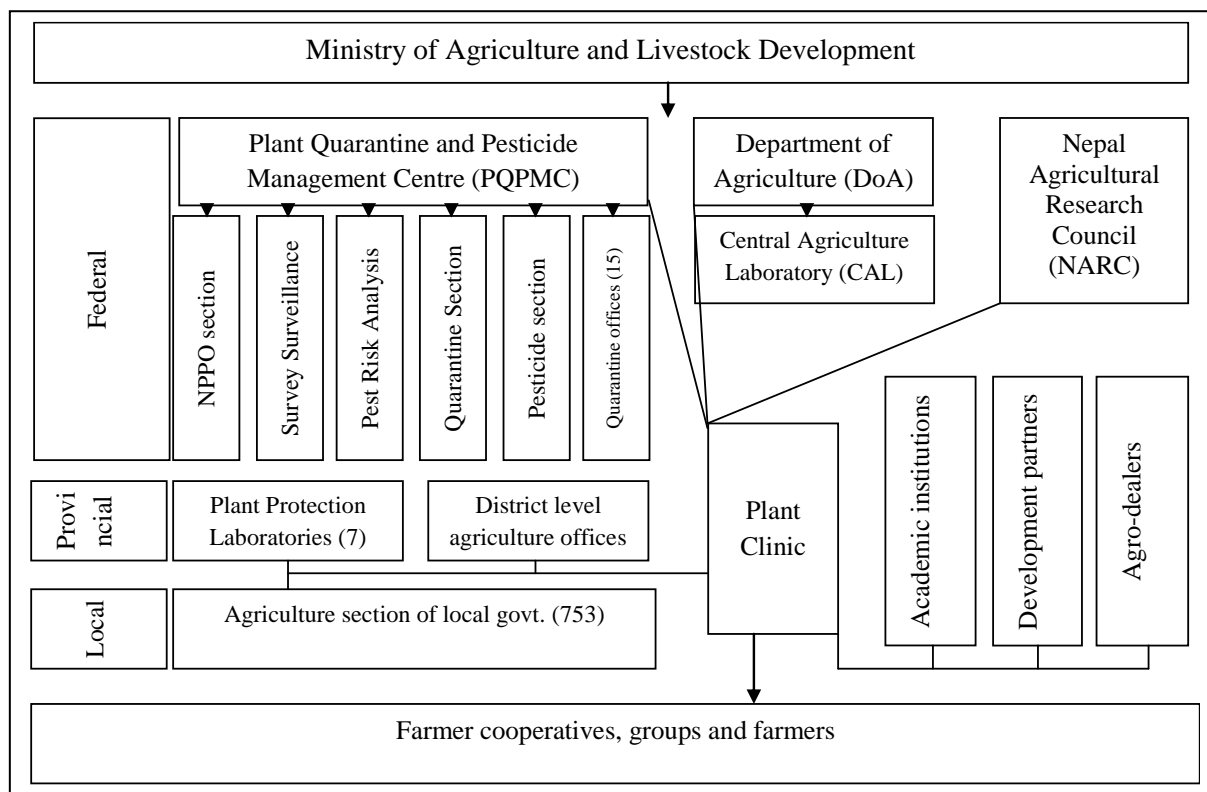
The agriculture extension in Nepal is mainly the function of government under local and provincial government and is also performed by Federal Ministry of Agriculture and Livestock Development, as well as there are other stakeholders such as International/Non-Governmental Organizations (I/NGOs), private sectors, farmer’s group, and cooperatives involved in the development of agriculture. The rural livelihood in Nepal is mostly depending on the agro enterprises. Thus, the development activities in rural areas mostly focused on agriculture. So, there are multi-stakeholders for the commercialization of agriculture sector. There is pluralism in agriculture extension services in Nepal. The plant health system in Nepal under Ministry of Agriculture and Livestock Development (MoALD) in central government including the Plant Quarantine and Pesticide Management Centre (PQPMC) and the Department of Agriculture (DoA). Plant Protection Laboratories in all seven provinces and district-level agriculture offices are major organizations under the provincial structure. The agriculture section of local government acts as a front-line agriculture extension agency at the grass root level in Nepal. A representative

and simplified Plant health system in Nepal with a plant clinic is presented in *Figure 1*.

The producers are organized into farmers groups and cooperatives to access government extension services (AED, 2016). Nepal Agricultural Research Council (NARC) (divisions, programs and centers, etc.), academic institutions (universities and colleges; AFU, TU/IAAS, FWU, HICAST, CTEVT) national and international organizations such as CABI, iDE Nepal, etc., private sectors, agro dealers, pesticides entrepreneur’s association Nepal, and farmer’s associations are found involved to support plant health clinics services in Nepal (*Figure 1*).

In order to fulfill the gap in agricultural extension, the plant clinic was established to provide plant health services to small-holder farmers for a variety of plant health issues affecting many crops (Adhikari et al., 2015). At the field level, diagnosing crop issues at the plant clinic involves closely observing the host plant's symptoms and relating them with possible causes. Following diagnosis, recommendations for issue management must be feasible, safe, effective, affordable, and readily available locally (Taylor, 2015). The precise identification and recommendation of plant health problems determines the quality of advice given in plant clinics (Reeder, 2015).

Figure 1. The plant health system in Nepal



Source: Adopted from Adhikari et al., 2016

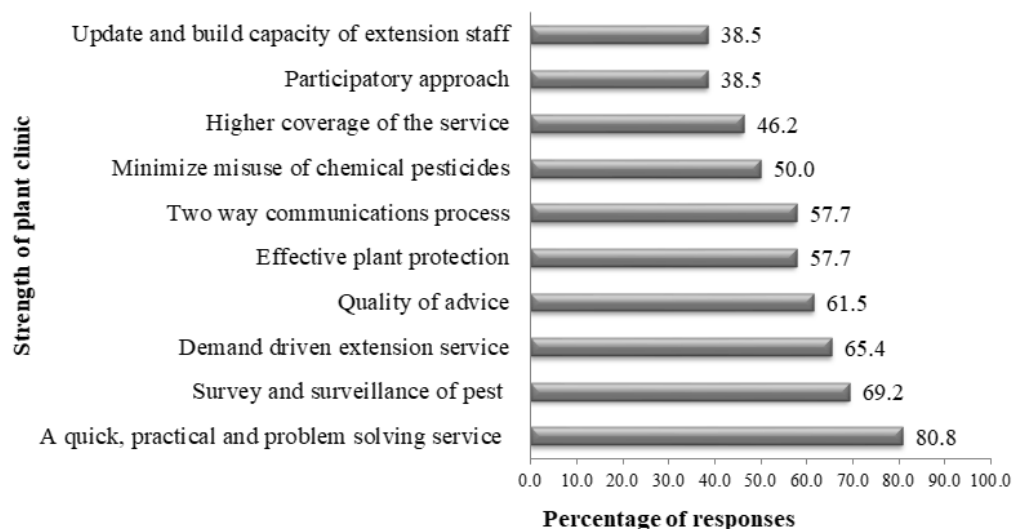


Perception of plant clinic by plant doctors of Nepal

The highest percentage of respondents plant doctors perceived plant clinic as a quick, practical and problem-solving service (80.8%) followed by survey and

surveillance of the pest (69.2%), demand-driven extension service (65.4%) in Nepal (Adhikari et al., 2016) (*Figure 2*).

Figure 2. Strength of plant clinic as perceived by plant doctors in Nepal



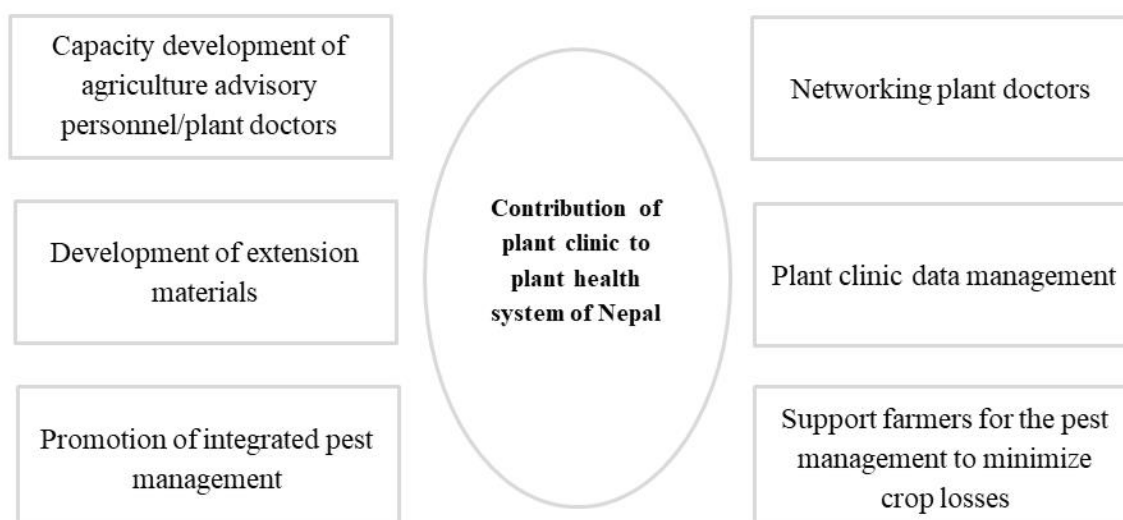
Source: Modified from Adhikari et al., 2016

Contribution to the plant health system of Nepal

Plant clinics play a vital role that goes beyond diagnosis and advice for the management of plant pest problems. These could include training plant doctors and extension staff on how to diagnose pests and diseases in the field, creating extension materials such as fact sheets and PMDGs, promoting integrated pest management, networking with other plant doctors,

recording the distribution of pests and diseases, managing clinic data and conducting pest surveillance (*Figure 3*). To achieve the objective, cooperation between the media, development agencies, and input traders is essential (Srivastava, 2013). Similar to this, the plant clinics focus their efforts on extension by collaborating more closely with farmers and groups that support crop production.

Figure 3. Contribution of plant clinic to the plant health system of Nepal



Plant clinics in Nepal are vital to the health and production of agricultural crops by offering farmers diagnostic and consulting services. Plant clinics work to identify and manage plant diseases, pests, and other problems that affect the health of crops. They provide a forum for farmers for diagnosis and to get recommendations, advice from experts, and information about crop management and plant health. Plant clinics are often put up in settings where farmers can readily reach them, including agricultural centers, extension offices, or marketplaces. These clinics are operated by qualified plant doctors or specialists, usually plant protection experts. Plant clinics provide a variety of services, such as the diagnosis of pests and diseases, the detection of abnormal plant growth, advice on integrated pest management (IPM) techniques, details on the proper use of pesticides, and suggestions for crop nutrition and management. Different diagnostic methods are used by plant doctors for detecting diseases, pests, or nutritional deficiencies. Visual inspection, microscopy, laboratory testing, and the use of diagnostic instruments and resources, such as field guides or digital tools, may be among them. Farmers' engagement and participation are prioritized during plant clinics. Farmers are encouraged to bring samples of the affected plants or plant parts to the clinic, for the diagnosis, and receive recommendations from experts. To improve farmer learning, open conversations, and knowledge-sharing events are frequently encouraged.

Plant clinics provide a strong emphasis on enhancing the knowledge and skills of extension agents and farmers. To educate farmers on pest management, disease prevention, and sustainable agricultural practices, workshops, training sessions, and

demonstrations are organized. Plant clinics perform awareness campaigns using a variety of media, such as radio programmes, brochures, rallies for plant health, and other activities. These initiatives seek to educate farmers on the value of maintaining healthy plants, preventing crop pests, and using sustainable farming methods. Governmental organizations, agricultural laboratories, non-governmental organizations (NGOs), and other stakeholders work together to manage plant clinics. Access to current knowledge, skills, and resources is ensured by this collaborative approach. The establishment and operation of plant clinics in Nepal have greatly improved crop health, increased farmer knowledge, and promoted more environmentally friendly agricultural practices. They have developed into useful venues for addressing issues with plant health and encouraging the use of integrated pest control techniques.

CONCLUSIONS

To offer on-the-spot diagnostic services, particularly to small farmers, Nepal established a plant clinic in 2008. Crop problem identification in the field and management recommendations are highly technical tasks. Effective plant health advisory services play a pivotal role in the agricultural growth of the country. Considering the lack of resources at institutional level, the extension approach that offers farmers the option of field-level services at an economic way appears to be plant clinic. The role of the plant clinic and its contribution to the plant health system of Nepal is well reflected with the institutionalizing of the some activities of the programme.

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