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Research Article

AGRICULTURAL INPUTS AND YIELD LEVELS: A STUDY ON ANANTAPUR DISTRICT

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ABSTRACT

The transformation from the traditional method of cultivation to the adoption of latest technology in cultivation may be termed as modernization. The increase in population and rapid urbanization has resulted in reduction in the area under cultivation. Under these circumstances, the present paper objectives are to study the utilization of Agricultural machinery, to study the quantity of subsidized seed distributed to the farmers and the cost of subsidy, to study the consumption levels of chemical fertilizers, to study the yield levels of major crops in the district. In the present paper the utilization of some modern inputs in Anantapuram district is attempted by using secondary data of each of the aspect. The actual number of different types of agricultural machinery used in the district at mandal level has been analyzed for the year 2010-11 and mapped the same. Since, seed subsidy is considered as an important input for agricultural development, the total quantity (in tones) distributed seed, cost of subsidy and number of farmers availed have been analysed at mandal level for the year 2010-11. Consumption of chemical fertilizers, such as Urea, NPK, DAP and others (in tonnage), has been analyzed at mandal level. Lastly the yield levels of major crops have been computed in comparison to the state levels and to find out yield gaps between state and district.

INTRODUCTION

Improved iron Ploughing implements, tractors, threshers, tube wells, chemical and bio-fertilizers and high-yielding seeds, constitute the inputs of new farm technology. The presence of each of these factors of production in terms of quantum, quality and price varies spatially, affecting relationship between them and their effect on the development of individual farms (Morgan and Munton, 1971). Soil moisture cannot be conserved unless the soil is ploughed deep with the help of iron-made soil scratchers. Thus, it can be seen that a farmer has to make use of iron-made implements and machines in one form or another for boosting his agricultural production. Nevertheless, many farmers continue to use age-old implements. Agriculture also requires for its improvement other specialized appliances, such as harrows, seed drills, threshers and sprayers. Plant protection machines are a prerequisite for the cultivation of high-yielding varieties. Fertilizers are still sprayed manually, a method which is technically unsound as it may lead to excessive and uneven distribution of fertilizers. There is therefore, need for introducing modern innovations in this context in agriculture, such as seed-cum-fertilizer drills, etc. High-Yielding seed breeding technology is a revolutionary transition from age-old tradition to innovation. The green revolution sweeping the agricultural economies of the developed countries is essentially the outcome of the use of improved high-yielding varieties of different crops. The degree of yield-certainty and the profitability from Investment in newer inputs are generally higher in regions where rainfall reliability is high and irrigation is controlled and assured. The transformation from the traditional method of cultivation to the adoption of latest technology in cultivation may be termed as modernization. The increase in population and rapid urbanization has resulted in reduction in the area under cultivation. Under these circumstances, increase in agricultural productivity could be achieved only by the adoption new technique in farming.

The Green Revolution of the seventies in food crops resulted in higher production through an improvement in per hectare yield and to that extent, helped to save land (Swaminathan, M.S. 1990), Anantapuram District, for example, produced 2.10 lakh tonnes of Paddy during 1965-66 from 2.05 lakh hectares. This was before the advent of the high yielding varieties. In 1988-89, the farmers harvested about 5.58 lakh tonnes of Paddy from about 2.34 lakh hectares. To harvest 5.58 lakh tonnes of paddy at 1964 yield levels, the district would have needed nearly 3.53 lakh hectares of additional land. Unfortunately, the fruits of agricultural modernization have not been shared equally by all regions and by all crops. The high growth in agricultural

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production has been concentrated in a few pockets, while more areas continue to wallow in stagnation. The concentration on the improvement of crop yield levels has also been laid on food grain crops especially Paddy, while the large number of crops are still persisted with poor yield levels in many parts. Consequently, the agricultural modernization has increased the disparities in both between regions and crops. According to Moonis Raza (1978) the process of agricultural development in India, is essentially a function of differential doses of technological inputs interacting with environmental constraints of varying severity under the inhabiting influence of institutional factors of different intensities. In view of spectacular spatio-temporal variations in the performances of certain crops due to differences in the intensities of agricultural modernization, it is essential to focus on the study of changing patterns of yield levels and yield gaps. Such a study helps to design crop planning for a cyclone prone area like Anantapuram District, and to lessen both the yield gaps and regional disparities in crop yield levels. Hence, here an attempt is made to study the changing trends in the yield levels of important crops and to identify the yield gaps in individual crops (A. Krishna Kumari, 1991).

The main objectives of the present study are: To study the utilization of Agricultural inputs and the quantity of subsidized seed distributed to the farmers and the cost of subsidy.

To examine the consumption levels of chemical fertilizers and to study the yield levels of major crops in the district.

Data and Methodology: In the present study the utilization of some modern inputs in Anantapuram district is attempted by using secondary data of each of the aspect. The actual numbers of different types of agricultural machinery used in the district at mandal level have been analyzed for the year 2010-11 and mapped the same. Since, seed subsidy is considered as an important input for agricultural development, the total quantity (in tones) distributed cost of subsidy and number of farmers availed have been analysed at mandal level consumption of chemical fertilizers, such as Urea, NPK, DAP and others (in tonnage), have been analyzed at mandal level. Lastly the yield levels of major crops have been computed in comparison to the state levels, to find out yield gaps between state and district.

RESULTS OF THE STUDY

Agricultural Machinery in Anantapuram District: A variety of machinery is being used in Anantapuram district ranging from wooden ploughs, Steel ploughs, Cultivators, seed-cum-fertilizer drills, sugarcane crushers and manually operated sprayers or dusters. There are only 9 of power operated sprayers in the district.

Fig-1 shows distribution of Wooden Ploughs in Anantapuram District: The total number wooden ploughs used in the district for the year 2010-11 are estimated as 1, 24,207. Of these very high quantity (>4000) of wooden ploughs are noticed in Madakasira (4912), Kundurpi (4793), Nambula Poolakunta (4411), Vajrakarur (4361) and Pamidi (4249). High concentration (3000-4000) are reported in 8 mandals, moderate (2000-3000) concentration in 12 mandals, low (1000-2000) in 25 mandals and very low (<1000) in 12 mandals of the district during the study period wooden ploughs have not been reported in Yadiki mandal.

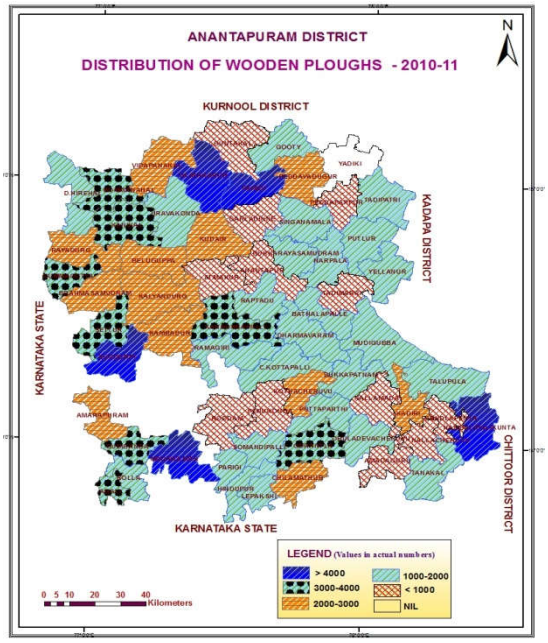

Fig 1

Fig-2 reveals that distribution of Steel ploughs in Anantapuram District: The total number of steel ploughs reported in the study area is 73,358. Very high (>4000) concentration is registered in only Pamidi (4906) mandal followed by high (3000-4000) concentration in Vajrakarur (3435), Settur (3302) and Kundurpi (3268) mandals. Moderate concentration of steel ploughs has been found in 7 mandals, low (1000-2000) in 22 mandals and very low (<1000) in 29 mandals of the district. Steel ploughs are not reported in Nallacheruvu mandal.

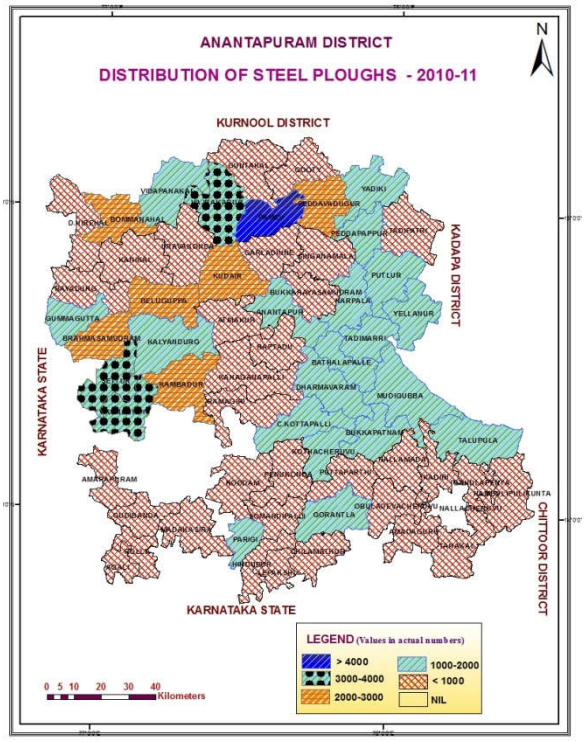

Fig 2

Fig-3 shows distribution of Cultivators in Anantapuram District: There are about 1,27,804 cultivators have been

reported in the district during the study period. Very high (>4000) quantity of cultivators are registered in Pamidi (5146), Vidapanakal (4665), Kanekal (4591), Vajrakarur (4358) and N.P.Kunta (4284) mandals. In about 8 mandals, high (3000-4000) concentration moderate (2000-3000) in 15 mandals, low (1000-2000) in 21 mandals and very low (<1000). In 13 mandals is found. In Nallacheruvu mandal, zero number of cultivators is reported.

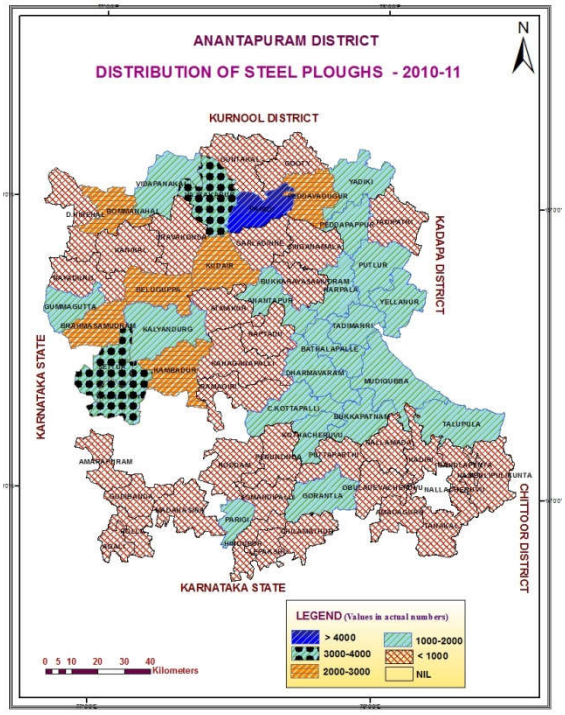

Fig 3

Fig-4 presents distribution of Seed cum Fertilizer drills in Anantapuram District: About 86,240 seed cum fertilizer drills have been found in the district. Very high (>4000) numbers of seed come fertilizer drills are observed in Vajrakarur (4312) mandal. High (3000-4000) concentration is noticed in Pamidi (3999), Kundurpi (3794), Peddavadugur (3255) and Settur (3175), medium concentration (2000-3000) in 12 mandals, low(1000-2000) in 18 mandals, very low (>1000) in 25 mandals is reported. Seed cum fertilizer drills are absent in Kothacheruvu, Amarapuram and Nallacheruvu mandals.

Fig-5 reveals distribution of Sugarcane Crushers in Anantapuram District: The total numbers of sugar crane crushers in the district are estimated as 1429. As the area under sugarcane cultivation is very limited with only 0.02 percent (243 hectares) to the total cropped area, the number of sugarcane crushers are also limited, compared to other machinery. High (>100) quantity of crushers are seen in Vidapanakal (391), Tanakal (385) and Dharmavaram (110) mandals. Moderate (50-100) concentration is noticed in Gorantla (70), Yellanur (67), Bukkapatnam (61) and Raptadu (53). Low (<50) concentration of sugarcane crushers has been observed in 31 mandals of the district. In about 25 mandals, crushers are completely absent.

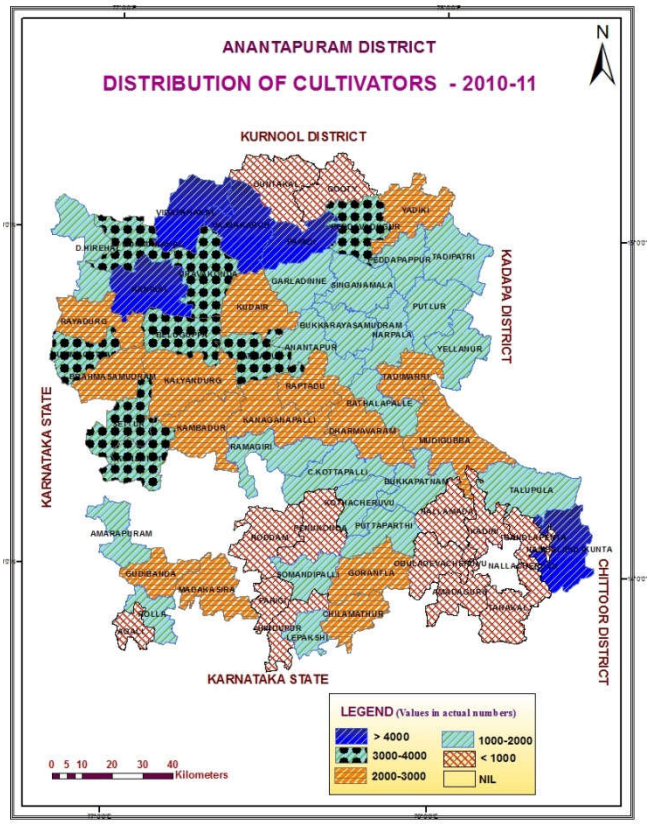

Fig 4

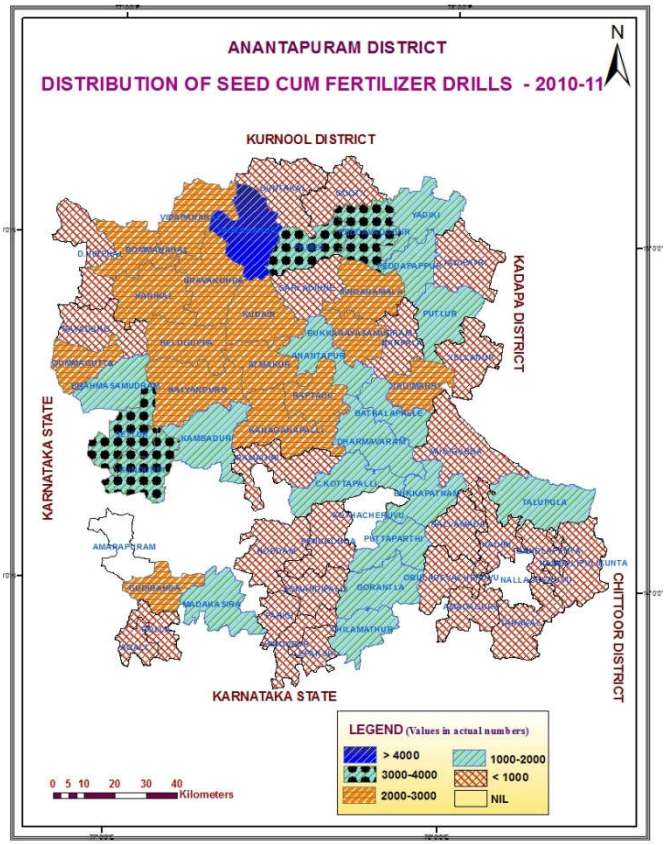

Fig 5

Fig-6 shows distribution of Manually operated Sprayers/Dusters in Anantapuram District: In Anantapuram District, the total number of manually operated Sprayers/Dusters is accounted as 581 during the study period.

High (>100) quantity has been found in Tadimarri (287) and Anantapuram (105) mandals. Moderate (50-100) concentration is completely absent in the study area and in about 12 mandals, low (<50) concentration is observed. Most of the mandals (49) of the district are not having manually operated sprayers/dusters.

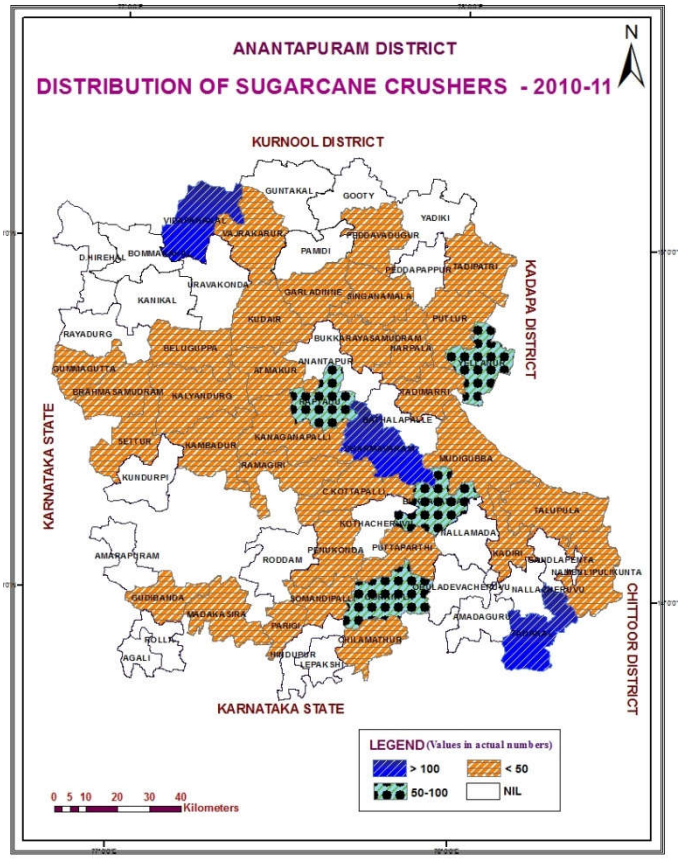

Fig 6

Fig-7 Distribution of Subsidized Seeds in Anantapuram District: An amount of 51418.3 tones of subsidized seeds have been distributed to the farmers in the study area. The total cost of the subsidy amounts to 6676.7 lakh rupees and the total farmers benefitted were 803677. Of the total subsidized seeds, Groundnut seed subsidy occupy major share of 99.78 percent. It reveals the dominance of Groundnut in the total subsidy and also in the cropping of study area. The other crops which are getting the subsidized seeds are Soyabean (0.19%), Redgram (0.02%) and Maize (0.004%) with an in significant total share of only 0.22 percent to the total subsidized seed tonnage. With regard to mandal wise distribution of subsidized seeds in the study area during 2010-11, very high (<2000 tonnes) quantity is found in Kalyandurg (2038.55 tonnes) with a total cost of 288.99 lakh rupees, and the farmers benefitted are 22651. High (1500-2000) quantity is noticed in Kambadur (1617.28 tonnes) with a total cost of 213.29 lakh rupees and the total farmers covered are 26416. Moderate quantity (1000-1500) of subsidized seed is reported in 14 mandals, low (500-1000) in 38 mandals and very low (>500 tonnes) quantity in 9 mandals of the study area.

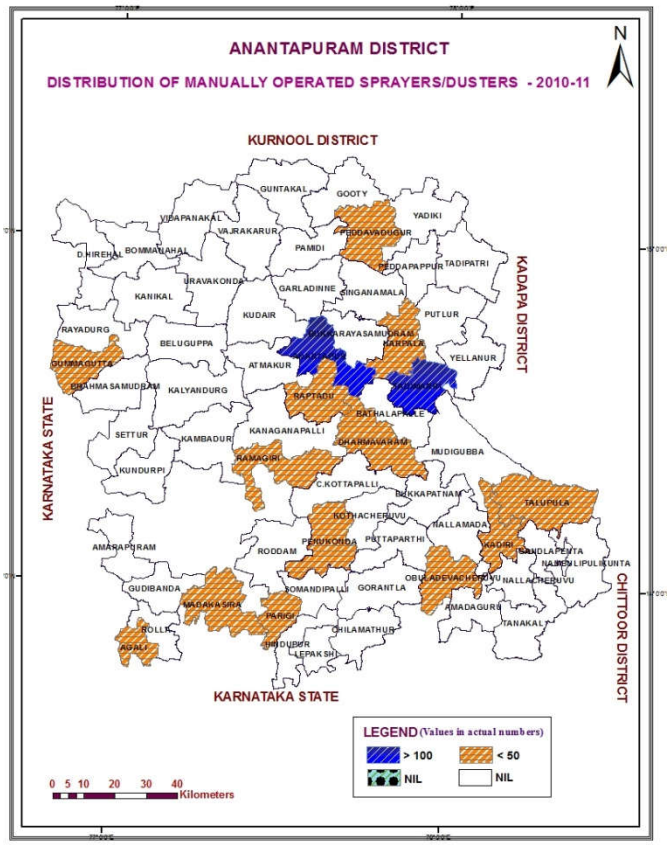

Fig 7

Fig-8 presents consumption of chemical fertilizers in Anantapuram District: To keep cultivated plants healthy, it is necessary to apply fertilizers to the soil. Plants, as they grow, extract nutrients from the soil. Unless these nutrients are replenished, plants will eventually cease to grow. In nature, nutrients are returned to the soil, when plants die and decay. However, this does not occur with cultivated plants. When the cultivated plants are harvested, the nutrients that the plants extracted from the soil are taken away. To keep the soil productive, it is necessary to replace these nutrients artificially. These artificial nutrients are called as chemical fertilizers. "Nitrogen" is the first major element responsible for the vegetative growth of plants above ground. With a good supply plants grow sturdily and mature rapidly, with rich dark green foliage. "Phosphorus", being the second major element in plant nutrition is essential for the healthy growth, strong roots, fruit and flower development and greater resistance to disease. The third major plant nutrient "Potassium Oxide" is essential for the development of strong plants. In fact, it helps plants to resist diseases, protects them from the cold and protects during dry weather by preventing excessive water loss. A variety of chemical fertilizers are being used by the farmers to increase their farm production in the study area during 2010-11. Among them, Urea, Nitrogen-Phosphorous-Potash(NPK), Di Ammonium Phosphate(DAP), Sulphate of Potash, Potassium Nitrate, Mono ammonium phosphate, Mono Potassium phosphate, Calcium Nitrate, Ammonium Nitrate, Sodium Nitrate, Zinc Sulphate etc. About 1,39,915 tonnes of different chemical fertilizers have been used in the study area during 2010-11 in about 8,99,911 hectares of cropped area. Of the total tonnage of chemical fertilizers, Urea consumption is 26.15% (36589 tonnes), NPK consumption is 28.86 %(40382

tonnes), DAP consumption is 21.72 %(30393 tonnes) and other chemical fertilizer consumption is 23.26% (32551 tonnes) NPK consumption is relatively more compared to other chemical fertilizers.

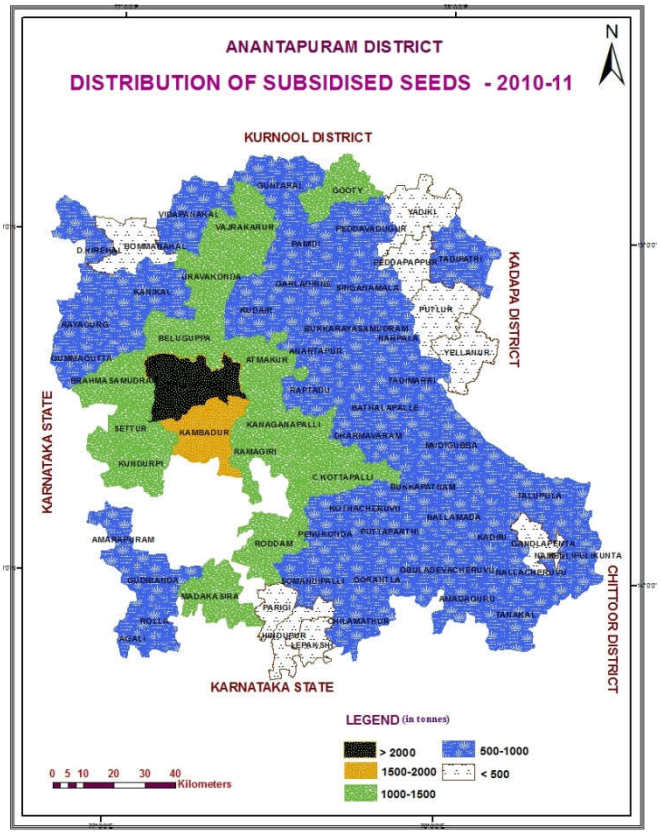

Fig 8

Fig-8 presents consumption of NPK in Anantapuram District: Consumption of Nitrogen-Phosphorus-Potash is more in the district accounting for 40,382 tonnes (28.86%) to the total tonnage of chemical fertilizers. Very high (>800 tonnes) quantities of NPK consumption is reported in 22 mandals with a maximum in Uravakonda (1292.7 tonnes) followed by Vajrakarur (1254.6 tonnes), Vidapanakal (1236.7 tonnes), Kalayandurg (1163.9 tonnes), Settur (1029.8 tonnes) etc. High consumption (600-800 tonnes) is observerd in 9 mandals, medium consumption (400-600 tonnes) in 17 mandals, and low consumption(200-400 tonnes) in 11 mandals and very low consumption (<200 tonnes) in 4 mandals of the study area.

Fig-9 shows consumption of Urea in Anantapuram District: Urea, a solid compound containing 46 percent Nitrogen is an essential nutrient to the plants. In Anantapuram District very high consumption (<800 tonnes) of urea is found in 14 mandals, with maximum in Gooty (962.5 tonnes) followed by Kalyandurg (941.1 tonnes), Uravakonda (933.4 tonnes), Brahmasamudram (927.5 tonnes), Tadipatri (923.6 tonnes), Settur (914.6 tonnes) etc. High consumption(600-800 tonnes) is noticed in 16 mandals, moderate consumption (400-600 tonnes) in 19 mandals, low consumption(200-400 tonnes) in 11 mandals and very low consumption(>200 tonnes) of Urea is observed in Parigi, Somandepalle and Hindupur during 2010-11.

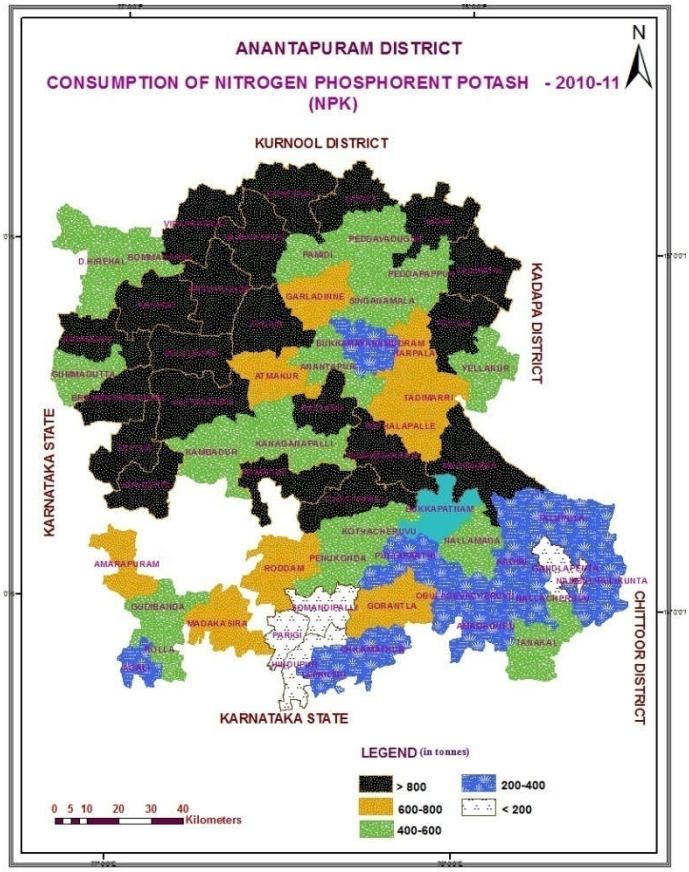

Fig 9

Fig-10 presents consumption of DiAmmonium Phosphate (DAP) in Anantapuram District: DiAmmonium Phosphate is another important chemical fertilizer used by the farmers of Anantapur District.

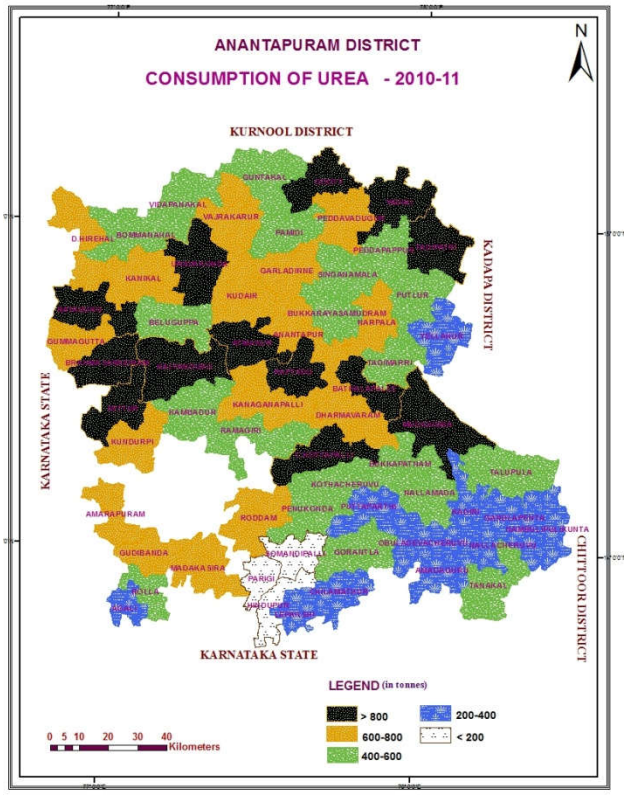

Fig 10

During the year 2010-11, very high consumption (>800 tonnes) is reported in Vidapankal (1184 tonnes), Uravakonda (1152.2 tonnes), Kanekal (1072.1 tonnes), Kalyandurg (986.6 tonnes) and Vajrakarur (907.6 tonnes). High consumption(600-800 tonnes) is registered in 15 mandals of the district, medium consumption (400-600 tonnes) in 17 mandals, low consumption(200-400 tonnes) in 19 mandals and very low consumption (<200 tonnes) of DAP is found in 7 mandals of study area.

Fig-11 presents consumption of other Fertilizers in Anantapuram District: Apart from the major nutrients, the plant needs some other nutrients depending on the quality of the soil. They are Sulphate of Potash, Potassium Nitrate, Mono Ammonium Phosphate, Mono Potassium Phosphate, Calcium Nitrate, Ammonium Nitrate, Sodium Nitrate, Zinc Sulphate etc. The consumption patterns of other fertilizers are as fallows. Very high (>800 tonnes) consumption is observed in 13 mandals, with a maximum in Kalyandurg (1305.9 tonnes), followed by Kanekal (1218.9 tonnes), Uravakonda (1025.1 tonnes) etc during the study period. High consumption (600-800 tonnes) in 7 mandals, medium consumption(400-600 tonnes) in 15 mandals, low consumption(200-400 tonnes) in 23 mandals and very low consumption (<200 tonnes) in 5 mandals as depicted in .

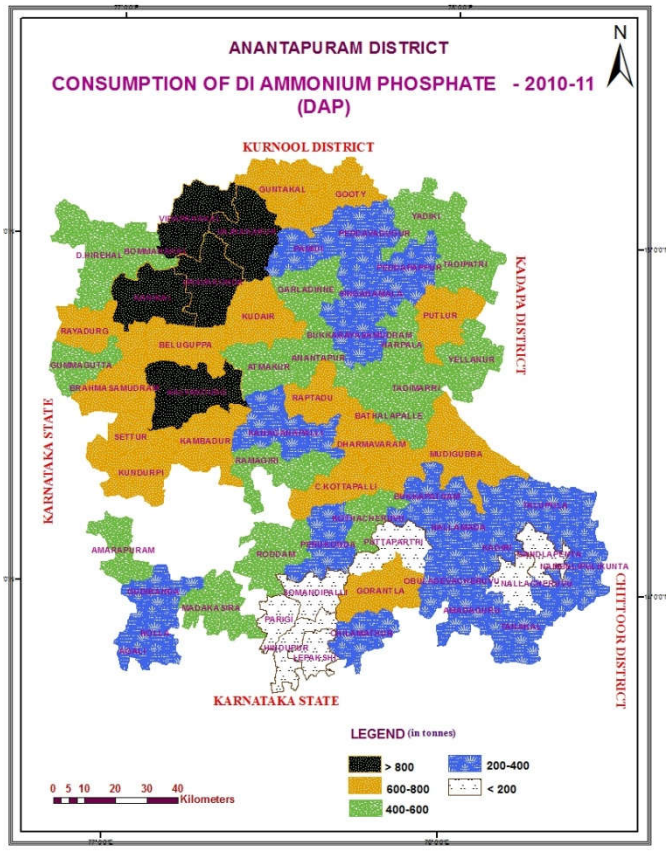

Fig 11

Fig 5.12 presents the patterns of Average Consumption of total Chemical fertilizers per hectare in Anantapuram District: The average consumption of total chemical fertilizers i.e., NPK, Urea, DAP and other fertilizers has been computed as the percentage of total tonnage of all chemical fertilizers used in the study area to the total cropped area. In Anantapur district, the total tonnage of chemical fertilizers consumed during the year 2010-11 is 1,39,915 tonnes and the total fertilized area is 8,99,911 hectares only. The average consumption of chemical fertilizers is estimated as 119 kg per hectare in Anantapur district. Only 76.33 percent of total cropped area is being consumed chemical fertilizers. At mandal level, the pattern of average consumption of total chemical fertilizers per hectare in the study area is as follows. High consumption (>150 kgs/hectare) is reported in 53 mandals with a maximum in Kambadur (180 kgs/hectare) followed by Bathalapalle (177 kgs/hectare), Nallamada (175 kgs/hectare) and others. Moderate average consumption (100-150 kgs/hectare) of chemical fertilizers is found in 10 mandals and less consumption (<100 kgs/hectare) in zero mandals as shown in Fig 5.12.

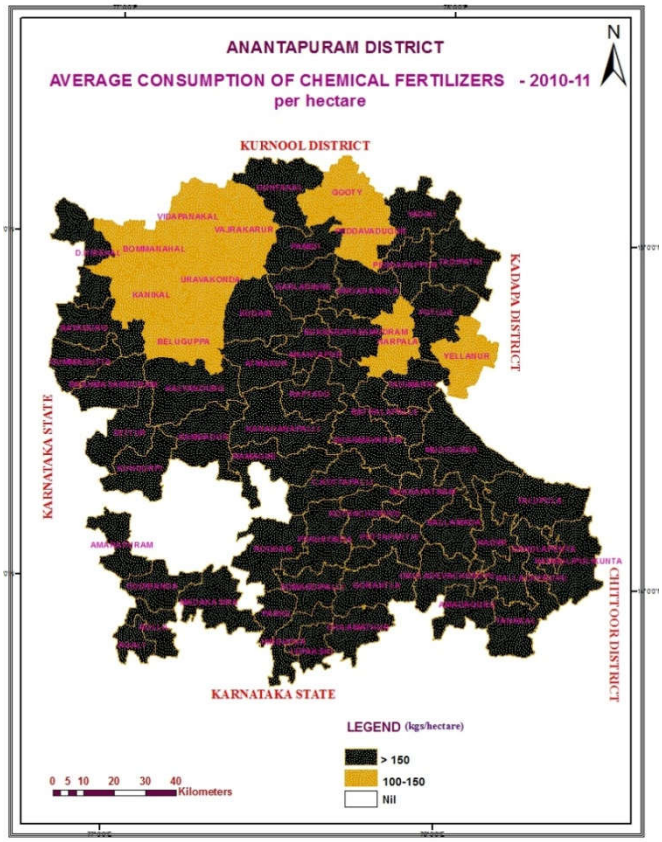

Fig 12

Tabl-1 presents the Yield levels Yield gaps and production of major crops in Anantapuram District: In Anantapuram district, Groundnut is the foremost crop, cultivated mostly as a rain fed crop in Kharif season. The irrigated ground nut crop to the total ground nut cropped area of the district is only 3.42 percent. Still, both in terms of area and production, the district tops the total Andhra Pradesh. In the yield levels also, Anantapuram district is getting 170 4kgs/hectare when compared to the state's average groundnut yield of 898 kgs/hectare. There is a positive gap of 806 kgs/hectare between the study area and the state. It shows the dominance of groundnut cultivation in Anantapuram District.

Table 1 Production of Major crops in Anantapur District, 2010-11

S.No.	Crop	Production in '000 tonnes		Percentage to State's Production
		Anantapur District	Andhra Pradesh State	
1	Groundnut	481	1457	33.00
2	Bengalgram	74	667	11.09
3	Redgram	11	265	4.15
4	Paddy	171	14419	1.18
5	Sunflower	14	160	8.75
6	Jowar	10	308	3.25
7	Maize	94	3953	2.38
8	Cotton	3	3890	0.08
9	Ragi	4	NA	NA
10	Horsegram	1.2	NA	NA

Source Hand book of Statistics, Anantapuram district, 2010-11

Spatially, Bengal gram is the second most important crop in the district. About 781 kgs/hectare yields are noticed in the study area during the year 2010-11, against state's average yield of 1142 kgs/hectare. A negative gap of -361 kgs/hectare is reported between the district and state's yield. Red gram, a third important crop in the district, is reported with only 169kgs/hectare of yield against state's average yield of 415 kgs/hectare with a negative gap of -246 kgs/hectare. Paddy, which is basically an irrigated crop, occupies fourth place in the district with an area of only 5.07 percent to the total cropped area. On an average, about 1783 kgs/hectare yield of Paddy is observed against the state's average of 3035 kgs/hectare during the year, 2010-11. A negative gap of -1252 kgs/hectare is found in paddy crop. Lack of sufficient irrigation facilities reflected in the yield levels of paddy. Another important crop, Sunflower's yield level is 799 kgs/hectare against the Andhra Pradesh average of 713 kgs/hectare. There is a positive gap of 86 kgs/hectare regarding to Sunflower yield. In the Jowar crop, a yield of 653 kgs/hectare is registered in the district against state's average yield of 1212 kgs/hectare with a total gap of -559 kgs/hectare. In the case of maize also a negative gap of -907 kgs/hectare is reported in the study area with an actual yield of 6105 kgs/hectare as against state's average of 7012 kgs/hectare. Cotton also recorded with -124 kgs/hectare of yield gap. A positive yield gap of +176 kgs/hectare and +15 kgs/hectare has been observed in the case of Ragi and Horse gram crops, respectively.

On the whole, regarding to yield levels and gaps, positive yield gap is registered in only 4 major crops, namely groundnut (+806 kgs/hectare), Ragi (+176 kgs/hectare), Sunflower (+86 kgs/hectare) and Horse gram (+15 kgs/hectare) in Anantapuram district against their respective state's average yields. A Negative yield gap is reported in 6 major crops, such as, Paddy (-1252 kgs/hectare), Maize (-907 kgs/hectare), Jowar (-559 kgs/hectare), Redgram (-246 kgs/hectare), Cotton (-124 kgs/hectare) and Bengal gram (-36 kgs/hectare) in the study area against their respective state's average yields. With regard to production levels of major crops in Anantapuram district, Groundnut crop tops the list with a total production of 4, 81, 000 tonnes occupying 33 percent share in the state's total groundnut production. The second major crop is Bengal gram with 74,000 tonnes, accounting for 11.09 percent to the state's total Bengal gram production.

Sunflower is third major producing crop in Anantapuram district with a total production of 14,000 tonnes occupying 8.75 percent of state's total sunflower production. Red gram (4.15%), Jowar (3.25%), Maize (2.38%), Paddy (1.18%) and Cotton (0.08%) are other crops in percentage order to the share of their respective crop production levels of state.

CONCLUSION

The economy of Anantapuram district is pre dominantly dependent on agricultural activities despite of drought-conditions. Hence it is essential to achieve optimum utilization of every piece of land available water resources. In order to improve and conserve, surface and groundwater resources, new techniques, modernization of agricultural inputs have to be adopted such as iron ploughing implements, tractors, threshers, tube wells, chemical and bio-fertilizers and high-yielding seeds, constitute the inputs of new farm technology. Village level mass awareness programmes to educate rural people and farmers on the above said programmes and to suggest suitable and economically viable cropping pattern through modern agricultural techniques. Negative yield gaps have been noticed in 6 major crops against state's average yields. These gaps have to be balanced to some extent.

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