

Adoption of Non-chemical Pest Control Methods in Chilli and Brinjal by Jaffna Farmers

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ABSTRACT: *A socio-economic survey was conducted to determine the extent to which non-chemical pest control methods are adopted in chilli and brinjal by Jaffna farmers. Data were collected by an interview survey of a random sample of 180 farmers who grew both chilli and brinjal. All farmers resorted to crop rotation. Infected chilli pods were removed and sold as low grade chilli. Onion and chilli were grown as mixed crop in the same plot or in adjacent plots. Pest infested parts and crop residues served as sources of infection. Only few farmers fully adopted the recommendations on non-chemical pest control in chilli and brinjal. To bring about better adoption of non-chemical pest control, research on cropping systems and pest control methods adopted by traditional farmers should also take into consideration socio-economic factors. Farmer education on non-chemical pest control through group and mass media is vital.*

INTRODUCTION

The Jaffna district which includes a major portion of the Northern peninsula of Sri Lanka is well known for its agricultural products like chilli, onions, tobacco and other vegetables. In 1981, the population in the district was 738,791 (Balasundarampillai and Rupamoorthy, 1987). In a normal *Maha* season 25,082 hectares of land are cultivated in the district (Anonymous, 1987). Because of the limited availability of land for agriculture it is exploited to the maximum by practising intensive cultivation on small holdings of size ranging from 0.10 to 0.20 hectares.

Intensive cropping has led to the problems of high incidence of pests and diseases. The farmers are compelled to use frequent and high doses of pesticides to protect their crops. The Jaffna farmers spend

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over rupees 18 million for agrochemicals annually in a normal cultivation year (Anonymous, 1987). This has resulted in occupational hazards to pesticide applicators, environment pollution and pesticide residues in food. In recent years the above problems have received much attention by agriculturists, sociologists, health authorities and environmentalists.

Traditionally, Jaffna farmers adopted non-chemical pest control methods such as resistant varieties, correct time of planting, crop sanitation and crop rotation. They grew local varieties of crops which showed resistance to pests and diseases. The farmers followed the local almanac which gave the dates of planting of various crops. Thus the farmers had more or less the same time of planting. Most of the plots were cultivated only during the *Maha* season and were left fallow during the *Yala* season thus reducing pest population and disease occurrence. As family labour was abundantly available hand picking of pests was also practised.

The introduction of market-oriented economy forced the farmers to adopt new high yielding varieties which were more prone to pest and disease attack. Price incentives favoured the farmers to resort to continuous cultivation of the same crop. The availability of underground water and the introduction of water pumps promoted intensive cultivation during the *Yala* season too. Furthermore, the younger generation looking forward to white collar jobs caused a drop in family labour. The above factors forced the farmers to neglect the non-chemical pest control methods and rely totally on chemical pest control methods.

Many of the non-chemical pest control methods used by farmers traditionally should, however, be preserved as far as possible because they were the results of a long evolutionary process and experience. Relevant techniques such as field sanitation, crop rotation, *etc.*, need to be examined in relation to the requirement of the crop and their feasibility in the field. This will lead to greater adoption of non-chemical pest control methods by farmers thus reducing their dependency on pesticides. Furthermore, it is stated that in any integrated pest management, the basic approach should include fuller use of all cultural possibilities in crop sanitation (Anonymous, 1979).

Cultural control utilizes agricultural practices to alter the environment so that it is unfavourable for a pest (Wilson *et al.*, 1984).

The objective of this study was to find out the non-chemical pest control methods that were still being adopted by the chilli and brinjal farmers in Jaffna district and to make suitable recommendations with respect to the adoption of these practices.

METHODOLOGY

The population consisted of all the farm families living in the Jaffna district. Using stratified random sampling 6 AI ranges were selected, 3 in predominantly red loam areas and the other 3 in the brown and sandy loam areas. The above sampling method was adopted to ensure representativeness of the predominantly chilli and brinjal growing areas in the district. The list of farm families was obtained for each selected AI range. Only the farmers growing both chilli and brinjal were considered for this study. Of these farm families a sample of 30 was drawn randomly from each selected AI range resulting in a total sample of 180. The data were collected through personal interviews using structured questionnaire in *Maha* 1986/87 and *Yala* 1987. These data were supplemented by information collected by observation.

The data were examined, using percentages and frequency distributions. The adoption of non-chemical pest control methods was measured by allocating scores. A score of one was given if the method was adopted and zero, if not adopted.

RESULTS AND DISCUSSION

Different non-chemical pest control methods were examined and the extents of their adoption were also determined.

Cropping pattern

It was found that crop rotation of some form was adopted by all farmers. Nearly 23% of the farmers reported that they grew chilli followed by chilli with a fallow period of 2 - 2 1/2 months in between. The main crops included in crop rotations by the other farmers are onion, beetroot, diascorea, manioc, sunhemp, tobacco, potato and tomato. Lack of knowledge among the farmers on proper rotations of crops limits

the efficiency of the method in controlling the pests. For instance, rotations among crops such as tobacco, potato, brinjal and tomato which belong to the same family solanaceae were observed in the field.

Control of weeds

Majority of farmers kept their chilli plots free of weeds (Figure 1). As most of the Jaffna farmers rear cattle for milk and draught purposes, weeds are removed regularly by the farmers to feed their livestock as pasture land is scarce in the district.

Disposal of pest infested plant parts

About 63% of farmers reported the removal of pest affected chilli pods and marketed them as low grade chilli in the local market (Figure 1). But improper disposal of pest infested chilli plants and pods needs attention (Table 1).

It is noted that nearly 81% of the farmers simply throw away the pest infested plants and their parts on the boundaries of the plots. This practice is very undesirable as these would be possible sources of infection, spreading the insect pests and diseases to adjacent plots.

In brinjal 88% of the farmers removed pest infested shoots and 98% of them removed pest infested pods. However, as revealed by Tables 2 and 3, more than half the farmers disposed the infested shoots and pods by throwing them away, a practice that leads to build up of pests which could attack the crop again. Although some farmers reported that they fed the entire pest infested brinjal pods to cattle, further investigation revealed that only the uninfested portions of the pods were used as feed and the rest thrown away, creating breeding opportunities for brinjal shoot and pod borers.

Removal of crop residues

The immediate removal of residues of both crops chilli and brinjal was practised only by 48% of farmers. Thus the non-removal of crop residues by the other farmers promotes pest build-up. Further inquiry

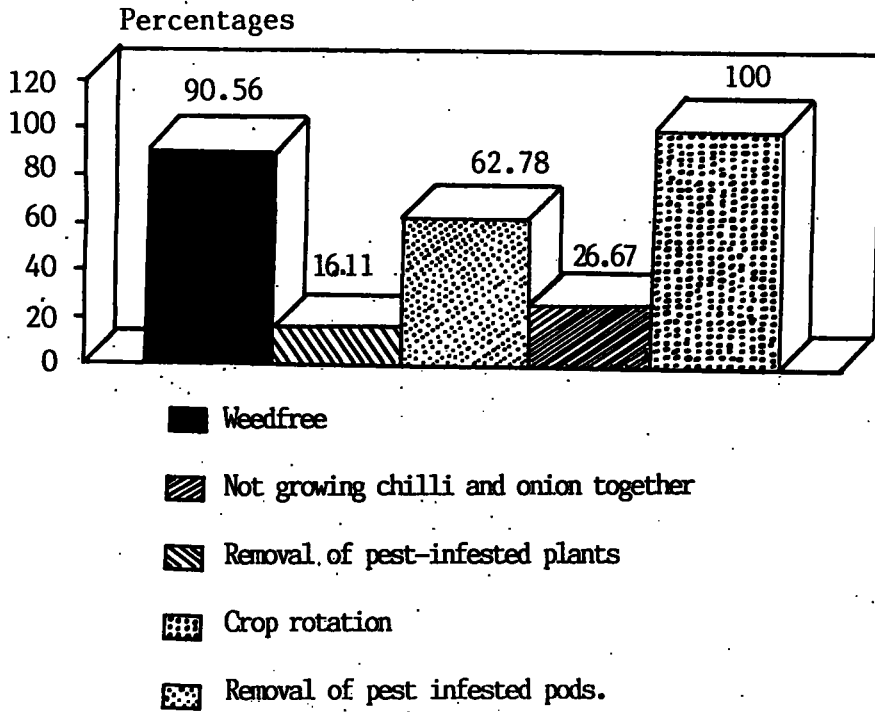


Fig.1. Non-chemical pest control methods.

Table 1. Disposal of infected chilli plants and pods by farmers (N=113)

Type of disposal	No.	Percent
Throw away	91	80.53
Burn	16	14.16
Bury	11	9.73

* Column total is greater than 113 due to multiple response.

Table 2. Disposal of infected brinjal shoots by farmers (N=158)

Method of disposal	No.	Percent
Throw away	103	65.19
Burn	39	24.68
Bury	20	12.66

* Column total is greater than 158 due to multiple response.

Table 3. Disposal of infected brinjal pods by farmers (N=178)

Method of disposal	No.	Percent
Throw away	89	50.00
Feed to cattle	78	44.32
Bury	08	4.55
Burn	04	2.27

* Column total is greater than 178 due to multiple response.

revealed two factors which were responsible for the non-removal of crop residues immediately. One was their possible use as firewood and was applicable to both chilli and brinjal. The other, with particular reference to chilli which in certain areas is interplanted with dioscorea, was the substitutability of residual chilli plants for stakes required by the dioscorea.

Both factors mentioned are of socio-economic significance. For in an area where there is scarcity of firewood the crop residues would save not only money but valuable time usually spent on collecting the former. The above reasons can be given for the other factor as well. In remedying the situation one has to, therefore, consider the advantages against drawbacks associated with keeping crop residues on the ground.

To determine farmer adoption of the recommendations given by the Department of Agriculture on non-chemical control of pests in chilli and brinjal, scoring was done and frequency distributions were obtained. Those who practised a particular recommendation correctly were given a score of one and the others were assigned zero. The recommendations on chilli considered were keeping the plots weed free, removal of pest infested parts, not growing chilli and onion together, crop rotation in chilli and disposal of residues by burying or burning. In brinjal, the recommendations considered were removal of pest infested shoots, disposal of pest infested shoots by burning or burying, removal of pest infested pods, disposal of pest infested pods and disposal of crop residues immediately. The total scores obtained and the frequency distributions are given in Tables 4 & 5.

It is evident that only about 3.3% of the farmers have adhered to all the non-chemical methods of pest control in chilli useful to bring down the pest population. About 66% of the farmers adopted three or more of the above practices. In the case of brinjal too, only 3.3% of the farmers have adopted all the non-chemical methods examined.

CONCLUSIONS

Farmers do adhere to non-chemical pest control methods. There is, however, much room for improvement which will pave the way to integrated pest control programs.

Table 4. Frequency distribution of scores on adoption of non-chemical pest control practices in chilli by farmers.

Score	Frequency	Percent	Cumulative percent
0	00	0.00	0.00
1	03	1.67	1.67
2	58	32.22	33.89
3	86	47.78	81.67
4	27	15.00	96.67
5	06	3.33	100.00
Total	180	100.00	

Table 5. Frequency distribution of scores on adoption of non-chemical pest control practices in brinjal by farmers

Score	Frequency	Percent	Cumulative Percent
0	01	0.56	0.56
1	14	7.78	8.34
2	62	34.44	42.78
3	67	37.22	80.00
4	30	16.67	96.67
5	06	3.33	100.00
Total	180	100.00	

RECOMMENDATIONS

Based on the findings of this study and the experience of the authors the following recommendations are made with respect to the adoption of non-chemical pest control methods in the production of chilli and brinjal.

Research has to be done to identify cropping systems with crops belonging to families other than solanaceae that will provide the same income as chilli and brinjal. Socio-economic factors should be considered when conducting such research so that the findings will be easily adopted by the farmers.

Greater emphasis should be given to educate the farmers on the need for and principles of non-chemical pest control methods in the cultivation of chilli and brinjal. Group approach through farmer training classes, demonstrations, field days, and talks to school children as well as mass media such as special leaflets, radio and television programs are useful in disseminating the above information.

The above recommendations, if properly implemented, will lead to greater adoption of non-chemical pest control methods in the cultivation of chilli and brinjal paving the way to a reduction on pesticide dependency.

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