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Enhancing Adoption of Eco-friendly Technology among Chilli Growers of Karnataka-India

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Abstract

The study was conducted in Chickmagalore and Kadur taluks of Chickmagalore District of Karnataka to find out the extent of adoption Eco-friendly technologies by chilli growers. The sample size of 50 Chill growers was drawn on proportionate random sample method. The study revealed that 64% i.e. majority of the respondents was in medium level adoption of eco friendly technologies.The results revealed that Number of Eco-friendly Technology adopted (IPM & INM) Farmers are 29(64%) with an average yield of 5260.34 Kg of green chilli Yield per acre with significant changes, compare to Number of Non INM Farmers; are 8(16%) with an average yield of 2287.50 Kg of green chilli Yield per acre and Number of Non IPM Farmers are 18(36%) with an average yield of 3969.44 Kg of green chilli Yield per acre. 64 % of the farmers adopted Eco-friendly Technology in chilli Crop resulted in preventing soil pollution, and other chemicals side effect on Microbes of Soil, and other useful insects. Harvested fruits are chemical free and consumer preference is high.

Key Words; INM, IPM, FYM, Weeding, Crop Rotation, Cropping System, Soil health,

Introduction

Vegetables constitute about 55 per cent of horticultural crop production in the country with a total production of 85 million tonnes which is estimated to cross 100 million tonnes in near future. Successful cultivation of vegetables is hampered due to the incidence of several insect pests. Cultivation of hybrids, improved varieties, intensive agronomic practices, off season cultivation and indiscriminate use of insecticides has changed the pest complex in these crops.

Chilli is considered as one of the commercial spice crops. It is the most widely used universal spice, named as wonder spice. Different varieties are cultivated for varied uses like vegetable, pickles, spice and condiments. In daily life, chilies are integral and the most important ingredient in many different cuisines around the world as it adds pungency, taste, flavor and color to the dishes. Indian chilli is considered to be the world famous for two important commercial qualities its colour and pungency level.

The largest producer of chillies in the world is India accounting for 11 lakh tons of production annually followed by China with a production of around 4 lakh tons. Mexico and Pakistan produces 3 lakhs tonnes each of chili every year.

In India, Chilli was grown on an area of 8.82 Lakh ha and annual production of 11.0 lakh tones and with an average productivity of 1200 kg/ha (Anon., 2002). Among Chilli producing states in the country Andhra Pradesh stands first in the list of leading chilli-producing states in India and also constitutes the maximum acreage for chilli cultivation in the country. It occupies 49% share in the Indian total production and produces around 2.7 lakh tons of chillies followed by Orissa (18%), Karnataka (15%), Maharashtra (6%), West Bengal (5%), Rajasthan (4%) and Tamil Nadu (3%) (www.ikisan.com).Karnataka state stands 3rd in contribution of Chilli production to country. We have different chilli varieties such as Byadagikaddi, Byadagidabbi, Guntur(G-4) , Pusa jwala, KDSC-1, etc. are cultivated by farmers.

The modern farming systems aim at maximizing production through the use of increased quantities of external inputs such as fertilizers and plant protection chemicals without due consideration to their ill effects. Consequently, the traditional agronomic practices such as green manuring, use of farm wastes either as such or after composting and other soil ameliorative measures have not become part of the farming

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systems. This has resulted in a slow but steady decline in the productive and productivity of the soil.The use of fertilizer and pesticides is increasing in the process of adopting high yielding varieties (HYV) and hybrids without giving attention towards proper dosages and methods of application and waiting periods. This is gradually leading to many hazardous effects on environment and human beings. These hazards are of different kinds with different intensity. There are many articles supporting the issue that the pesticide residues are found in every day diet and in the human body which may cause severe health hazards.

Eco-farming

Anonymous (1980) defined eco-farming as a production system, which precludes the use of synthetic fertilizers, pesticides, growth regulators and livestock feed additives. It rather relies upon crop rotation, crop residues, animal wastes, legumes, green manure, farm wastes, mechanical cultivation and biological pest management.

According to Swaminathan (1991), there are nine basic principles promoting ecological agriculture namely, land, water, energy, nutrient supply, genetic diversity, pest management, post harvest system, system approach, location specific research and development.

It refers to techniques or system of farming based on integral relationship with nature (Lampkin, 1990). The principle elements to be considered in eco-farming are, 1) Create a healthy soil 2) Make nutrient and energy flow in soil eco-system 3) Keep the biological life in the cycle and 4) Provide sustainable yield.

Many instances the dry chilli exports from Indian market were rejected because of pesticide residue problem. Hence, the need of the popularization of adoption Eco-friendly technologies by chilli growers is felt. The project was started with the special objective of educating chilli farmers of nine selected villages in Chickmagalore & Kadur Taluks of Chickmagalore district of Karnataka on IPM, INM, reduces the problem of chemical Fertilizers and pesticide residues in the harvested produce in turn prevent Soil pollution, safeguarding Soil Microbes and useful insects to maintain good ecosystem.

Research Methodology

A study on Enhancing Adoption of Eco-friendly Technology by Chilli Growers was conducted in two predominantly Chilli growing Taluks Chickmagalore and

Table 1: ICRISAT Hyderabad IPM module

Activity	Stage of crop	Management option
Seed treatment	Sowing time	Imidacloprid (Gaucho) @ 5 grams per kg seed
Management of sucking pests	Nursery	Imidacloprid @ 1 ml in 3-4 liters of water or fipronil @2 ml per liter.
Sowing trap crops	At the time of transplanting	Sunflower and marigold as border crop .
Installation of pheromone traps and bird perches	At the time of transplanting	Two traps per location for each species About 25 perches/ ha
Management of thrips in main crop	Transplanting to one month before harvest	Overhead irrigation with sprinklers wherever possible. Imidacloprid @ 1 ml in 3-4 liters of water or fipronil @ per Ltr of Water
Management of mites	In the nursery and main crop	Overhead irrigation with sprinklers wherever possible. Spray one of these chemicals once in the nursery and second time in the main crop – dicofol @ 5 ml per liter or wettable sul phur 3 grams per liter or Pegasis @ 1 gm per liter or Vertemic @ 0.5 ml per liter
Management of fruit borers	Flowering stage	Application of neem fruit powder extract @ 25 kg ha-1 NPV @ 500 LE/ha, Bt 4 ml per liter.
Management of pod borers	Fruiting stage	Setting poison baits for Spodoptera Spray indoxacarb @ 1 ml per liter or spinosad @ 0.3 ml per liter
Arresting immigrating Spodoptera	Crop maturity stage	Erecting polythene fence around the field (4 inches above ground)
Management of pod borers	During crop maturity	NPV @ 500 LE/ha, Bt (dipel @ 4 ml per liter) or spinosad @ 0.3 ml per liter
Anthracnose	Green fruit stage	Thiophonate methyl 1 g per liter /Mancozeb 2.5 g per liter / Tilt 1ml per liter / Antrcol 2g per liter
Powdery mildew	Flowering and fruiting Stage	Dinocap 1 ml per liter/ wettable sulfur 3g per liter

Kadur taluks of chickmagalore District in Karnataka from June 2013. The Training programmes and field advisory visits on INM, IPM, FYM, Weeding, Crop Rotation, Cropping System, Soil health, in Chilli was conducted in 9 villages of the two Taluks with 50 Chilli farmers. The selected farmers were briefed about, the Eco-friendly Technology and its importance in initial group meetings with the selected farmers. Continuous field visits was done by the Extention team. Regular feedback on progress of the crop, pest and disease incidence, Soil management was collected from the field. Regular interaction meetings were conducted with farmers to integrate appropriate IPM technologies into their existing cultivation practices.

IPM technology for Chili

The schedule for Integrated Pest Management in Chilli has been standardized at International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) Hyderabad. By following the IPM, the disease and insect pest incidence were reduced to negligible. The number of sprays of pesticides was reduced to about 4 (botanical+ chemical) as compared to 6 chemical sprays in non-IPM plots. Among various insect pests, thrips, aphids, mites and fruit borers in chilli, are of prime importance (Table 1).

Integrated Nutrient Management

Organic Fertilizers and Manures Organic fertilizers include both plant and animal bi-products. They are slow acting. Organic nitrogen fertilizers include oil cakes, fish manure, dried blood from slaughter houses etc., where as organic phosphorus from bone meal and organic potassium from cattle dung ash, wood ash, leaf mould, tobacco stems and water hyacinth.

Soil Fertility and its Importance

Soil fertility may be defined as the inherent capacity of soil to supply plant nutrients in adequate amount and in suitable proportion and free from toxic substances. There are two types of soil fertility viz.

A. Sampling area

Total Nine villages (Five Villages from Chickmagalore Taluk & Four Villages from Kadur Taluk) in Chickmagalore district where the project activities carried were purposively selected (Table 2).

B. Selection of the Respondents;

50 farmers from nine villages having 175.74 Acre cultivable land & growing Chilli in 111.03 Acre were selected.

C. Data collection tools and procedures

A questionnaire was developed for the purpose was used for the survey. The questions were asked in Kannada and were used for collecting responses from the project farmers. The data were collected from the respondents through personal interview with the help of interview schedule. Necessary precautions were taken to ensure that the questions in the schedule were unambiguous, clear, concise, complete, and comprehensive. The respondents were contacted in person mostly at the common place in the village.

D. Statistical Analysis

The data collected for the study was tabulated, processed and analysed using simple statistical tools like frequency and percentage.

Results and Discussion

Table 3 indicates that Number of IPM Farmers are 32(64%) with an average yield of 4904.68 Kg of green chilli Yield per acre, Number of Non IPM Farmers are 18(36%) with an average yield of 3969.44 Kg of green chilli Yield per acre, Number of INM Farmers; are 38(76%) with an average yield of 4703.94 Kg of green chilli Yield per acre, Number of Non INM Farmers; are 8(16%) with an average yield of 2287.50 Kg of green chilli Yield per acre and Number of IPM & INM Farmers are 29(64%) with an average yield of 5260.34 Kg of green chilli Yield per acre with significant changes.

But a drastic improvement (64 %) has been achieved in adoption of INM, IPM, Soil Health management technology through Adoption of Eco-friendly Technology once the farmers realized its importance in pollution, health hazards. This achievement could be possible because of the

Table 2: Sampling area

S No	Village/Taluk	Taluk	No. of Farmers	Total Cultivable Area (Acre)	Chilli Area(Acre)
1	Kunnalu	Chickmahalore	10	20.50	17
2	Sirabidagi	Chickmahalore	5	22.98	14
3	Uddeboranahally	Chickmahalore	5	15.35	9.20
4	Karisiddanahally	Chickmahalore	5	13.71	9.33
5	Kenganahally	Chickmahalore	5	11.36	7.30
6	Govindapura	Kadur	5	14.20	10
7	Chikkangla	Kadur	5	28.34	16
8	Shakunipura	Kadur	5	22	11
9	Yammedhoddi	Kadur	5	27.30	17.20
Total	9		50	175.74	111.03

Table 3: Economic improvement in Chilli cultivation through Eco-friendly Technology

S. No	Particulars	Non IPM farmer	IPM farmer	Non INM farmer	INM farmer	INM & IPM
1	No. of plant protection chemical sprays	06	4	6	4	4
2	Reduction in no. of chemical sprays	-	2	-	2	2
3	No. of biological sprays	0	1	-	1	1
4	No. of micronutrient sprays	0	1	-	3	3
5	Yield Kg per acre	3969	4904	2287	4703	5260
6	Cost of plant protection chemicals/acre	Rs 3750	Rs 2750	2500	4000	4000
7	Rate obtained per kg of Green Chilli	Rs 12	Rs 13	Rs 13	Rs 14	Rs 14
8	Total Revenue per acre	Rs 47633	Rs 63752	29731	65842	73640
9	Total cost per acre	Rs 40541	Rs 39693	Rs 25000	Rs 39693	Rs 40541
10	Net profit	Rs 7092	Rs 24059	Rs 4731	26149	33099
11	Benefit cost ratio	1.17	1.60	1.18	1.65	1.81

· Specific for the Red Chilli Kaddi variety grown during August 13 to April 2014,
· Economics have been worked out for the district of Chickmagalore

Development Activities of Extension Team.

It is evident from the table 3 the components of Eco-friendly Technology like reduction in chemical sprays, considerably reduction in the environmental pollution, health hazards and improves the marketability of the Green chilli achieving higher economic returns. Reduction in usage of chemicals, frequency of sprays and unnecessary usages of chemicals has been thoroughly communicated to the farmers to achieve more economic returns. As per the results Eco-friendly Technology adopted farmers could get Rs 1.81 for every rupee invested compared to only Rs 1.17 in case of farmers of Non IPM, Non INM. A considerable improvement in economic returns as well as awareness regarding hazardous chemicals among the farmers has been achieved in this project. This in turn a lesson for fellow farmers of same villages as well as neighboring district Chilli farmers.

Table 4: Farmers Participation in Trainings of Eco-friendly Technology on Chilli (N=50)

S. No.	1-2 times		More Than 2 times	
	Freq (n)	%	Freq (n)	%
1.	12	24	39	78

Table 4 Shows that 78 % of the farmers attended training on Adoption of Eco-friendly Technology more than 2 times that shows the interest.

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