Zoo Botanica
ISSN: 3007-2050 (E), 3007-2042 (P)

Check for updates

ROOTS PRESS

Research Article

Assessing the role of plant clinic advisory services in plant health improvement in Chakwal district of Punjab

Awais Zafer, Muhammad Rameez Akram Khan, Laraib Malik
Department of Agric. Extension, Pir Mehr Ali Shah-Arid Agriculture University, Rawalpindi, Pakistan.

ABSTRACT

Plant clinic (plant-wise) is a global catalog that Punjab Agriculture Extension is currently implementing to reduce crop losses to improve food security and rural incomes. Plant clinics provide farmers with information that obligates them to lose less of their produce due to pest and disease outbreaks. Plant clinics are held once a week in a village where farmers come to get advice on crops under the protection of a shade. The goal of the desk monitoring was to assess the overall execution and the assistance provided by this initiative. The study covered the district Chakwal, and 225 total participants were randomly selected for data collection in the research area. The data was collected by a well-structured interview schedule consisting of closed-ended and open-ended questions to maintain the quality regarding farmers' perceptions of plant clinics. After data collection, it was analyzed by using SPSS. Descriptive statistical analysis, including frequencies, averages and percentages was undertaken. The results show that 55.6% of the respondents belonged to middle aged. About 60.0% work as private jobs, 44.0% attained matric level education and 60/0% of them were living in a nuclear family. According to 100.0% of the respondents, the plant clinic was providing services about disease management, pest control resources, and integrated pest management. All (100.0%) the respondents reported that extension field staff teaches them methods of weed control, pest identification, fungal and bacteria identification through plant clinic. About 66.7% of the respondents learned the manure application from plant clinic activities. According to 100.0% of the respondents, disease identification and control of the disease were very important. All (100.0%) of the respondents never visited the plant clinic daily. All (100.0%) of them communicated with office calls. The vast majority (90.2%) of the respondents contacted the plant clinic through the farm visit. The majority (82.2%) of respondents disclosed that crop production increased up to 25% with the adoption of the plant clinic services advises. The majority (82.2%) of plant clinics are working with value addition. All (100.0%) of the respondents had awareness about the disease's services, pest identification & control, seed verities recommendation, and spraying technique services. About all (98.2%) of them also stated that they had increased awareness about the fertilizer's application services from the plant clinic. The majority (82.7%) of the respondents enhanced awareness about the disease's services, pest identification & control, seed varieties recommendation, and spraying technique services.

Keywords: Plant clinic, agriculture extension, crop management, pest control, rural development.

OPEN ACCESS

Correspondence
Laraib Malik
laraibmalik2060@gmail.com

Article History
Received: May 13, 2023
Accepted: July 29, 2023
Published: August 15, 2023

INTRODUCTION

Effective plant health management is becoming ever more important in agriculture, not only for food security but also for increasing farm income. Various factors, such as climate change, are expected to increase the frequency and magnitude of pest and disease outbreaks, leading to production losses if they are not properly managed.

Rural advisory or extension services play an important role in assisting farmers to interact with current and upcoming challenges through exchange of information and collective capability (Bourne, Gassner, Makui, Muller, and Muriuki, 2017). Plant health management is a persistent issue for small farmers, who are confronted with unpredictability in pest and disease patterns and pressures because of climate change and increasing global mobility of people and goods (Bebber, Holmes, and Gurr, 2014). However, rapid and reliable plant health information and advisory services are frequently lacking or non-existent in low-income areas (Smith, Waage, Woodhall, Bishop & Spence, 2008).

The Center for Agriculture and Bioscience International (CABI) leads a worldwide project “plant clinic” that takes a horizontal (many crops and pests) strategy rather than a vertical approach. Plant clinics have proven to be a useful access point for improving plant health, it is same as healthcare system for human has proven to be a successful platform for improvement in several countries (Kruk, Porignon, Rockers & Van Lerberghe, 2010; Pallas, Curry, Bashyal, Berman & Bradley, 2012). It promotes plant health networks in order to increase plant health services for farmers. A plant clinic is a simple public service that is available to the public and is provided by 'plant physicians' (local extension workers) who are experts in the field of diagnosis and plant healthcare. In a plant clinic, simple examination tools are typically available (scissors, knife, magnifier), materials of reference, and visual aids, such as photos and fact sheets. Plant physicians (plant doctors) typically combine plant clinic work with their regular extension activities. Plant clinics can be stationary or mobile and typically operate weekly or quarterly from public locations like local markets, local premises, or cooperatives (Danielsen and Kelly, 2010). In order to address specific crop health issues, farmers consult at plant clinics. They take samples of the diseased crops to the plant doctor, who can diagnose the issue and recommend a treatment plan. According to the principles of integrated pest management (IPM), the proposed treatment includes agronomic strategies as well as pesticide application (Danielsen *et al.,* 2013; Ochilo *et al.,* 2018).

Effective plant health management is critical for food security, as well as meeting the demands of domestic and international markets. However, in the majority of developing nations, plant health advising services are either limited in scope and substance or inaccessible to small-scale farmers (Smith *et al.,* 2008; Ochilo *et al.,* 2018; Miller, Beed & Harmon, 2009).

While small-scale farmers rely on many crops for food, medicine, fodder, and revenue, traditional pest management approaches are restricted to a small number of crops, illnesses, and technology. Increased reactivity to plant health concerns becomes even more necessary and urgent in a global setting of new exotic diseases and unanticipated disease patterns driven by climate change and increased mobility of people and commerce. Plant clinics have been created in Asian countries as well as in America, since 2003 to address some of the short comings of traditional plant health management methods (Boa, 2009; Romney *et al*., 2013). These clinics can benefit smallholder farmers since they provide a novel method to plan health improvement. A plant clinic is a free public service given by extension workers who are experts in crop diseases and diagnosis, at public locations such as farmers’ cooperatives, local markets, and bus stops (Boa, 2009). Plant doctors usually combine their work in the plant clinic with their regular extension responsibilities. Plant doctors are inspired mostly by community health professionals in several underdeveloped countries who have made substantial contributions to human and animal health (Catley, Leyland, Mariner, & Akabwai, 2004; and WHO, 2008).

Plant clinics represent a shift from a single crop to a multi-crop strategy. Plant clinics have been deemed a viable platform for developing health systems in many nations, just as primary care in human health has proven to be an effective platform for strengthening health systems in several countries (Kruk et al., 2010; Pallas *et al*., 2012).

As progressive farmers have different options for managing disease and insect attack, some of them have partnered with agronomists or any private company to address the issues or hire any staff. Smallholders, on the other hand, just seek aid from a neighbour or a chemical provider. However, the plant clinic will specifically assist small-scale growers. Since these farmers rely on any progressive farmer, neighbour even some farmers attempted to rid themselves of disease based on personal experience, and the media provided more relevant information than pesticide merchants and neighbours (Van Mele, Hai, Thas & Van Huis, 2002).

The development of plant diseases later in the treatment of a wide range of cases such as the effects of disease threats and food security, with a focus on diagnosis. Plant treatments are important in the management of plant health for this purpose (Boa, 2009).

As small-scale farmers have limited access to extension advisory services, so they have well knowledge regarding plant health and use of pesticide applications (Atreya, 2005), which have severe effect on human, livestock and the environment (Shrestha & Neupane, 2002). As a result, it is critical to provide ideal plant health services, such as sound advice on plant health issues as well as preventive and curative measures, to farmers. Furthermore, farmers should

be able to access these services whenever they need them. Since 2003, the concept of a 'plant health clinic,' also known as a 'plant clinic,' has evolved as a unique method to deliver farmers with consistent, low-cost plant health services in order to fill some of the gaps in plant health extension (Bentley *et al.,* 2009; Boa, 2009). Plant clinics, like human and animal clinics, provide primary health care for plants and are run by local extension workers in any location that is convenient for local farmers. They have very basic tools and facilities for examining sick plants brought in by farmers (Danielsen & Kelly, 2010).

The agriculture sector is challenged by many problems, out of those, the increase in pest attack and plant diseases are the major problems. (Negussie *et al.,* 2011; Tambo, Uzayisenga, Mugambi, Bundi & Silvestri., 2020). According to Shiferaw, Dindamo, Lemma & Hoekstra (2016) pre- and post-harvest pest losses in Ethiopia were estimated to be between 30 and 50%. Pest disease caused annual crop production loss to 40% worldwide, with damage to different crops increasing day by day (Flood, 2010; Day *et al*., 2017; Savary *et al.,* 2019). Reducing such massive crop losses and increasing crop yield and product quality is critical to meeting the sustainable development goals which are based on no hunger and no poverty. However, farmers, on the other hand, face several challenges in taking suitable action to minimize crop losses due to a lack of timely and relevant crop health advice (Tambo *et al.,* 2020). Crop pest management in Ethiopia, as in many other developing countries, has been seriously limited which cannot support services timely (Goveronment of Ethopia GOE, 2016).

Studies have shown that pesticide abuse and overuse is a concern. Chemical pesticide use has increased significantly in Ethiopia during the previous decade. According to Negatu, Kromhout, Mekonnen & Vermeulen (2016) increasing agricultural output while conserving the environment, biodiversity, and product quality is a key global concern.

Primary plant healthcare is offered through plant clinics located in farmer-friendly venues for example, stack markets, village hub and cooperative centres, and farmer training facilities (Bentley *et al*., 2009; Ghiasi, Allahyari, Damalas, Azizi & Abedi 2017; Negussie *et al*., 2011).

Plant clinics are held weekly or biweekly in Ethiopia; these can be held more regularly by incorporating them. Farmers experiencing crop problems bring samples to qualified extension officials referred to as plant physicians. Plant doctors evaluate plant samples, diagnose the problem, and then counsel farmers, accompanied by a written prescription, on how to resolve the problem. Plant physicians keep records on farmers, crops, and crop health issues, in addition to the recommendations they make during each consultation. Thus, plant clinic records are crucial for determining farmers' key concerns regarding plant health, as well as the importance and changing status of agricultural pests (Finegold *et al.,* 2014).

PROBLEM STATEMENT

The plant clinic is very important for the increased knowledge of the farmers. The majority of the farmers did not take part in the activities of the plant clinic which reduced the interest of the farmers and also decreased the confidence of the plant clinic officers to increase the awareness of farmers.

Objectives

The first objective of the study is to analyze the farmers' perception regarding the effectiveness of extension advisory services for plant clinics. The second objective is to examine the obstacles in the adoption of plant clinic recommendations suggested through extension advisory services.

METHODOLOGY

The study covered the district Chakwal, the population of the study included farmers who contacted plant clinic in district Chakwal. Respondents who were present at the time of plant clinic were organized in the area at the time of interview were interviewed. A sample of 225 farmers were selected conveniently for data collection. The data was collected by a well-structured interview schedule consisting of closed-ended and open-ended questions to maintain the quality regarding farmers' perceptions of plant clinics. The raw data were collected and transferred on an excel sheet in coding form, afterward, the data was analyzed by using SPSS. Descriptive statistical analysis, including frequencies, and percentages were undertaken.

RESULTS

The attitude of the respondents depends on the demographic information and characteristics including age, educational level, land holding, etc., that contribute a significant part in deciding their behavior towards rejection or adoption of

presentday innovation. These attributes may have a positive or negative impact based on the level of adoption and awareness. These attributes are discussed below:

Table 1. Age of the respondents.

Age	Frequency	Percentage
Young age (up to 35 years)	55	24.4
Middle age (36 to 50 years)	125	55.6
Old age (More than 50 years)	45	40.0

Data regarding age is reported in Table 1 which describes that slightly above than half (55.6%) of the respondents belonged to middle aged group. Followed by old (40.0%) and young age (24.4%) groups The results showed that the majority of middle-aged farmers were involved in plant clinic activities and services. The extent of involvement of farmers was middle-aged farmers > young age farmers > old age farmers. These farmers must involve their young farmers and take knowledge from their old-age farmers. Because of their experience they had better knowledge regarding the plant clinic and their relationship with crops. The result of Zubair & Garforth (2005) also found that the similarity index was high in middle age. The results of the study show that the majority of farmers belong to middle age. The plant clinic extension services must be provided to young age farmers for energetic learning and adoption.

Table 2. Education of the respondents.

Education	Frequency	Percentage
Illiterate	25	11.1
Middle	22	9.8
Matric	99	44.0
F. Sc./FA	43	19.1
Bachelor	20	8.9
Above Bachelor	16	7.1

The data collected from respondents about education level are reported in Table 2. The data show that 44.0% of the respondents attained a matric level of education (10 years of schooling) from the formal educational institution. The 2nd highest frequency (19.1%) of education was recorded at 12 years of schooling (F. Sc./FA). The middle class of education was followed by (9.8%). The higher education (7.1%) percentage was recorded with very few numbers of respondents and the illiterate (11.1%) respondents were also recorded from the research area. According to Kassie et al. (2011), the majority of respondents had a matric level of education.

Table 3. Experience of the respondents with plant clinic.

Experience (years)	Frequency	Percentage
2 to 5	186	82.7
6 to 10	39	17.3
Total	225	100.0

Knowledge, skill attitude, and diffusion of any technology are directly linked with the experience of adopters. The farmer's experience with the plant clinic is very important regarding the attitude and awareness about the plant clinic. Therefore, for this purpose, the farmers' experience collected from the respondent. The majority (82.7%) of the respondents took information from the plant clinic from the last 5 years. It is shown (Table 1) that a high rate of farmers did not connect with the plant clinic for a long period. The innovation of mass media increased the direct linkage between the farmers and plant clinic officers. 17.3% of farmers stated that they are achieving the service of the plant clinic within 10 years. The farmers further stated that the services of the plant clinic were limited in the initial decades. The plant clinic was wide's its information resources and connected a lot of farmers with their services.

All (100.0%) of the respondents stated that the plant clinic was providing services about disease management, providing pest control resources, and integrated pest management (Table 5). The plant clinic officer is providing the crops seeds, 92.9% of the respondents stated that they achieved knowledge from the plant clinic about it. 60.0% of the respondents stated that they learned from the plant clinic about the soil test. It increased their soil quality. Fertilizers are the basic part of disease spreading and controlling. 98.2% of plant clinic beneficiaries stated that they adopted fertilizers services from the plant clinic.

Table 5. Farmers' response regarding extension services for plant clinic.

Services	Yes	No
Crops seeds	92.9	7.1
Soil test	60.0	40.0
Fertilizers	98.2	1.8
Financial support	17.8	82.2
Diseases management	100.0	0.0
Providing pest control resources	100.0	0.0
Climate information	60.0	40.0
Agriculture practices	82.7	17.3
Integrated pest management	100.0	0.0
Water management	45.8	54.2

Table 6. Perception of respondents regarding the importance of plant clinic.

Statements	1	2	3	4	5
Plant clinics are important	0.0	0	0	66.7	33.3
Sowing methods	0.0	0	0	78.7	21,3
Recommendation of improved seed varieties	0.0	0	0	78.7	21,3
Pest control	0.0	0	0	76.9	23.1
Reduce input costs	0.0	0	0	75.6	24,4
Information related to fertilizers use and application	0.0	0	0	72.9	27,1
Disease identification and control	0.0	0	0	0.0	100.0
Agricultural marketing	17.0	0	0	82.7	0,0

Scale: 1= Less important, 2 = much important, 3 = not important, 4 = very important, 5 = highly important

Table 6 shows that 100.0% of the respondents stated that the disease identification and control of this disease are very important. 78.7% of farmers mentioned the sowing methods and recommendation of improved seed varieties are very important for plant growth. 82.7% of them also stated that agricultural marketing is very important for farmers' knowledge. Most of the respondents couldn't find a profitable agricultural market for their crop production. The majority (76.7%) of plant clinic beneficiaries mentioned pest control, they stated states that it is very important for crop protection. The majority (75.6%) of plant clinic beneficiaries said that the reduced input costs are very important to increase the outcome of the production. The majority (72.9%) of the respondents stated that the information related to fertilizers use and their application is very important for crop production.

Table 7. Hurdles faced by the respondents.

Hurdles	1	2	3	4	5
Cultural differences	88.9	0.0	0.0	11.1	0.0
Language problem	86.7	0.0	0.0	13.3	0.0
Environment	0.0	68.9	0.0	31.1	0.0
Lack of information	0.0	68.9	0.0	31.1	0.0
Lack of interest on the part of farmer	0.0	77.8	0.0	22.2	0.0
Attitude of EFS of plant clinic	100.0	0.0	0.0	0.0	0.0
Favoritism on the part of EFS	0.0	20.0	0.0	80.0	0.0
Lack of modern technology	0.0	80.0	0.0	20.0	0.0
Lack of Finance	0.0	28.9	0.0	71.1	0.0
Lack of skills	0.0	0.0	11.1	88.9	0.0
Lack of training	0.0	40.0	0.0	60.	0.0
Lack of experience	0.0	100.0	0.0	0.0	0.0
Lack of facilities	0.0	26.7	0.0	73.3	0.0
Agricultural policies	37.8	48.9	13.3	0.0	0.0

Scale: 1 = Poor, 2 = fair, 3 = medium, 4 = good, 5 = excellent

Table 7 reports the plant clinic farmer's response regarding hurdles faced by the respondents' plant clinic. All (100.0%) of the respondents indicated that poor attitude of EFS of plant clinic. A vast majority (88.9%) of the respondents stated that cultural difference among farmers and extension field staff was very poor. The majority (86.7%) reported that language was a hurdle for them to get swift information. A fair majority (68.9%) of the respondents also mentioned that

the environment of plant clinic was a hurdle for them to obtain accurate information was a problem for them. The majority (77.8%) of the respondents reported that lack of interest on the part of them was a problem. About 80.0% mentioned a low lack of modern technology in plant clinics. All (100.0%) of the respondents also mention lack of experience. Less than half (48.9%) reported that agricultural policies remain a challenge for them.

FINDINGS

Most of the respondents were middle aged and they were doing private jobs along with farming. The plant clinic was providing services about disease management, pest control resources, and integrated pest management. Through plant clinic respondents were trained in weed control methods, pest, fungal and bacteria identification. Respondents also learned manure application. Based on the respondent's perception, disease identification and control of diseases were very important.

RECOMMENDATIONS

Based on the findings it is recommended that EFS may give concentration on the aspects which were considered most important by the farmers.

REFERENCES

Abdullah, A., Gillani, W.A., Naveed, S., Amanullah, K., & Kashif, H. (2005). Computerized farm guide: Using ICT for better dissemination of agriculture extension information. *Center for Agro-Informatics Research, National University of Computer & Emerging Science, Islamabad, Pakistan*.

Agbogidi, O.M., & Ofuoku, A.U. (2009). Forestry extension: Implications for forest protection. *International Journal of Biodiversity and Conservation*, *1*(5), 098-104.

Ajani, E.N. (2010). Farmer Field School (FFS) and Junior Farmer Field and Life School (JFFLS) as challenges to agricultural extension development and practice in Nigeria. *Journal of Agricultural Extension*, *14*(1).

Akinola, M.O., Issa, F.O., & Sanni, S.A. (2011). Agricultural extension systems in West Africa: Adoptable strategies for Nigeria's agricultural extension reform agenda. *Journal of Agricultural Extension*, *15*(2), 1-7.

Atreya, K. (2005). Health costs of pesticide use in a vegetable growing area, central mid-hills, Nepal. *Himalayan Journal of Sciences*, *3*(5), 81-8

Azimi, R., Allahyari, M.S., Damalas, C.A., & Kalashami, K.M. (2017). Technical performance of plant clinics as providers of crop protection services: The case of Guilan Province, Iran. *Crop Protection, 101*, 12–18.

Bebber, D.P., Holmes, T., & Gurr, S.J. (2014). The global spread of crop pests and pathogens. *Global Ecology and Biogeography*, *23*(12), 1398-1407.

Bentley, J.W., Boa, E., Danielsen, S., Franco, P., Antezana, O., Villarroel, B., & Colque, S. (2009). Plant health clinics in Bolivia 2000—2009: operations and preliminary results. *Food Security*, *1*(3), 371-

Bentley, J., Boa, E., Almendras, F., Franco, P., Antezana, O., Díaz, O., ... & Villarroel, J. (2011). How farmers benefit from plant clinics: an impact study in Bolivia. *International Journal of Agricultural Sustainability*, *9*(3), 393-408.

Bentley, J., Boa, E., Danielsen, S., & Zakaria, A. K. M. (2007). Plant clinics for healthy crops. *Low External Input and Sustainable Agriculture*, *23*(4),

Boa, E. (2009). How the global plant clinic began. *Outlooks on Pest Management*, *20*(3), 112-116.

Bourne, M., Gassner, A., Makui, P., Muller, A., & Muriuki, J. (2017). A network perspective filling a gap in assessment of agricultural advisory system performance. *Journal of Rural Studies*, *50*, 30-44.

Bradfield, D.J. (1966). Guide to Extension Training: User's guide (No. 11). *Food & Agriculture Organization,* Rome, Italy.

Brubaker, J., Danielsen, S., Olupot, M., Romney, D., & Ochatum, N. (2013). Impact evaluation of plant clinics: Teso, Uganda. *CABI Working Paper*, (6).

Catley, A., Leyland, T., Mariner, J.C., Akabwai, D.M.O., Admassu, B., Asfaw, W., & Hassan, H. S. (2004). Para-veterinary professionals and the development of quality, self-sustaining community-based services. *Revue Scientifique et Technique-Office International Des Epizooties*, *23*(1), 225-252.

Christoplos, I. (2010). Mobilizing the potential of rural and agricultural extension. Neuchatel Group. Rome, Italy.