

Assessment of Impact of Crop Cultivation Practices on Environment in Mysuru District of Karnataka

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Abstract:-Mysuru district of Karnataka is known for the cultivation of major food crops as well as commercial crops on a large scale. The impact assessment study was conducted on the cultivation practices of crops like maize (food crop), cotton, tobacco (commercial crop) and ginger (spice crop) grown in Mysore district by majority of the farmers. Parameters like fertilizer consumption, nutrient uptake, pesticide usage, water consumption and energy requirement were studied for the above mentioned crops. The methodology adopted for the study was about validating and quantifying the data collected based on the farmer survey with standard review articles and then arriving at the conclusions. The study revealed that Fertilizer consumption by cotton (155:90:145 kg/ha), maize (195:75:110 kg/h) and ginger (134:110:115 kg/ha) are on a higher side as compared to standard recommendations and in the case of tobacco (65:35:116 kg/ha), the applied dosage of fertilizers is almost on par with the standard fertilizer recommendations. Lowest value for tobacco is due to the Integrated Nutrient Management practices and soil health improvement interventions adopted by the tobacco farmers. Nutrient uptake was the highest in maize (166.1:89.9:65.7 kg/ha) and the lowest in tobacco (16.6:19.3:21.9 kg/ha). Tobacco can generally be grown in soils with low inherent fertility. The pest and disease incidence was the highest in cotton (7 pests and 9 diseases) and the lowest in tobacco (1 pest and 3 diseases) for Mysuru region. The pesticide consumption expressed as kilogram active ingredient per hectare (kg ai/ha) was the highest for ginger (1.43 kg ai/ha) and the lowest for tobacco (0.446 kg ai/ha). Tobacco as a crop generally requires less pesticide usage and in addition the services rendered by the Tobacco board, industry and CTRI in serving the growers through supply of various inputs like bio pesticides and ensuring recommended chemical usage adds on to lower pesticide consumption in tobacco. With respect to energy consumption, there was no significant difference in the total quantity of diesel consumed for carrying out various operations like land levelling and inter cultivation in all the crops.

I. INTRODUCTION

Agriculture is the predominant occupation of majority of the people in Mysuru district. About 3, 42,852 ha out of the total geographical area of 6, 76,382 ha in the district is cultivable area. The district is known for the cultivation of crops like cotton, maize, tobacco and ginger on a large scale. Among all these crops cultivated tobacco is one of the most remunerative and attractive crop for the Mysuru farmers because, the production system is as per International standards and almost 80% is being exported from the region. FCV tobacco is the only agricultural crop which is highly regulated and subjected to stringent restrictions on extent of area planted, quantity of tobacco produced and cured. Flue Cured Virginia (FCV) tobacco crop cultivation is being regulated by Tobacco board and its horizontal expansion is not encouraged.

Various agricultural operations in the above mentioned four crops from land preparation till harvest depend on various resources like water, soil etc. The study on the impact of the various cultivation practices like fertilizer usage, nutrient uptake, pesticide consumption, water consumption and energy requirement was undertaken for the four major crops like cotton, maize tobacco and ginger cultivated in Mysuru district and evaluated in detail in this study.

II. METHODOLOGY OF THE STUDY

The objective of the study was to evaluate the impact of cultivation practices of these major crops on the environment. The project critically investigated the field of study like usage of water, nutrients, pesticides, energy by the selected crops and also the quantified data for pest and disease infestation of all these crops in different stages of growth.

On a brief, methods like primary data collection from authentic review sources and farmer survey in the crop growing regions of Mysuru district was carried out. Primary data was collected from various sources like standard reference books, research and review articles, leaflets, Journals and authenticated websites. A total of 100 farmers were selected from Mysuru region for conducting the study. The farmers for the study were finalised in such a way that, twenty five farmers per crop was randomly selected and a survey was conducted among them based on the standard questionnaire that was designed by the team of experts and approved by Tamil Nadu Agricultural University.



Figure 1. Data Collection From the Farmers

The collected data was consolidated and analysed to get the desired results. Post completion of primary and secondary data collection, the required parameters were analysed and results were drawn. Later the farmer survey results were compared with the standard review articles and arrived at the conclusions. The data collected were analysed, sorted and studied for fertilizer consumption, Nutrient uptake from soil, pesticide consumption, pest and disease infestation, water and energy consumption.

III. RESULTS AND DISCUSSION

Fertilizer consumption by cotton (155:90:145 kg/ha), maize (195:75:110 kg/ha) and ginger (134:110:115 kg/ha) are higher when compared to the standard fertilizer

recommendation provided by the respective crop research institutes. This shows that farmers growing maize, ginger and cotton use more fertilizers. But in the case of tobacco (65:35:116 kg/ha), the applied dosage of fertilizers is almost on par with the standard fertilizer recommendation provided by CTRI (Central Tobacco Research Institute) (Table 1). The balanced fertilizer consumption in Tobacco is due to the Integrated Nutrient Management programmes adopted by the farmers during tobacco cultivation. Various other soil health improvement interventions like green manuring, vermicomposting and soil fertility based nutrient recommendation practices are also adopted on a large scale in tobacco farming which is promoted by Tobacco Board, CTRI and Industry.

Crop	Fertilizer consumption farmer survey data (Kg/Ha)	Fertilizer recommendation (Kg/Ha)
Cotton	155:90:145	120:60:60 (hybrids) 90:45:45 (varieties)
Maize	195:75:110	135:62:50
Ginger	134:110:115	100:50:50
Tobacco	65:35:116	60:40:120

Table 1. Comparison of Fertilizer Consumption By Major Crops of Mysuru

Nutrient uptake was the highest in maize (166.1:89.9:65.7 kgs of NPK/ ha) Bender (2012), followed by ginger (59:24:111 kg/ha) as reported by Sadanandan et.al. (2002), cotton (60 -70: 19 - 25: 60-80 kg/ha) reported by

(www.cicr.org.in) and the least value was observed for tobacco (16.6:19.3:21.9 kg/ha) as mentioned in the Handbook of horticulture, ICAR (2012). Fig 2.

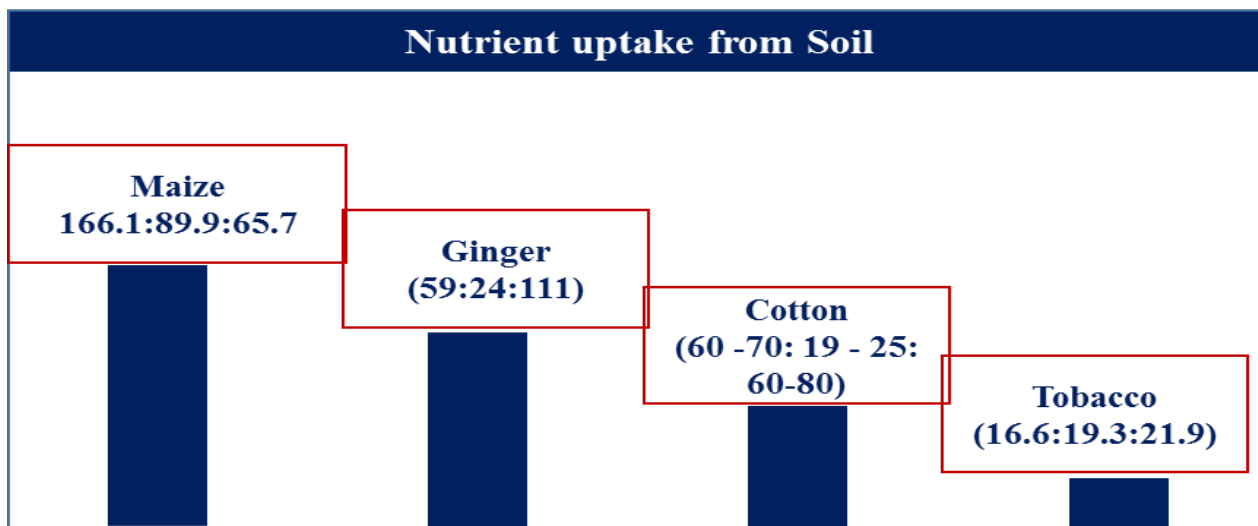


Figure 2. Nutrient Uptake From Soil By Major Crops in Mysuru District

The pest and disease infestation was the highest for cotton and the lowest for tobacco. The total quantity of pesticide consumed in terms of active ingredient per hectare was the highest for ginger (1.43 kg ai/ha) and the lowest was reported for tobacco (0.446 kg ai/ha Table 2, Fig 3). In the case of tobacco, with the objective of reducing the pesticide consumption, the Tobacco board has been serving the

growers through supply of various inputs like bio pesticides and ensuring recommended chemical usages as a part of the Integrated Pest Management practices. This ensures that only recommended and safe chemicals are used during tobacco production thereby having less impact on environment resources such as soil and water.

Crop	Pesticide consumption as active ingredient (Kg ai /ha)
Ginger	1.43
Maize	1.37
Cotton	1.08
Tobacco	0.446

Table 2. Pesticide Requirement of Major Crops in Mysuru District

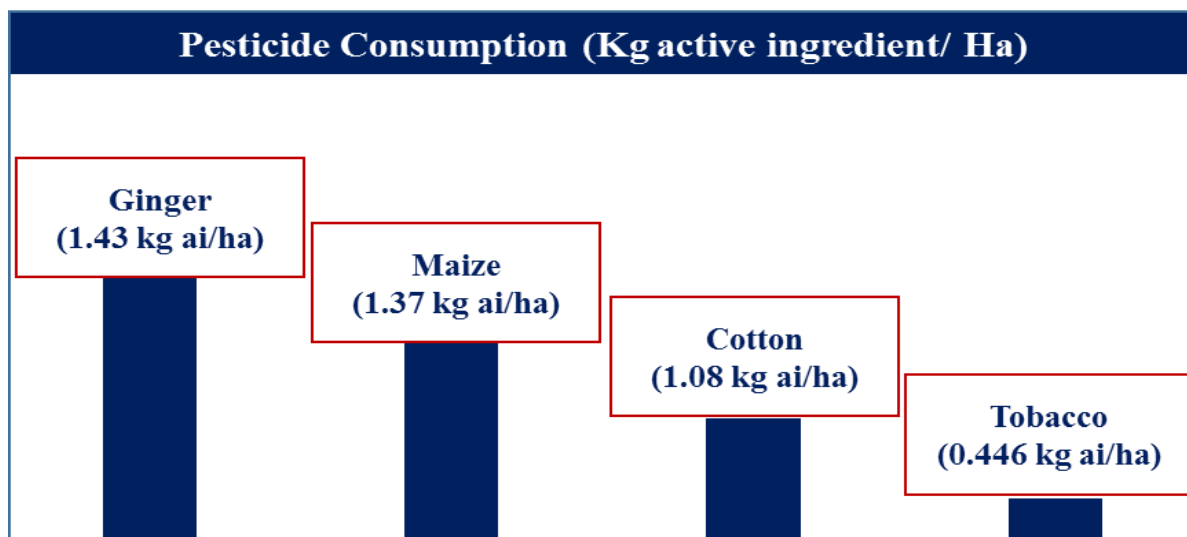


Figure 3. Pesticide Consumption (Kg Ai/Ha) By Major Crops in Mysuru District

With respect to water consumption, the preliminary survey results revealed that cotton, maize and tobacco are rainfed crops for Mysuru region. Irrigation is practiced in ginger and

all the surveyed farmers rely upon sprinkler method of irrigation. The water requirement for ginger was arrived in the range between 1200 mm to 1500 mm. (Fig.4).

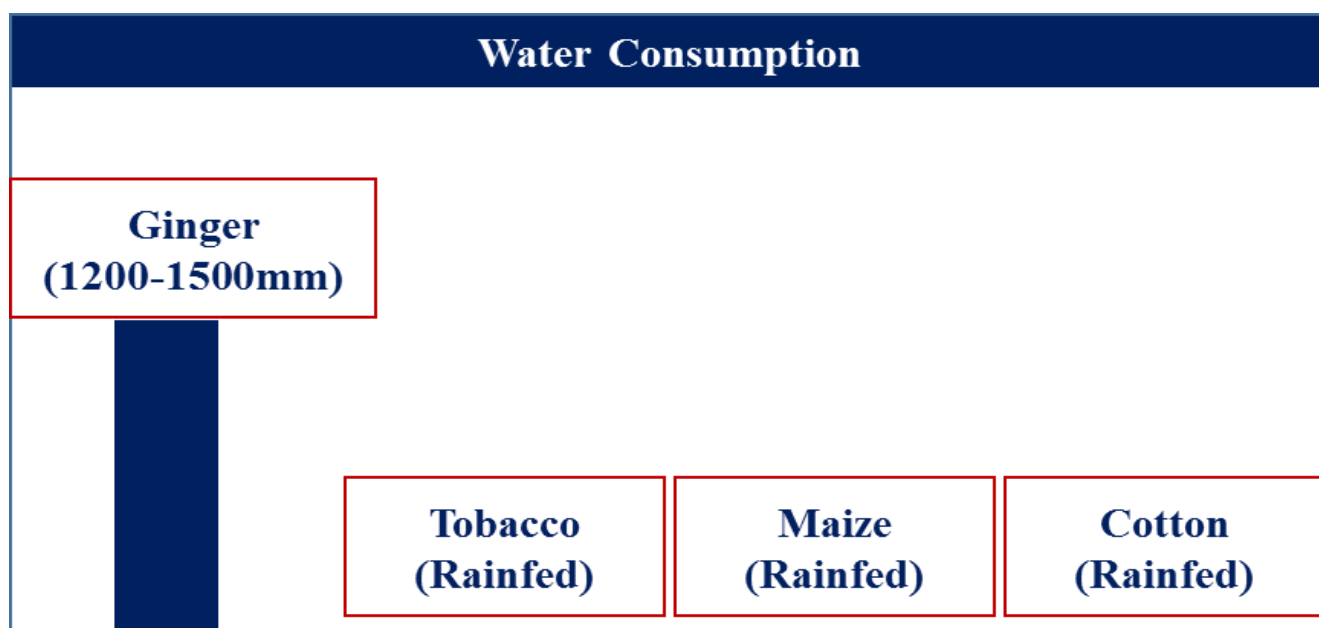


Figure 4. Water Consumption By Major Crops in Mysuru District

In regions where irrigation is practiced, the water requirement of cotton ranged from 550- 900 mm, maize from 500 – 600 mm, tobacco from 250-500 mm and that of ginger was in the range of 1320- 1520 mm (Majumdar, 2010 and Reddy 2015). Literature studies also stated that among these four crops, ginger is the highest water consuming crop and tobacco is the lowest water consuming crop.

IV. SUMMARY AND DISCUSSION

The environmental impact study conducted for the major crops like cotton, maize, tobacco and ginger cultivated in Mysuru district points out to various agricultural practices and operations impacting the environment. The study revealed that Fertilizer consumption by cotton, maize and ginger are higher when compared to the standard fertilizer recommendation and in the case of tobacco, the applied

dosage of fertilizers is almost on par with the standard fertilizer recommendation provided. Nutrient uptake was the highest in maize and the lowest in tobacco. The pest and disease incidence was the highest in cotton and the total volume of pesticide consumption expressed as kilogram active ingredient per hectare was the highest for ginger and was the lowest for tobacco.

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