

Indigenous Technical Knowledge for Weed Management and Insect-Pest Management

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SUMMARY

Indigenous technical knowledge provides valuable inputs to make efficient use of natural resources and extends relevant support for sustainable development. Indigenous techniques used in different component of farming system are mostly organic, eco-friendly, sustainable, viable and cost effective. It is used in weather forecast, soil and water management, insect pest management, weed management, disease management and post harvest management of plant. ITKs in weed and insect-pest management is important for reducing the cost of cultivation, reducing the pollution and also the natural resource base.

INTRODUCTION

Indigenous technical knowledge is the sum total knowledge and practices which are based on people's accumulated experiences in dealing with situations and problems in various aspects of life and such knowledge and practices are special to a particular culture (Wang, 1988). ITK refers to the unique, traditional, local knowledge existing within and developed around the specific conditions of a particular geographic area (Grenier, 1998). Indigenous technical knowledge is a community based functional knowledge system, developed, preserved and refined by generations of people through continuous interaction, observation and experimentation with their surrounding environment. It is a dynamic system, ever changing, adopting and adjusting to the local situations and has close links with the culture, civilization and religious practices of the communities (Pushpangadan et al., 2002). The indigenous technical knowledge (ITK) covers a wide range of subjects, viz. crop production, livestock rearing, natural resource management, food preparation, healthcare, insect pest management and many other. The use of non-chemical methods for pest control and crop protection is already gaining importance in several countries including India. The integrated pest management and integrated weed management strategies developed and promoted by the Governments. ITKs have been found effective in management of pest, disease and weed in agriculture (Shakrawar et al., 2018). It can be an economically viable option for sustainable development of eco-friendly pesticides or insecticides and herbicides.

ITKs for Weed Management

- Summer deep ploughing was practiced to reduce annual and perennial weeds by exposing the field to heat of the sun. Repeated ploughing and hand weeding is effective methods for control of weeds.
- Harrowing with blade harrow is very effective for destroying newly germinated weeds before sowing of the crop. Stale seed bed is one where initial 1 to 2 flushes of weeds are destroyed by harrowing before planting or sowing of the crop.
- Keeping the irrigation channels free from weeds to control dissemination of weeds.
- Frequently ploughing the fields by wooden plough made up of neem trees and frequent application of neem cake in the soil to control nut grass.
- Raising and ploughing the green manure crops like daincha in the field before their flowering to reduce weed population. Farmers grow sunhemp in those fields where the motha weed is problem.
- Farmers grow sesamum or sesbania crop, to minimize the weeds and increase nitrogen level in field.
- To control hariali (*Cyanodon dactylon*) in black soils, the field is kept fallow for 3 years.
- To control nut grass (*Cyperus rotundus*); apply 50 kg neem cake in the field both at the time of ploughing and sowing, growing horse gram and cowpea as a green manure. Allowing swine in the fields to eradicate nut grass.
- The black polythene mulching is more effective for controlling weeds.
- Growing coriander as a mixed crop in sorghum to control the parasitic weed (*Striga lutea*).
- The ash of cow dung is dusted on the plants at the rate of 50-60 kg/ha to prevent growth of cuscuta.
- Common salt is used for Lucerne seed treatment to control doddar (*Cuscuta reflexa*).
- Ash is spread or broadcasted over field for weed control.

- Farmers use sugarcane leaves for mulching in between the rows that save sugarcane crop from weeds and minimize the cost on inter culture operations.

ITKs for Insect-Pest Management

- Deep ploughing in summer is helpful in preventing crops from soil borne insects. It is practiced to expose and destroy the pupae of red hairy caterpillar pest in groundnut.
- Small lamps are placed on either side of the house entrance and light from the lamps acts as a light trap and the farmers are able to identify the pest outbreak.
- Sorghum or pearl millet is grown very closely in 4 rows around the fields to act as a shelter so that aphids and mite flies can not enter the fields and prevent its attack.
- Use of trap crop; grow castor as a border crop (trap crop) in cotton, groundnut to reduce the attack of tobacco cut worms. Cowpea grown as a trap in groundnut fields to control red hairy caterpillar. Cultivating sorghum or pearl millet around cotton fields to prevent whiteflies and thrips.
- Use of intercrop; grow cowpea as intercrop to control leaf miner in pearl millet. Grow cowpea as an intercrop in sorghum to minimize stem borer attack due to its repellent smell. Cowpea grown as an intercrop crop in groundnut fields to control red hairy caterpillar. Lady's fingers are grown as intercrops in cotton to reduce boll worm attack.
- To control storage pest, mixing the dried leaves of neem with seeds. Mixing sorghum seeds with ash to prevent storage pests. Mixing the green gram seeds with sand before storage. Milled chickpea, green gram and other pulses are stored after thoroughly treated with mustard oil.
- To control termite damage; grow castor on the fields, spread neem leaves over the nursery, dusting ash in the pits before planting tree seedlings, sprinkling 5 per cent common salt solution to reduce termite attack on the trees, providing frequent irrigation to control termites.
- Pouring neem cake extract drop by drop on the sorghum shoot to control shoot borer. Neem kernels or neem cake are powdered, soaked in water overnight and the filtrate is diluted and sprayed to control early shoot borer in sugarcane. Neem oil and neem seed kernel extract are the general organic pesticides used to control many pests. Spraying botanical pesticides like neemstra, bramastra to control sucking pests.
- Neem oil is sprayed (6 lit./ac.) to control powdery mildew in black gram crop. Sugar solution and neem oil are mixed with water and sprayed to control mealy bugs. Mixing 1 kg of cotton seeds with 200 ml of neem oil and pasting it with fresh cow dung and then drying this over night before sowing to avoid pests.
- Sprinkling of ash over and around the vegetable crops like onion, okra, brinjal, tomato and cucumber and in fields is effective against insect pests viz, beetles, leaf defoliating insects, leaf miners, thrips and aphids. Ash acts as a detergent. Chewing and sucking type of insects, find it difficult to chew plant parts due to deposition of ash.
- Kitchen ash is spread around the groundnut storage bags to prevent insect attack. Dusting ash on cotton leaves to control aphids and thrips. Kitchen ash is applied to control aphids. Chulah ash is applied 2-3 months after planting to control early shoot borer in sugarcane.
- Detrashing the canes to control scales and mealy bugs in sugarcane crop.
- Maize seeds are soaked in cow urine for 12 hours before sowing to increase resistant against insects.
- Planting closely notchi (*Vitex negundo*) and erukku (*Calotropis gigantea*) around the fields as a fence helps to control rat problem.
- Green gram can be kept free from any pest infestation by treating with 1 per cent neem leaf powder.

CONCLUSION

Indigenous technical knowledge is community, local and rural in origin. Farmers are familiar with indigenous practices and technologies. They can understand, handle and maintain them better than introduced practices and technologies. A careful attention is required to monitor and management of insect-pest and weed population for success of organic farming. ITKs are drawn on local resources, farmers are less dependent on outside supplies which can be costly, scarce and available only irregularly.

ITKs in weed and insect-pest management is important for reducing the cost of cultivation, reducing the pollution and also the natural resource base.

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