

Pesticide Usage Pattern In Four Districts Of Karnataka : A Survey

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Abstract: In this study selected farmers from four different Talukas were surveyed regarding the pesticide use pattern in Karnataka. The results indicate that pesticides are readily available and widely used in crop cultivation. The main intention of introduction of pesticides was to prevent and control insects, pests and diseases in the field crops. Indiscriminate and excessive use of pesticides damaged not only the environment and agriculture but also have entered into the food chain there by affecting health and development. The level of education and illiteracy majorly contributed the poor awareness about use of pesticides. Therefore pesticide usage pattern among farmers needs improvement. The present study could help to develop strategies for avoiding hazards of pesticides, its misuse and promoting sustainable development.

Keywords: Awareness, Crops, Hazardous, Health effects, Pesticide

I. Introduction

The state of Karnataka is located at the West Coast of India. Karnataka is blessed with more than adequate rain and sunshine throughout the year, combined with fertile soils kept well irrigated by major rivers such as Cauvery, Godavari, Krishna, North Pennar, South Pennar, Palar and several other west-flowing rivers / rivulets. The share of agriculture in the state GDP is around 16%, which is higher than the current national average. Sixty five percent of Karnataka's population depends on agriculture as their main means of livelihood. For many rural residents of Karnataka, agriculture is the major occupation. A total of 123,100 km² of land is cultivated in Karnataka constituting 64.6% of the total geographical area of the state. The main crops grown here are rice, ragi, jowar, maize, and pulses (Tur and gram) besides oilseeds and number of cash crops.(1) Cashews, coconut, arecanut, cardamom, chillies, cotton, sugarcane and tobacco are among the other crops produced in the state. Karnataka is the largest producer of coarse cereals (2), and coffee(3) among the states in India. Horticultural crops are grown in an area of 16,300 km² and the annual production is about 9.58 million tons. The income generated from horticulture constitutes over 40% of income generated from agriculture and its is about 17% of the state's GDP. In floriculture, Karnataka occupies the second position in India in terms of production and 700 tons of flowers (worth Rs.500 million) were produced in 2004–05(1). Pesticides constitutes the key control strategy for crop pests and disease management and have been making significant contribution towards improving the crop yields. However, in recent years, concern has been growing on the improper usage of hazardous agro-chemicals[4]. Increase in the consumption of pesticides is likely to be at least two to three times more in the years to come. However, in the last few years, there has been a considerable qualitative and quantitative change in pesticide use worldwide and in India as well.

In recent years, the use of organic synthetic pesticides has become widespread practice for preventing , controlling and destroying pests. Despite their usefulness in the increment of food production, the extensive use of pesticides during production, processing, storage, transport or marketing has led to environmental contamination and pesticide residues reach human body through food chain. Humans are also exposed to pesticides and its residues via water and air by different routes of exposure like inhalation, ingestion and dermal contact etc.

Exposure to pesticides results in acute and chronic health problems. These range from temporary acute effects like irritation of eyes, excessive salivation to chronic disease like cancer, reproductive and developmental disorders etc.(5). Therefore, the specific studies regarding agricultural practices for pesticide usage and its environmental and human health impacts are needed to frame policy decision, to create awareness about desired changes in agricultural practices(6,7,8). The aim of the present study was to investigate the various pattern of a few pesticide's usage, residue levels in different soils of agricultural fields from four districts of Karnataka.

II. Materials And Methods

2.1 Study area: The study was carried out in four districts of Karnataka namely Belgaum, Chamarajanagar, Gulbarga and Mandya. The major crops of these districts include, maize, rice, sugarcane, jowar, cotton and groundnut. Other crops cultivated in these districts are wheat, turmeric, pulses, chilli, cauliflower, cabbage and other vegetables. Study sites were earmarked in these districts based on intense agricultural activities and pesticide usage.

2.2 Interview and questionnaire: The interview with farmers was done to know about the extent of exposure to different types of pesticides and other health related problems their children are facing etc, questionnaire was prepared to know the details. Also, details were collected on crop wise pattern of cultivation, pesticides availability, types of pesticides used, frequency of pesticide application and pesticide practices adopted in the study area etc. The storage pattern of pesticides followed by the farmers were also investigated. The details collected were as self reported by the farmers and all the information elicited only from such farmers who are actively involved in the cultivation profession. The collected data were entered in the MS-Excel worksheet, classified and used in for further analysis. The analysed data were used to prepare result graphs and tables.

III. Results And Discussion:

In this study randomly selected farmers from four districts of Karnataka voluntarily participated. All the farmers reported that the growth of more than one type of crop each year. (TABLE-1).

3.1 Types of pesticides used in the study area and their toxicity class : Majority of the farmers in these study areas had only primary education and had no formal education on pesticides. The majority of the farmers reported that they are using synthetic pesticide formulations as crop protection to combat various pests and insects. Most of the formulations were used at various stages of crop production were recognized by their trade names and were not aware about the chemical name and their mode of action. Insecticides were most frequently used followed by fungicides and herbicides. Some of these pesticides used have been grouped under extremely hazardous or highly hazardous by World health organization (TABLE-2). The widely used insecticides were Chlorpyrifos, monocrotophos, cypermethrin, quinolphos, fungicides included Copperoxide, Bavistin, Mancozeb, Glyphosate and paraquate were used under herbicides group.

During survey it was observed that for a single crop multiple formulations of pesticides were used. Farmers reported that most of the pesticides were obtained from more than one sources and they were readily available for purchase by farmers. The primary source of pesticides for purchase by farmers in the study area were the Agro-chemical shops in the local markets and municipal markets. Pesticides found to be stored at different sites and farmers were very casual in terms of pesticides storage. Most of them were stored outside their houses along with Fertilizers and farm equipments and some of the pesticides were observed to be stored inside the houses of farmers (TABLE-3).

The major sources of information for use of pesticides by farmers were based on notifications by television, radio broad casting, leaflets and pamphlets that were made available from agrochemical shops and also through agricultural government employed officers, sales representatives from various agro chemical companies.

3.2 Pesticide application and practices: All the farmers reported the use of sprayers for pesticide application. Most of the farmers indicated preventive spraying of pesticides once or twice per season. Few farmers reported spraying of pesticides depending on pest manifestation. With regard to time between spraying of pesticides, some farmers sprayed once or twice per month, few farmers from four districts followed instructions in the labels on pesticide containers, and others followed the instructions/directions from the agrochemical shops where they purchased pesticides. Thus the spraying was not uniform. More than 60% of farmers used personal protection while spraying pesticides. They covered mouth and nose and wore hand gloves,. About 15% reported having bath after spraying. None of the farmers completely protected their body as per the requirements of personal protection. This was because of lack of awareness about pesticides, its usage and hazards.

3.3 Crop wise pesticide usage pattern:The qualitative survey on pesticide usage pattern in four Districts showed that each district had different major crop productions which utilized most of the formulations of pesticides. Among these,vegetables occupied first position in consumption of pesticides followed by rice ,sugarcane, maize cotton etc.(Fig.1,2,3 and 4).

3.4 Health impacts of pesticide:During survey and in consultation with the individual farmers it was found that few of them knew that there are harmful effects of the pesticides on human beings. The farmers who are actively involved in the pesticide usage were asked whether they experience any health related problems (signs and

symptom related to pesticide exposure) during or immediately after pesticide spraying days and non spraying days. The signs and symptoms were reported by a large number of farmers.. skin problems are the most common health problem linked to pesticide use, eye irritation symptoms, breathing problem, dehydration/vomiting, cramps and diarrhoea were also reported for which these people either go to a doctor or hospital. It was found that agricultural farmers are relatively free from illness during non –pesticide spraying days. Female workers were also facing stomach problems sometimes during or after spraying. It is pertinent to note that due to bad smell, eye irritation, throat infection and many other reasons majority of the farmers chewed either tobacco, gutka or smoke while spraying and farmers expressed the fact that they consume country liquor/wine during spraying to avoid smell and adverse effects of pesticides.

IV. Conclusion

The results of this survey indicated that a variety of pesticide formulations were used for different crops in these study areas. The use included highly and moderately hazardous pesticides. Insecticides were frequently used followed by fungicides and herbicides/weedicides. Most of the pesticide formulations were used on vegetables, rice ,maize, sugarcane , groundnut and pulses. Significant lack of knowledge among the farmers about preventive and proper pesticide application, personal protection and personal hygiene were observed. The disposal of empty pesticide formulation containers were inappropriate and were executed carelessly. This survey points the need for a comprehensive intervention and awareness amongst farmers on environmental issues including health impacts due to usage of pesticides in the above study areas.

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Figures And Tables

Table-1:Types of crops grown in study area.

Belgaum	Chamarajanagar	Gulberga	Mandya
Maize	Maize	Pulses	Rice
Rice	Sugarcane	Cotton	Sugarcane
Sugarcane	Rice	Wheat	Ragi
Jowar	Pulses	Maize	Maize
Groundnut	Turmeric	Sugarcane	Pulses
Cotton	Cotton	Groundnut	Groundnut
Sunflower	Groundnut	Sunflower	Mulberry
Vegetables	Vegetables	Vegetables	Vegetables

Table-2 : Types of pesticides used in the study area and their toxicity class.

Pesticide group / Common name	Chemical family	Toxicity class*
Insecticides		
Endosulfon	Organochlorine	II
Ethion	Organophosphate	II
Monocrotophos	Organophosphate	Ib
Chlorpyrifos	Organophosphate	II
Quinolphos	Organophosphate	II
Phorate	Organophosphate	Ia
Dimethioate	Organophosphate	II
Dichlorovas	Organophosphate	Ib
Methylparathion	Organophosphate	Ia
Phosphamidon(Demicron)	Organophosphate	Ia
Profenofos	Organophosphate	II
Fenvalerate	Pyrethroid	II
λ-Cyhalothrin	Synthetic pyrethroid	II
Cypermethrin	Synthetic pyrethroid	II
Carbosulfan	Carbamate	II
Methomyl	Carbamate	Ib

Acetamipride	Neonicotinoid	U
Chlorantraniloprole	Anthranilic diamide	U
Spinosad	-	III
Fungicides		
Pentachlor	Chlorinate	Ib
Carbendazin(Bavistin)	Carbamate	U
Mancozeb	Carbamate	U
Copperoxide	Inorganic	II
Thiram	Dimethyl dithiocarbamate	III
Hexaconazole	Azole	III
Imidaclopride	Neonicotinoids	II
Herbicides		
Paraquate	-	II
Glyphosate	Nphosphonomethyl Glycine	III
Alachlor	Chloroacetanilide	II
Metribuzine	Triazine	II

Source: * Toxicity class of pesticides - classified by the World Health Organization (2004),
Ia: extremely hazardous; Ib:Highly hazardous; II: moderately hazardous;

Table-3: Sources of pesticide and its storage practices

Sources of pesticide	Storage site
Agrochemical shops in the local markets	Outside the house with farm equipments
Agrochemical shops in the municipal markets	At farm site, away from house
Agrochemical shops in the community	Inside the house

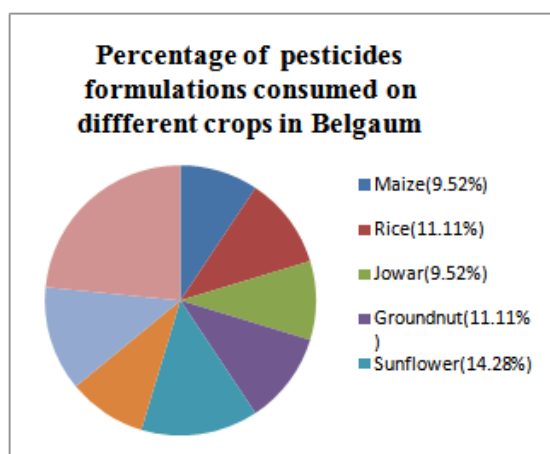


Fig 1: Percentage of pesticides formulations Consumed on different crops in Belgaum

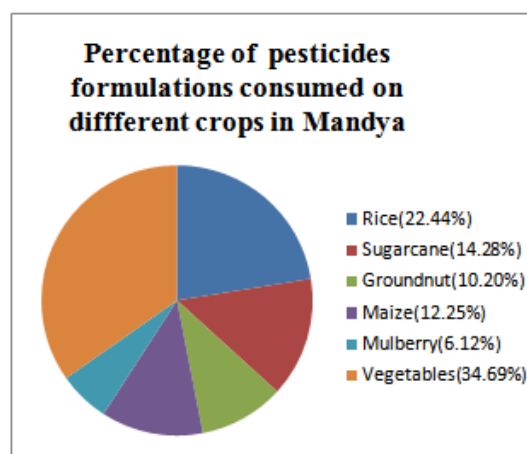


Fig 4: Percentage of pesticides formulations consumed on different crops in Mandya

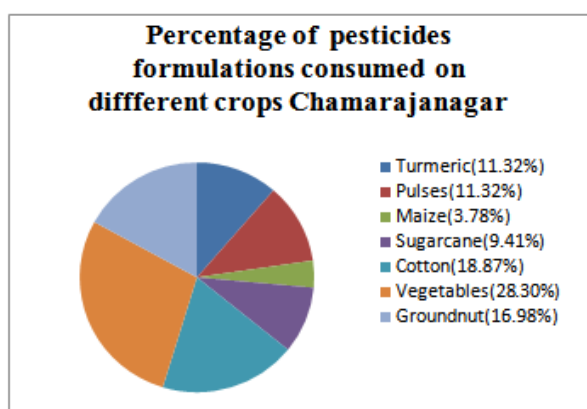


Fig 3: Percentage of pesticides formulations Consumed on different crops in Chamarajanagar

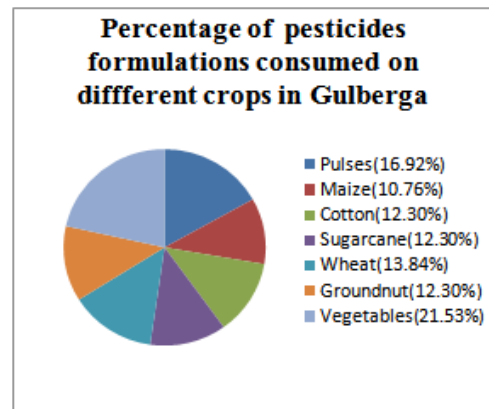


Fig 4: Percentage of pesticides formulations consumed on different crops in Gulberga