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Pesticide Consumption on Agriculture in Solapur district of Maharashtra: A Geographical Perspective

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Abstract:

The role of pesticide is most significant among various agrochemicals in the sense that these act as protective umbrella for other inputs. After using other inputs such as H.Y.V. seeds, irrigation fertilizers machinery, etc. the crop is destroyed by pest and diseases; the entire investment is lost (Jalan M.L. (1987 The farmers in Solapur district are aware of the importance of this input in agriculture. But farmers have inadequate knowledge for using intimae and quantity too. The use of pesticides for Jawar, Wheat, Rice, Soyabean, Sugarcane, Grapevine cultivation. Pesticide may be classified as insecticides which control insects, fungicides which kill pathogens causing diseases to the plant rodent cider to kill rodent's weedicides or herbicides to control unwanted plants and nematicides to control nematodes. The region is drained by Bhima River and its tributaries Nira, Man, Sina, Bhogavati etc. The Bhimariver on Ujjani irrigation project is a major irrigation project in solapur district. The district has a total area of 14886 Kms2 and population of 4317756 persons as per 2011 census which constitute purposes; the district is divided into eleven tehsils (Fig.No.1 (e.g. North Solapur, BarshiAkkalkot, South Solapur, Mohol Managalwedha, Pandharpur, Sangola, Malshiras, Karmala and Madna.The Solapur district is located in Southern Maharashtra. The primary data have been generated from sample villages. The Secondary data were collected published records of ZillaParishad and Agricultural Department of the district.The Collected data and information were presented with help of maps and tables. The high consumption (150gm/hect.) is observed in two tehsils Mangalwedha and Barshi located in central and central eastern part of the region. The objectives of the research paper are examined on Pesticide consumption in Solapur district of Maharashtra.

Key Ward- Consumption, Insects, Fungicides, herbicides

Introduction: The role of pesticide is most significant among various agrochemicals in the sense that these act as protective umbrella for other inputs. After using other inputs such as H.Y.V. seeds, irrigation fertilizers machinery, etc. the crop is destroyed by pest and diseases; the entire investment is lost (Jalan M.L. 1987). It includes, apart from legislative controls, the use of chemical pesticides in the post world war period, quick and easy method of plant protection become available to the farmers. Chemical measures gained importance thereafter as the principal method of post control in agriculture. The term pesticide encompasses all chemical material used for controlling of pests. Based on their principal usages, pesticide may be classified as insecticides which control insects, fungicides which kill pathogens causing diseases to the plant rodent cider to kill rodent's weedicides or herbicides to control unwanted plants and nematicides to control nematodes.

The pesticides are generally used by farmers for many improved varieties ranging from food grains to many commercial and horticultural crops. They cannot be afforded by small farmers and especially farmers in dry farming areas where income level of farmers is insignificant. However, there is regional disparity in the distribution of these pesticides. In view of this, the study of spatial variations in the consumption of pesticide has been attempted. Besides this an efforts have also been made here to examine the use of pesticides for grapevine cultivation. It is because grape vine cultivation. It is because grapevine cultivation absorbs greater quantity of pesticides.

Objectives: The present Research paper is examined Pesticide Consumption in Solapur district of Maharashtra.

Database and Methodology: - In this present analysis, both primary as well as secondary data have

been used. The primary data have been generated from sample villages. The selection of sample village is based on random sampling method and accordingly to zone in which consumption of pesticides are high. Further the farm level study is attempted for that randomly and purposefully selected farm to collect primary data through schedule method. The secondary data obtained from records maintained by Zilla Parishad and Agriculture Department of Solapur District. However, some limitations have been set for data availability which has restricted the scope of study data pertaining to the consumption of pesticide per hectare for earlier period i.e. in 2020 was available. Besides it is difficult to assess crop wise consumption of pesticides because of its scattered nature. The Pesticide data were abstracted for the present analysis from the published records of Zilla Parishad and Agricultural Department of Solapur, The data thus obtained were analyzed with the help of following

Formula - $Ipe = \frac{TP}{DP}$

Where,

Ipe = Index of pesticide consumption
TP = Pesticide consumption the tehsil (gm/hect.)
DP = Pesticide consumption in the district (gm/hect.)

The Region: - Solapur district area under present investigation lies entirely in the Bhima Sina-Man river basins of Krishna river system of South Maharashtra. The district is bounded by 17o 10' North and 18o 32' North latitudes and 74o 42' East and 76o 15' East longitudes. The district is fairly well defined to its west as well as its east by the inward looking scarps of Phaltan range and Osmanabad plateau respectively. The adjoining districts are Sangli to its south west, Satara to its west, Pune to its north-west, Ahmadnagar to its north, Bhir and Osmanabad to its east and Bijpur district of Karnataka state to its south. Broadly the Physiography of the district may be grouped into three parts i.e. 1) The Hills and Ghats height between (750-850) meters II) The Foot hills (650-750) meters. III) The Plains and Plateau (below 500-600) meters. The soils vary from deep medium black alluvial of the river tracts and further to poor gray soils in the east. The region is drained by Bhima River and its tributaries Nira, Man, Sina, Bhogavati etc. The Bhima River on Ujjani irrigation project is a major irrigation project in solapur district. The district has a total area of 14886 Kms2 and population of 4317756 persons as per 2011 census which constitute purposes; the district is divided into eleven tehsils (Fig.No.1) e.g. North Solapur, Barshi Akkalkot, South Solapur, Mohol Managalwedha, Pandharpur, Sangola, Malshiras, Karmala and Madna.The Solapur district is located in Southern Maharashtra. Its latitudinal extent is from 17˚ 10 north to 18˚ 32North and longitudinal is 74˚ 42 east to 76˚ 15 east. The average annual rainfall in the district is 584.3 mm. The region has predominantly a drought prone area of South Maharashtra.

Crop wise Use of Pesticide Technology

The role of pesticide technology is most significant of the various agro chemical in the sense that these act as protective cover for other inputs. A crop is usually attacked by a number of pests which are often selective in the sense that they appear at different stage of growth of crop but their virulence varies widely. The loss sustained by the crop depends on the extent and virulence of pest attack. Timely and Judicious use of pesticides can save the crop from such disease in the region under study. A cursory glance at Table 1 reveals the fact that there are various pests and diseases attached to different crops grown in Solapur, Sangli, district. Further the farmers use to control them by adopting pesticide technology as and when diseases influence the standing crop. Due to lack of tehsilwise data the picture of entire region is developed here.

As far as Jawar crop is concerned. Insect like stem border, earthed webbing and caterpillar along with grain, smut, downy mildew diseases are affecting this crop adversely every year. The farmers use indosulphon maletheaon to control them.

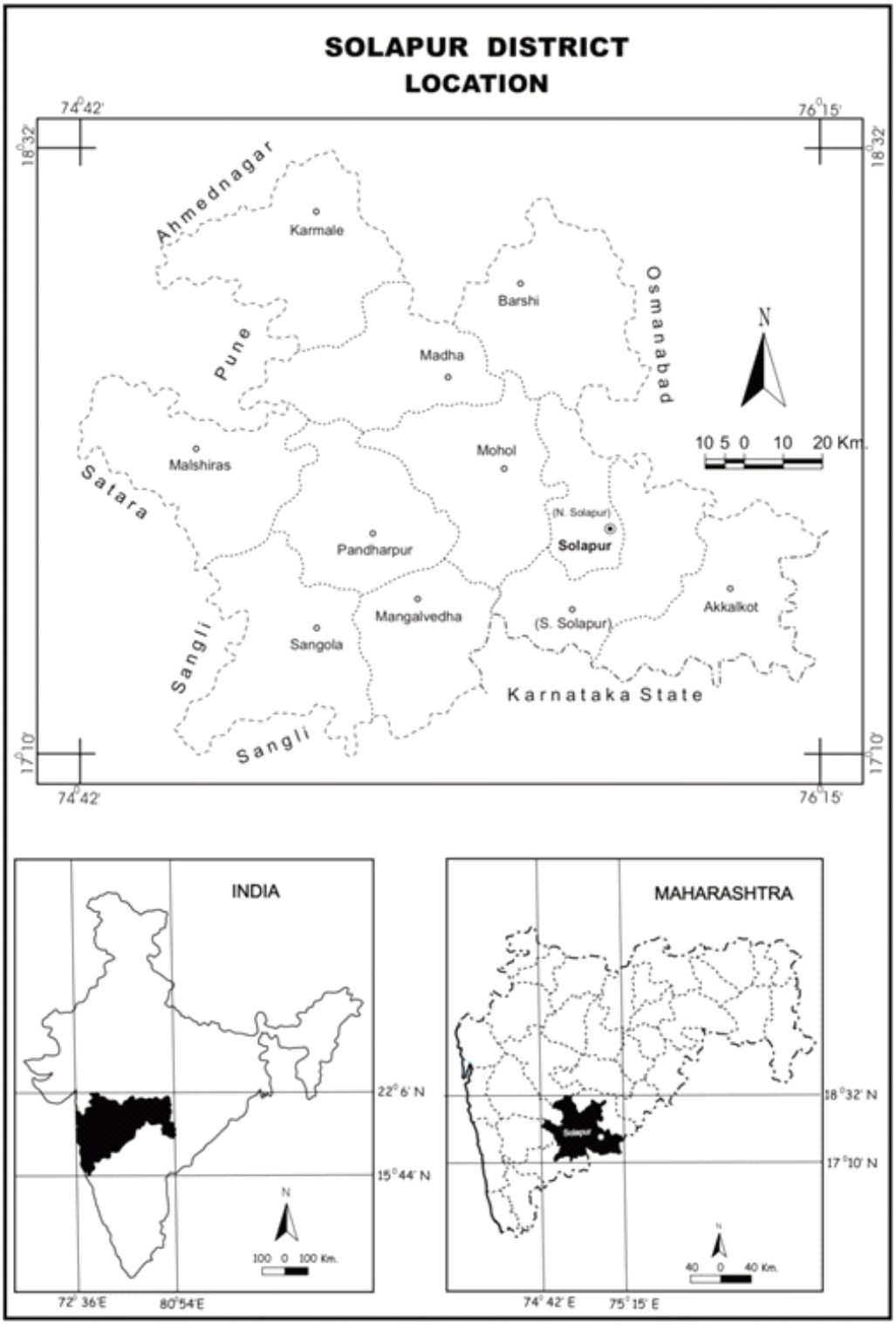
SOLAPUR DISTRICT
LOCATION
74°42'
76°15'
18°32'
17°10'
Ahmednagar
Karmale
Barshi
Osmanabad
Pune
Madha
N
10 5 0 10 20 Km.
Malshiras
Mohol
Satara
(N. Solapur)
Solapur
Pandharpur
Mangalvedha
(S. Solapur)
Akkalkot
Sangola
Sangli
Karnataka State
INDIA
22°6' N
15°44' N
72°36'E
80°54'E
100 0 100 Km.
MAHARASHTRA
18°32' N
17°10' N
74°42' E
75°15' E
40 0 40 Km.

Fig. 1.1

Table 1
Crop wise Diseases and Insects and Pesticides Used to Control them in Solapur District

Sr.No.	Crops	Insect	Diseases	Pesticides
1	Jawar	Steam borer, earhead, weebing cuter pillar	Grain, Smut, downy, mildew	Indosulphon Maletheaon
2	Wheat	Cutwrms, blue beetle	Yellow rust	Zyaben 75, Mencozeb
3	Rice	Gundhybugs , leaf hooprs, caseworm hispa army worms	Blast, steam rot, helminthos porium	Farrest, Syperme Threen, Monocrotoyos
4	Soyabean	White fly, Jassid, semi 100 per, Girdle Beetle	Soyabean mosaic Bacterial pustules root-rot	Forret, Indosulphon, Queen holfos
5	Sugarcane	Pyrilla, topborer, stem borers	Red rot, smut	Carboril, Indosulphon, Dymethoet
6	Grape Vine	Therpse mitles millibugs	Davinimildue , Anthracnose mildew	Malthuon Bordo, Bina Pakril

Source – Zilla Parishad and Agricultural Department of Solapur district Districts 2020

In case of sugarcane, Pyrilla, topborer, stemborer are commonly observed which harm standing crop resulting into appreciable decrease in yields per unit area. Carboril, indosulphon dymethoet are the pesticides used by the farmers. In grape vine cultivation there are many diseases like davnimildew anthracnose, mildew and insects like herpes, mile's millbugs are taking heavy tall during leafy and flowering season. In fact, several types of pesticides are used in grapevine in the central eastern and eastern dry zones where it is located. There are also heavy doses used to control various diseases. Besides Boro mixture of lime and copper has been traditionally used as effective measures to this cash crop. (Patil.P.V.2002) it is estimated that more than 80 per cent pesticides are adopted for this crop as it is delicate vine and requires the use of pesticide technology in time. Any delay in spraying pesticides may result into heavy damage of vines leading to economic loss of farmers. Generally farmers are not using pesticide technology largely to food grains. However, in view of extensive use of seed technology in the form of improved seeds, the farmers adopt pesticide technology as these varieties are susceptible easily to diseases.

Regional Pattern of Pesticide Consumption:

Spatial pattern of Pesticide consumption in Solapur district, the tehsils can be grouped under three zones based on Pesticide consumption but they have been grouped under three broad categories

A) Region of high Pesticide consumption (above 150 gm/hect.)

The covers the area of two tehsils located in central and north eastern parts of the river Sina, Man of the tehsils of Mangalwedha and Barshi. The zone has been characterized by assured supply of water dominance of Sugarcane and Pulses and Oil seeds, location of Sugar factories and after all close network of village level co-operatives and these tehsils were developed to domestic oil mills, horticulture in Grapevine, Bhir and Pomegranates due to the close networks of local and national market. As a result this zone possesses high level of pesticide consumption.

B) Region of moderate Pesticide consumption (between 75 to 150 gms/hect)

It includes six tehsils of, northern and eastern parts of the region namely Karmala, North

Solapur, South Solapur, Akkalkot, Madha and Mohol tehsils .The tehsils located in north and eastern parts are endowed with the developments in irrigation mainly from wells, lift and canal irrigation and presence of grapevine cultivation has attributed to the moderate level of consumption. Besides this is tehsils located along the Sina and Bhima river have been characterized by black fertile alluvial soils. Dominance of sugarcane

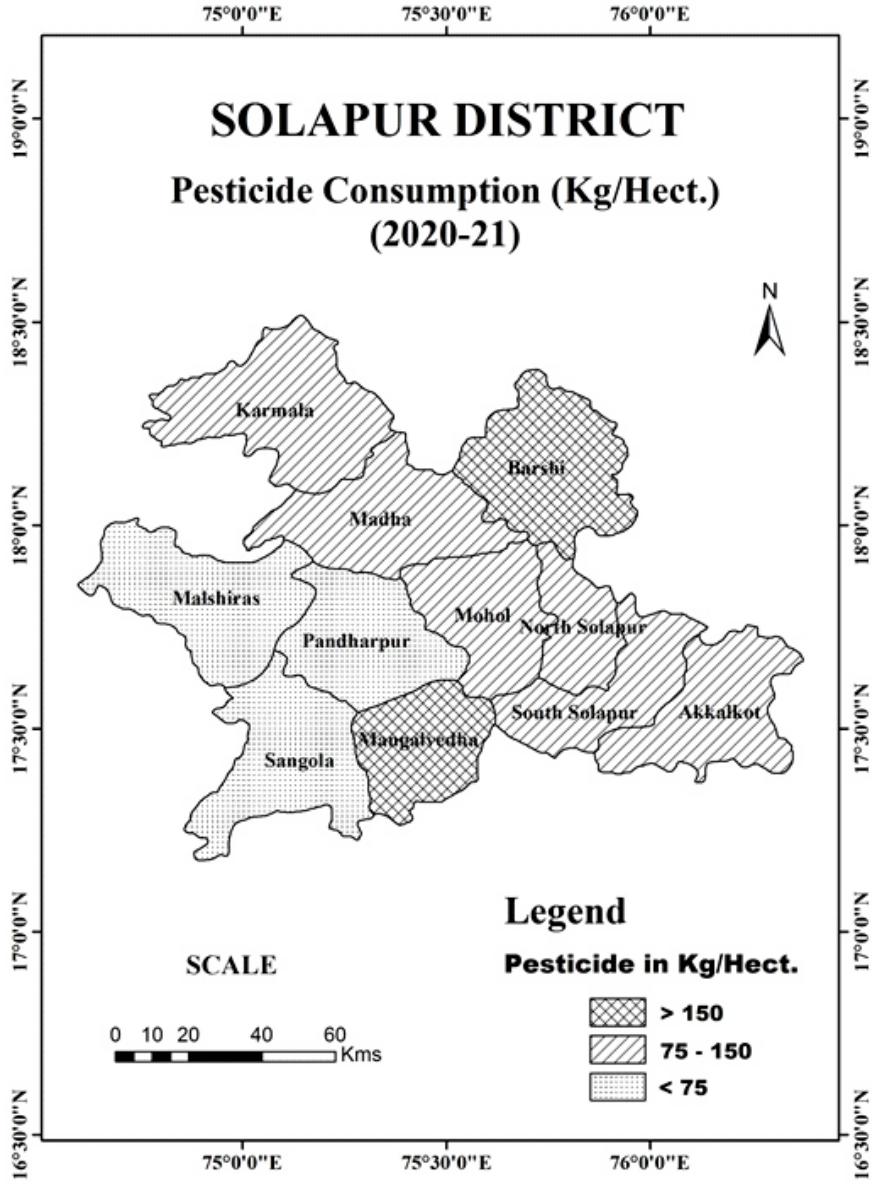

Fig. No. 1.2

vation have restricted the use of pesticide in large quantity. (Fig 1.2)

C) Region of Low Pesticide Consumption (below 75 gm/hect.)

It includes 3 tehsils namely Malshiras, Pandharpur and Sangola. In that Malshiras tehsil

alone shows (28.33) gms hect. Pandharpur (70.35) gms/hect and Sangola (73.16) gms hect, Frequent drought conditions meager water supply dependence on rainfall has led to the poor economic status of farmer which has constrained the consumption of pesticides.

Conclusion: The success of planning in India rests critically on increasing production in the agricultural sector. The scope for further extension in cultivable land having nearly been exhausted any further increase in agricultural production has to emanate from improving the productivity of the agricultural sector. The extension of area under the high yielding varieties of crops has empty demonstrated that their higher yield potential can be realized only if adequate plant protection measures are adopted (K.Seeta Prabhu,1987).

The role of pesticide is most significant among various agrochemicals in the sense that these act as protective umbrella for other inputs. After using other inputs such as H.Y.V. seeds, irrigation, fertilizers, machinery, etc. the crop is destroyed by pest and diseases; the entire investment is lost (Jalan M.L. 1987). The farmers in Solapur,district are aware of the importance of this input in agriculture. But farmers have inadequate knowledge for using intimae and quantity too. The pesticides are generally used by farmers for many improved varieties ranging from food grains to many commercial and horticultural crops.

There are some regional variations in the consumption level of pesticides. The high consumption (150 gm/hect.) is observed in two tehsils Mangalwedha and Barshi located in central and central eastern part of the region due to the dominance of Oil seeds, Pulses and Grape Vine cultivation which requires more proportion of pesticides.

Jawar crop is concerned. Insect like stem border, earthed webbing and caterpillar along with grain, smut, downy mildew diseases are affecting this crop adversely every year. The farmers use indosulphone maletheaon to control them. Sugarcane, Pyrilla, topborer, stemborer is commonly observed which harm standing crop resulting into appreciable decrease in yields per unit area. Carboril, indosulphon dymethoet are the pesticides used by the farmers. Grape vine cultivation there are many diseases like davni mildew anthraces nose, mildew and insects like therpse, mitle's millbugs are taking heavy tall during leafy and flowering season. In fact, several types of pesticides are used in grapevine in the central eastern and eastern dry zones where it is located. There are also heavy doses used to control various diseases. The low consumption of pesticides i.e. below 75 gms.hect. Have been observed in Pandharpur and Sangola tehsils. The frequent drought conditions meager water supply dependency on rainfall has led to poor economic status of farmers which has further constrained the consumption of pesticides. Remaining tehsils were moderate consumption 75 gm to 150 gms hectare It includes six tehsils of, northern and eastern parts of the region namely Karmala, North Solapur, South Solapur, Akkalkot, Madha and Mohol tehsils .The tehsils located in north and eastern parts are endowed with the developments in irrigation mainly from wells, lift and canal irrigation and presence of grapevine cultivation has attributed to the moderate level of consumption. Besides this is tehsils located along the Sina and Bhima river have been characterized by black fertile alluvial soils. Dominance of sugarcane Cultivation have restricted by black fertile alluvial soils dominance of sugarcane cultivation have restricted the use of pesticide in large quantity. (Fig 1.2)

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