

Use of Traditional Control Practices for the Management of Insect-Pest in Kitchen Gardens of Assam

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Abstract

Indian kitchen gardening is deeply ingrained in the culture, serving as a means of passing down customs and identity of culture from one generation to another. In Assam, kitchen gardening is very popular in both rural and urban areas, where a wide range of fruits, leafy greens, root vegetables and tuber crops are grown for family consumption. Beyond its cultural significance, kitchen gardening is essential for enhancing self-sufficiency, food security and sustainable and healthy living. In kitchen garden mainly local cultivars are grown which requires less nutrients and maintenance but mostly susceptible to various disease and pests that ultimately affects the yield and quality. Indigenous technical knowledge is a set of knowledge, skills and abilities developed by the local people in order to reduce or minimise crop loss due to these insect-pests and thereby maintain sustainability and productivity (Baruah *et al.*, 2023). Different ITKs (Indigenous Technical Knowledge) has been practicing from the ages in aspects of Assamese kitchen gardening to control various pest and diseases in some locality or by some community. Some Indigenous Technical practices that are extensively used by this community have been discussed in this study.

Keywords: kitchen garden, ITKs, eco-friendly farming, pest-disease, management

Introduction

For generations, kitchen gardening has been an important aspect of Indian culture. It is a practice that has been passed down through generations, instilling a sense of tradition and cultural identity in the participants. Kitchen gardens are an essential component of agriculture, which is an important aspect of the economy and daily life. They improve food security, encourage self-sufficiency, and support sustainability to live a healthy life. With growing population, there is a decreasing amount of agricultural farming land available, particularly for vegetable farming (Pramanik *et al.*, 2021) due to which kitchen gardens are gaining popularity



in rural as well as in urban areas of Assam where mostly different types of tubers, leafy and root vegetables and some fruit crops are grown for family needs. Vegetables are considered as protective food and a key component in meals. ICMR (Indian Council of Medical Research, New Delhi) has recommended 300g vegetables per day per adult for balanced diet. It is believed that the type of traditional home garden practices may depend on different community, tradition, needs, beliefs, etc (Tangjang and Arunachalam, 2008).

A kitchen garden, also known as a vegetable garden or home garden, holds significant importance for several reasons:

- 1. Food Security:** Kitchen gardens contribute to household food security. They provide a steady source of fresh, organic vegetables and herbs, reducing the dependence on market-bought products and helping families to save money.
- 2. Nutrition:** Growing our own vegetables ensures access to fresh, nutritious, and chemical-free food. It helps in diversifying the diet, as one can cultivate a variety of vegetables, ensuring a balanced intake of vitamins and minerals.
- 3. Cost Savings:** Maintaining a kitchen garden can lead to substantial cost savings. Home grown vegetables are often cheaper than the ones bought from market, and the initial investment in seeds and gardening supplies can pay off over time.
- 4. Reducing Food Waste:** Kitchen garden helps in reducing food waste. One can harvest what is needed, reducing the chances of food spoiling or being thrown away.
- 5. Environmental Benefits:** Home gardening promotes sustainable and organic farming practices. In addition to improving soil health and lowering the use of synthetic pesticides and fertilisers, organic farming lowers the carbon footprint associated with transporting vegetables from farms to markets.
- 6. Income Generation:** Surplus produce from a kitchen garden can be sold or traded locally, generating a supplementary income for the household.
- 7. Teaching and Learning:** Kitchen gardens offer a practical and instructive platform for teaching children about biology, environmental science, and sustainability as they learn about plant lifecycles, the importance of soil health and how ecosystems work. It also impacts physical and mental health.

In Assam, mostly fast-growing vegetables like brinjal, chilli, okra, tomato, cucurbits, tuber crops, leafy and root vegetables and fruit crops *viz.* banana, papaya etc. are grown in

kitchen gardens to meet the daily needs. In kitchen garden mostly local cultivars are used which requires less nutrients and fertilizers and also resistant to many pests and diseases but yet susceptible to different insect-pests and diseases where each crop faces its unique set of insect pests, demanding customized approaches for pest management. Usually, chemical pesticides or fertilizers are not used in kitchen garden for sustainable approach therefore many Indigenous Technical Knowledge (ITKs) have been practicing to control these insect-pests from the time immemorial by different indigenous communities in Assam. These practices mostly involve the use of natural, organic, and sustainable methods and proved to be very effective against wide range of insects-pests. Here are some indigenous and organic control practices for insect-pest management in kitchen gardens of Assam:

Understanding Indigenous Technical Knowledge:

Indigenous technical knowledge (ITK) refers to the traditional and time-tested practices and techniques that indigenous communities have developed and refined over generations to manage various aspects of their environment, including agricultural pest management. Assam is home to numerous indigenous communities with deep-rooted knowledge of local ecosystems, making them a valuable resource for sustainable pest management strategies. It represents the knowledge of a certain community that has evolved over many generations and continues to evolve throughout time. (Lenka *et al.*, 2020)

- 1. Maha neem leaf boil in water:** The fresh leaves of mahaneem tree (*Melia azedarach*) are widely used in Assam for pest control. Freshly collected matured leaves that are free from any diseases, boiled in water for one to one and half hours in a metal container. This process will transfer all the chemical compounds present in the leaves to the boiled water and the water can be used as spray against different insect-pests. The bitterness and insect-repellent properties of mahaneem act as a deterrent for many pests (Deka *et al.*, 2005). It works against all type of insect-pests.
- 2. Wild fern (Bihlongoni) mixed with cow urine:** Fresh leaves of wild fern, free from any contamination are collected and wash to remove dirt. Now grind the leaves to take out its sap, then mix the plant sap with cow urine in a bucket and make a suitable treatment to spray directly on the infected plants. Due to its strong aroma, insects do not feed on the crop plants, it works as a repellent to the insect-pests.

3. **Burning of paddy straw and dry chilli:** Smoking by burning of dry chilli and paddy straw under a quadrangle bamboo structure that is used as stand for creeping and vining crops especially for cucurbits (in Assamese called “hendali”) to repel gravid female of fruit fly (*Bactrocera cucurbitae* Coquillett) as it lies egg inside the newly developed fruit of cucurbitaceous vegetables (Borkakati *et al.*, 2022). This practice is also applied in tea plants by small tea growers and succeeded in repelling different insects.
4. **Tobacco leaves:** The fresh leaves of tobacco are soaked in a container for 24-48 hours in the water and kept it for fermentation. After the fermentation period, remove the solid residue and the water is used as spray on the infected crops. It works as an antifeedant against different type of chewing and sucking insect-pests. Use of tobacco leaves are prohibited in organic farming in most of the regions but farmers and households are unaware about it. Although some people categorize it as an eco-friendly pesticide. It is also highly efficient to mix detergent solution with tobacco powder and spray the mixture over vegetables, which functions as an antifeedant/repellent to vegetable pests. (Nath *et al.*, 2017)
5. **Using phoot chai (Fly ash):** Fly ash or phoot chai is commonly practiced by most of the household and farmers in the crops like potato and brinjal that is grown in the kitchen garden. It is mainly applied on the basal portion of crop plants to control pests like epilachna beetle (*Henosepilachna vigintioctopunctata* Fab.) and red ant (*D. orientalis*) in potato crop (Borkakati *et al.*, 2022). In brinjal it is applied to repel the epilachna beetle as well as to nourish the plants with potash, thereby boosting tolerance to the pests.
6. **Using turmeric powder to prevent red ants:** Red ant infestation is another major problem in Assam which causes severe damage to vegetable crops. To combat this problem, farmers in some places use turmeric powder to get rid of them.
7. **Eradicate infected plants:** Regular inspection of the plants and manual removal of insects and their eggs is especially effective for larger pests like caterpillars. If the infestation is more severe, complete removal of plants is done to prevent the spread to other crops. Complete eradication will directly affect in the yield but it will help to prevent insect-pests infestation in the subsequent planting seasons.
8. **Garlic-onion spray:** Garlic and onion extracts are effective against a wide range of insect pests and diseases. Crush and soak garlic or onion in water, strain the liquid, and spray it on plants to deter insects. It is highly effective against fungal diseases of crop.

9. Trap crop: Planting of specific trap crops to divert pests away from the main vegetable crops has been practicing since ancient time. For example, planting mustard as a trap crop can attract aphids away from other vegetables in the kitchen garden. Marigold plants are often inter-planted with vegetables as they emit a scent that repels certain insects. They can serve as a natural pest deterrent

Conclusion:

Indigenous technical knowledge in pest management for kitchen gardens in Assam has immense potential in addressing the challenges posed by various insect pests which results in loss of yield and quality. It is important to note that the dosage use in these practices may vary depending on the specific crops and the local pest population and the environmental conditions in different region. Therefore, there is a variation in effectiveness of these practices due to the lack of systematic formulation of dosage. The indigenous practices which are mentioned in this study has been widely used in kitchen gardens of Assam and observed that are eco-friendly and cause no harm to the soil and environment as well as human health. Therefore, furthermore research is demanded to extend the use of these indigenous practices in plant protection and can be analyzed and use for promoting sustainable agriculture. Current policies of government to minimize the use of synthetic pesticides and fertilizers can pave the way for a more sustainable and pest resistant horticultural future by harnessing the rich indigenous knowledge of Assam.

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