# Is Pest Management getting enough attention in the District Agricultural Development Plan?

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## Abstract

*Compared to any other means of crop losses, the damage caused by the insect pests, diseases and recently the non-insect pests is very serious. Pest Management has not received the attention it merits, in the District Agricultural Development Plan (DADP). The pest and disease management strategies adopted by the farmers are not philosophically based on scientific and rational advisories of the experts, in most cases, especially in cases of pests of serious concern. Many a time, even the advisories by the experts cease to be real-time and location specific, because of the time lag in delivery system or dissemination through unauthorized and unsolicited channels of communication. This policy paper recommends a renewed and vital strategy for addressing this issue and changing the agricultural situation at the district and block level, as pest management has not received enough attention in the District Agricultural Development Plan (DADP).*

**Keywords:** Pest Management, District Agricultural Development Plan

## Introduction

Agriculture in developing countries suffers most because of the high incidence of various pests and diseases. In India, the annual production losses due to pest and disease infestation are projected to be 20-30 per cent, and in monetary terms, it translates to around US $42.66 million (Sushil, 2016). Chemical control of pests is becoming a common practice in agriculture. There are more than a thousand pesticides, of both chemical and biological nature, used around the world, to minimize crop losses. The per hectare consumption of pesticides increased by nearly 50 per cent, from 0.20 kg/ha in 2009-10 to 0.36 kg/ha in

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2019-20 (FAO, 2021). The per hectare use of pesticides in India is much lower as compared to other countries like China (13.06 kg/ha), Japan (11.85 kg/ha), Brazil (4.57 kg/ha) and other Latin American countries (FAOSTAT, 2017). Within India, there is a lot of variation in the use of chemical pesticides among different states. The per hectare consumption of pesticides was highest in Punjab (0.74 kg/ha), followed by Haryana (0.62 kg/ha) and Maharashtra (0.57 kg/ha) during the year 2016-17, while the consumption levels were lower in Madhya Pradesh (0.03 kg/ha), Rajasthan (0.05 kg), Karnataka (0.10 kg/ha) and Bihar (0.11 kg/ha) (Subash et al., 2017). Sikkim became India's first '100 per cent organic state'. Today, all farming in Sikkim is carried out without the use of synthetic fertilizers and pesticides, providing access to safer food choices and making agriculture a more environment-friendly activity.

There is a strong perception that chemical pesticides are effective as they control pests effectively and are easy to adopt. However, they also leave a serious negative impact on the environment. Excessive use of pesticides may lead to the destruction of biodiversity. Many birds, aquatic organisms and animals are under the threat of harmful pesticides for their survival. Pesticides are a concern for sustainability of the environment and global food security as they pose a serious impact on the soil and environment, water quality, development of insect resistance and increase in toxic residue through the food chain and animal feed thus increasing health problems and many more (Subash et al., 2017). About 44 per cent of the global population working on farms i.e. nearly 860 million farmers and agricultural workers are poisoned every year due to exposure to pesticides (PAN, 2020). Therefore, the use of biopesticides to control pests is becoming more important and the preferred method of pest control these days, over synthetic pesticides. They are also turning out to be equally effective in pest control and with a diverse mode of action which helps to address the above listed problems.

Biopesticides are pest management agents and chemicals derived from natural sources such as bacteria, fungi, viruses, plants, animals and minerals. Presently, biopesticides cover only 2 per cent of the total pesticide usage globally (Kumar & Singh, 2015) and in the case of India, it comprises of 5 per cent of the total pesticide market (Kumar et al., 2019). The biopesticide industry in India is undergoing a rapid change due to the change in consumer preferences as they are less or not toxic and environment friendly. The biocontrol measures play a prominent role in organic farming and Zero Budget Natural

Farming (ZBNF). Questions over the feasibility of organic farming and ZBNF have been raised on whether these approaches will be able to control pests and diseases effectively and whether the yield of crops will remain stable if not negative. The decline in food production would create a food shortage that would ultimately result in increased prices of food commodities. Hence, we see an immediate need to put a further impetus on an Integrated Pest Management (IPM) approach to sustain the production and generate sustainable economic returns to the farmers. The point that arises here is to what extent the farmers will be ready to shift from the prevailing chemical pest control measures to the IPM approach.

A pilot study of the District Pest Management Plan (DPMP) was conducted during the period 2016-19 by the National Institute of Agricultural Extension Management (MANAGE) in association with the National Institute of Plant Health Management (NIPHM) on three major crops in Warangal rural and urban districts of Telangana. After two years of implementation of the programme with IPM interventions, an impact evaluation study was conducted. The study revealed that majority of the respondent farmers had high level of knowledge (63.33%) and highly favourable attitude (65.00%) towards the use of IPM technologies. Further, the study also revealed that there was a positive effect on adoption of IPM technologies among the farmers in terms of decrease in the number of chemical sprays (45.00%), and increase in the use of physical control (30.00%), cultural control (70.51%) and biological control (71.33%) measures of pest and disease management. At the same time, the study found that the yield in DPMP implemented villages had increased by 36.67 per cent as compared to the yield in non-implemented villages. If the concerted efforts in the pilot study can be replicated on a large scale, the overarching benefits of adopting IPM practices over chemical control methods can be observed. Hence, the district pest management plan should become an essential component in the district agricultural development plan at the district level (Shirur et al, 2020).

MANAGE as a pioneer national institute in agricultural extension is playing a major role in training the agri-input dealers and agricultural graduates as they are one of the major sources for providing agro-advisory services to the farmers. However, the erstwhile existing input dealers lack technical knowledge about agriculture, pests and the chemistry of pesticides. This has led to the recommendation of non-label chemicals and overdose

causing the destruction of the environment and natural ecosystems. Hence, the Government of India (GOI) initiated a programme namely, 'Diploma in Agricultural Extension Services for Input Dealers (DAESI)' where MANAGE is implementing and monitoring the programme to enhance the technical competency of input dealers. The one-year diploma programme with theory and practical visits has helped the input dealers to develop sound technical knowledge on crop pests, diseases and their management and safe use of pesticides. Agri-Clinics and Agri-Business Centers (AC&ABC) is another major programme implemented by MANAGE, which enables graduates from agriculture and allied sectors to start agri-clinics and agro advisory services to supplement the efforts of public extension system. Agri-Clinics and Agri-Business Centers are envisaged to provide expert advice and services to farmers on crop production and protection activities. This would lead to enhance the productivity of crops and animals and ensure increased income to the farmers.

There are several voices urging for a convergence platform to bring together different policies and plans executed at different levels by various agricultural and allied sector departments. Presently the Comprehensive District Agricultural Development Plan (CDAP - RKVY), Strategic Research and Extension Plan (SREP-ATMA), District Credit Plan (DCP), and District Irrigation Plan (DIP - PMKSY), District Profile of KVKs and Detailed Project Reports (DPR) of Watershed Programmes etc. are in operation in a majority of districts of the country. It is surprising to note that enough emphasis is not laid on the pest management plan to tackle the pests and diseases affecting the crops in a district. Many a time we see sudden outbreak of pests and diseases in a locality, affecting the farmer adversely. Mite infestation in coconut a few years ago, the fall armyworm in maize in 2018-19 and the locust swarming across many states in 2020 are a few incidences to recall. Therefore, the district pest management model and its elements need to be integrated into the district planning by the administrators. The most appropriate way to implement the pest programme is its integration in the DADP developed by ATMA and its participating stakeholders. The existing manpower and machinery will take up the timely operations depending on the weather, cropping pattern and the nature of farming operations.

The figure 1 shown below illustrates the District Pest Management Programme (DPMP) model developed and depicted based on DPMP implementation in rural and urban districts of Warangal. This model is a cyclic model which guides the officials from pre-sowing

precautions to pre-pest affected management practices, post-pest affected management practices and post-harvest cleaning measures. The model broadly laid on 7 steps 1) Survey and surveillance 2) Pre-sowing plans 3) Sowing operations and crop standing season 4) Post sowing plans 5) Problem analysis 6) Evaluation and 7) Feedback as an effective approach to pest and disease management in a district. The same can be recommended to other districts with need-based and situational modifications.

A pest in one field is a threat to the other fields in a village or an agro ecological region. Since there are staggered sowings in an agro-ecosystem, that led to the spread of pest and disease incidence to other fields in which the crop stages are vulnerable to pests and diseases. Seed treatment with biopesticides should be promoted by the departments working at the block and village level to safeguard against seed-borne diseases.

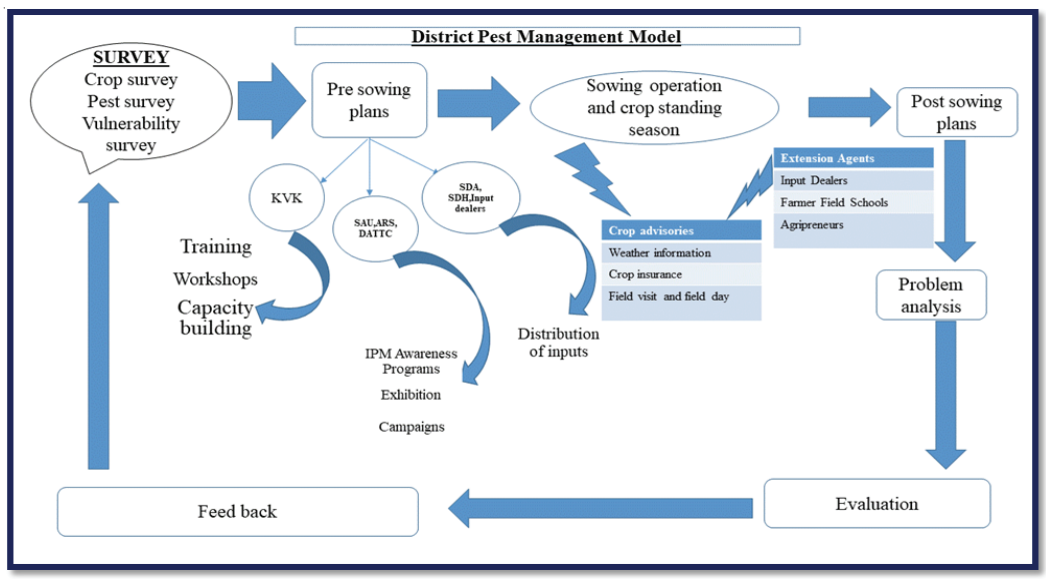


**Figure 1: District Pest Management plan (Shirur et al, 2020).**

The vaccination schedule for livestock should be formulated in advance to combat seasonal diseases. Farmers should be educated and trained, to improve their awareness of crop insurance and livestock insurance to avoid crop failures and losses because of the unpredictable spread of epidemic and endemic pests and diseases like the incidence of fall armyworm. Frequent inspection of the field for checking the pest epidemiology and

taking precautionary measures for their control should be taken up by the departments with regular follow-up to review the incidence of pests and diseases.

Doubling Farmers Income Committee (MAFW, 2017) put an onerous responsibility on MANAGE to facilitate the convergence of extension agencies between multitudinous institutions and to develop a platform for knowledge convergence and solutions for various challenges plaguing the agricultural extension and advisory service delivery system. Every individual institution has contributed in its own way in meeting the expectations of the farmers. However, this is not appreciated as these institutions work in isolation. Therefore, there is a strong case for realizing the complementary results by promoting effective collaboration among all the institutions to capture their knowledge. There is also need for functional strategies to realize sharing, learning and networking for innovation.

The required support to implement IPM practices should come, with sharing of technical expertise, from research and extension agencies either involved directly or indirectly in the agriculture sector at the district level, like SAUs, KVK and ATMA. The biopesticide and biofertilizer production units managed by both public and private institutions can be supported by the KVKs and training institutes of the district through vocational trainings, on the production of biopesticides, biofertilizers and vermicompost, for farmers. Extending handholding support to the trained AC & ABC graduates through National Bank for Agriculture and Rural Development (NABARD) and the National Horticultural Board (NHB) would help them to establish production units at the district level. In turn, KVK and the State Department of Agriculture (SDA) can take advantage of purchase and supply to the farmers at reasonable price to minimize the gap between supply and demand. Hence the State Department of Agriculture and ATMA should take lead in converging all the line departments and private agencies working at the district level to have a dynamic pest management plan.

In view of the problems and challenges discussed, major policy recommendations are given below for an effective pest management strategy for a district, in the District Agricultural Development Plan (CDAP - RKVY).

## Policy Recommendations

* District Pest Management Plan should not be confined to agriculture only, as in some districts allied activities like animal husbandry, poultry and fisheries exist as major activities. Hence DPMP should converge all the line departments for the preparation of consolidated pest and disease management strategies to enhance productivity and thereby ensuring returns to the farmers.

* Survey exercises suggested in the district plan should not be confined to mere data collection on the crop pest and disease incidence. The data enumerators should be professionally trained on the predisposing factors conducive for the emergence of a particular pest and its severity.

* As the microclimatic conditions, soil type, irrigation pattern and cropping pattern varies within the district and block, the block/sub-block, specific action plan based on weather conditions should be considered for pest and disease management.

* Agro-advisory information generated through limited data from the agro meteorological observations in the district should be fed into the reliable model so that the weather forecasting is accurate.

* Climate change has made India's monsoons more erratic that has led to a delay in sowing patterns and puts an enormous pressure on mechanization. Hence, custom hiring centers with trained technicians to operate the machinery should be promoted at the block level.

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