Agropedology 2014, 24 (02), 282-291

PERSPECTIVE AGRICULTURAL LAND USE PLANNING FOR PUDUCHERRY REGION

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Abstract : Perspective agricultural land use plan envisages estimating the demand for land resources for medium to long term period and identifying the broad categories or class of land use that are appropriate for achieving maximum benefits and attractive to the farmers. Any perspective plan for land use requires full assessment of the present status, the likely impact of historical, existing and intended policy intervention. Socio economic constraints and potentials for agricultural development were analysed for Puducherry. The potential for food supply and food demand were estimated using standard procedures. ARIMA model was used for forecasting the demand for land use. The area under non-agricultural use is projected to increase to 169344 ha in 2015 and 21697 in 2025 leaving only about 8000 ha or less for agricultural use. Puducherry region is covered by alluvial soils most of which do not have constraints that will limit profitable agriculture. Some soil series such as Thutipet, Gingee, Mannapattu and Kottuchery occurring over a small area have moderate to severe limitations for profitable agriculture. Appropriate actions to be taken to ensure rice cultivation includes soil based nutrient management, timely plant protection measures, easy availability of institutional credit, mechanization of transplanting, weeding and harvesting, improving storage and processing facilities, subsidized/free supply of inputs, increasing minimum support price at regular intervals, free education and transport to farmers families and extension education about the proper land use for achieving sustainable land use and food security to Puducherry Region.

Key Words: *Perspective Planning, Land Use Change, Land Use Modeling, Socio economic constraints*

Introduction

Analysis attempting to arrive at perspective on land use is confronted with multifunctional use of land and this category of economic activities at times works at cross purposes (Government of Karnataka, 2001). Emphasis has been on improving continuously the productive capacity of land and preventing the degradation. The land has to be utilized consistent with ecology and its capability with justified economic returns. The National Land Use Board was set up in 1983. The National Land Use Conservation Board, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India outlined the National Land Use Policy in 1988. The basic objectives of the land use policy as enunciated therein have to be kept in view while preparing perspective plan. The choice of the land use/crop depends on the macro (policy) parameters that are decided at the regional and national level (Vadivelu *et al.*, 2008). In India the earlier studies reported by different authors on land use changes and perspective planning showed different approaches in addressing land use planning. The studies carried out by Nadkarni and Deshpande (1979) observed that the climatic and institutional factors are crucial in determining the land use pattern. They further argued that the extent of land use is also influenced by technological

changes over a period of time. The technological changes ignited intensive cultivation resulting in conversion of marginal lands through capital intensive cultivation. This has resulted in high capital output ratio and efficient cultivation.

Ratna reddy (1991) analyzed the land use pattern and the extent of underutilization of land in Andhra Pradesh. According to him land use pattern was mainly influenced by the extent of adoption of modern technology. However, he concluded that it will not be applicable to drought prone regions where technological diffusion is highly limited. Giri (1966) in his study on the pattern of land use observed that the land use is influenced by the demand for land for cultivation of crops, forest and fodder to meet food requirement of the people and the raw material requirement of the industries using agricultural products as raw material. Sharma and Pandey (1992) examined the trends and dynamics of annual shift of land use in the various states of the country. They observed a general declining trend in area under permanent pastures, grazing land and barren and uncultivable land. The land requirement for non agricultural use was met from the area under cultivable waste. Current and other fallow land registered a positive growth in most of the states. Ratnam (1989) in his study on "Land use pattern in South India" employed a regional model for allocating different crops based on parity prices of the crops. The author has suggested replacing cereal crops with high value crops to exploit the land use capacity to maximum extent. Nasurudeen, P and Ramasamy (2002) made an attempt on preparing perspective land use for agricultural development of Tamil Nadu. Statistical model was used for estimating the growth rates and for projecting aggregate land requirement for food production by 2010 AD. Optimum land use plans were suggested for seven agro ecological regions using the linear programming model. To meet the aggregate demand for agricultural produce and area required for agricultural production by 2010 AD, they suggested need for improving the crop yield.

Lathika and Ajith (2005), analysed the growth trends in area, production and productivity of coconut of all the coconut producing states and union territories in India, for which the period was divided into two sub-periods as phase I (1951 to 1995) and phase II (1996 to 2002). With this background, this paper is an attempt to synthesize land use plan for Puducherry .

Perspective Agricultural Land Use Planning: A case study of Puducherry Region

The Union Territory of Puducherry consists of four regions namely, Puducherry, Karaikal, Mahe and Yanam with a total area of 492 sq. km (as per the records of the Survey of India). These four regions, however, are not geographically contiguous. The Puducherry and Karaikal Regions are situated on the East Coast surrounded entirely by the state of Tamil Nadu, Mahe is situated on the West Coast within Kerala, and Yanam lies on the East Coast surrounded by Andhra Pradesh. The present study deals with Puducherry region which is situated on the Coromondel coast between 11°47' to 12°03' N Latitudes and 79°39' to 79°50' E Longitude. It is bounded on the north, south and west by South Arcot district of Tamil Nadu and on the east by the Bay of Bengal. It covers an area of 29377 ha and consists of 179 villages. The major crops grown are paddy, sugarcane, tapioca, green gram and groundnut.

The Union Territory of Puducherry has been experiencing a significant shift in its economy since sixties. Agriculture now accounts for less than 10 per cent of Gross State Domestic Product (GSDP) in Puducherry as against 30 per cent only three decades ago. In spite of this change, which is indicative of the transition to a more diversified economy, agriculture continues to be a main source of livelihood for 25 per cent of the workforce and their dependents in terms of food needs and employment opportunities. Conversion of farm lands to uses other than agriculture such as industries, educational institutions, residential and commercial shopping centers continuously displaces farm workers to other sectors and even towards unemployment. This unplanned change in land use pattern is happening at an increased speed despite the fact that region is endowed with fertile soils and presence of adequate surface and ground water for irrigation.

The changes brought in by switch over to commercial crops, export crops, horticulture and floriculture has further reduced the demand for manual labour particularly women labour. This means that women are getting excluded from opportunities of livelihood in these new modes of agriculture. Further, diversion of land for non agricultural purposes such as infrastructure development and setting up of Special Economic Zones (SEZs) is leading to widespread loss of livelihood, which is not compensated by other employments that are generated, particularly in case of women. With this background, the present paper is an attempt to analyze the temporal dynamics in urban growth, land use pattern, agricultural performance and rural livelihood in the Puducherry Region.This paper is based on the study conducted during 2006 to 2008 (Vadivelu *et al*. 2008) and uses the data for the year 2003-04 as current data. It emphasizes that social and economic considerations drive the agricultural land use pattern when the soil and water resources pose no limitations.

Approaches in forecasting land use changes and estimation of food grain requirement

Autoregressive Integrated Moving Average (ARIMA) model uses extrapolation for forecasting and like any such methods, it requires only the time series data on the variable under forecasting.

The study is based on the data obtained from the various issues of economic surveys by Directorate of Economic and Statistics, Puducherry. The forecasting in the present study uses the time series data of nine fold classification of land use, cropping pattern, irrigation sources and food grains productions (cereals, pulses, oilseeds and commercial crops separately) from 1963-64 to 2003-2004. The cereals and pulses include the following crops: (i) Cereals: rice, sorghum, pearl millet, maize, finger millet and small millets. (ii) Pulses: Green gram, pigeon pea and other pulses. (iii) Oilseeds: Groundnutand (iv) Commercial crops: Sugarcane.

The data on population was collected from the census of population (different series). Population projections are based on Sample Registration System by the technical group, 1996, Registrar General India, using 1996 as the base year and it is collected from Statistical out line of India 1999-2000. The data on balanced diet for various groups is based on the recommendations of dietary allowances prepared by the Indian Council of Medical Research (ICMR, 1984).The estimation of food grains requirement for a particular age group depends on the per capita requirement at retail level of that age group and its corresponding population. To convert per capita food grains requirement at retail level by the physiological level, a tentative allowance of 10 per cent is made for kitchen and other wastages (ICMR, 1984).

The per capita requirement at retail level for a specific age group

= Per capita requirement for specific age group at physiological level × 1.1.

The requirement (S_{ij}) either for cereals or pulses for the particular i^{th} age group of the j^{th} region for a year is,

$S_{ij} = r_{ik}G_{ijt}$ x 365 where, i = 1, 2, 3.... n (age groups) and j = 1, 2, 3.... m (region) and, r_{ik} refers to per day per capita requirement of k^{th} food group (cereals or pulses) for i^{th} age group, G_{ijt} refers to the population of i^{th} age group for j^{th} region at time t. Summation of S_{ij} gives the total requirement at state level for all the age groups *i.e.* the total requirement (R) either for cereals or pulses for a year for Puducherry at time t is,

$$Rt = \sum_{i=1}^{n} Sij$$

here 'j' refers to Puducherry region and 't' refers to the projection years *i.e.* 2015 or 2025.

As per ICMR (1984) norms the per day balanced diet requirement by age groups for different food stuffs is given for 1–3 years, 4–6 years, 10–12 years (boys), 10–12 years (girls), adults(men) and adults (women). The estimation of food grains requirement requires the corresponding population figures for the groups, which were estimated, as on 1st March, with the help of projections based on Sample Registration System by the technical group, 1996, Registrar General, India.

In order to construct the population, the Compound Annual Growth Rate (CAGR) was calculated. On the basis of this CAGR, the total population figures for the year from 2001 to 2015 and 2025, as on 1st March, were constructed which helped out to estimate the population figures by age groups.

Present and Future Projections of human population

It could be seen from the Table 1 that, there is a positive growth from 1961 to 2001. The growth rate for the period 1961 to 1971 was 32.78 per cent for male, 30.15 per cent for female while the growth rate for the same period for the total population of Puducherry region was 31.47 per cent.

Table 1 Human population growth in Puducherry region

Particulars	Years			
	1961-71	1971-81	1981-91	1991-01
Population growth (in per cent)	31.47	30.65	36.97	20.88
Population density (person /sq km)	1172	1531	2098	2536

The growth rates of the total population for the periods from 1971 to 1981, 1981 to 1991 and 1991 to 2001 were 30.65 per cent (with 30.78 % male and 36.8 % female), 36.97 per cent (with 37.14 % male and 36.8 % female) and 20.88 per cent (with 19.29 % male and 22.52 % female), respectively. The different family planning programmes have resulted in the decline of decadal population growth rate from 31 to 21 per cent. The density of population in the year 1961 was 882 per sq km. and followed an increasing trend showing progress over the years from 1160 (during 1971) to 1515 (during 1981) and 2076 (during 1991). The density of population for the year 2001 was 2509 persons per square kilometer (Table -1).

For the purpose of estimating future population growth in the Puducherry region, the decadal population growth rate of 20.88 per cent for 1991-2001 was considered. It could be seen from the Table 2 that, population growth projections indicated positive rates for both the study periods. The projected total population for 2015 is 965413 of which male constituted 475664 nos. (49 %) and female constituted 490101 nos. (51 %). Similarly for 2025 the total human population was estimated to be 1166949 of which 567397 nos. (49 %) are males and 600495 nos. (51 %) are females.

Table 2 Population growth projections for Puducherry region, 2015 & 2025 (in nos)

Particulars/ year	2001	% to Total	2015	% to Total	2025	% to Total
Male	369428	50.24	475664	49.27	567397	48.62
Female	365904	49.76	490101	50.77	600495	51.46
Total	735332	100.00	965413	100.00	1166949	100.00

Projection based on 2001 Growth Rate

Trends in land use pattern in Puducherry region

Non-arable land (land put to non agriculture use, barren and uncultivable land, permanent pastures and grazing lands and land under miscellaneous trees and groves) constitutes approximately 40 per cent of the total geographical area in the year 2003-04 (Table 3). Due to increased urbanization and industrialization the land use that gains significant importance in future years is the non-agricultural use. Puducherry region had 25.66

per cent of the total area under non-agricultural use during 1962-63 and it followed an increasing trend reaching 11224 ha (38.21 %) during 2003-04.

Trends in size of barren and uncultivable land during 1962-63 to 2003-04 in the region showed fluctuation between 67 and 77 ha during the period (Table 3). Land under permanent pastures and grazing is an important category of land use which fulfills the fodder requirement of the region. There has been a total decline in the already small land area under this category affecting livestock development. i.e., during 1962-63 it was 15 ha (0.05 % of TGA) and later on there is no land reported under permanent pastures and grazing land. In Puducherry region the land under miscellaneous tree crops had drastically reduced from 2035 ha (6.93 % of TGA) during 1960's to 410 in 2003-04 with a maximum area of 2231 ha reported in 1983-84.

Trends in arable land in Puducherry region

As regards the area under cultivable waste, it was 1.69 per cent of the total geographical area during 1962-63 and then progressively increased to 1.84% in 1972-73, 2.44% in 1982-83 and 3.30 percent in 1992-93 (Table-3).

The area under current fallow also increased progressively from 157 ha during 1962-63 to 1121 ha during 1972-73 and 1620 ha during 1982-83 (Table-3). Thereafter, it declined to 1161 ha during 2003-04.

Other fallow lands which are not sown for a period of more than one year but less than five years are insignificant in the intensively cropped Puducherry region. However, it occupied 1865 ha in 1992-93 for reasons not known

Table 3 Change in land use pattern in the Puducherry region

Land use	(Per cent to TGA)			Projected land use (ha)	
	1963-64	1983-84	2003-04	2015	2025
Non agricultural use	25.66	27.49	38.21	16934	21697
Barren land	0.23	0.26	0.23	70	70
Permanent pastures	0.05	0.00	0.00	0	0
Miscellaneous trees	6.93	7.59	1.40	410	410
Cultivable waste	1.69	2.44	5.35	2264	3071
Other fallow	1.53	1.04	3.71	0	0
Current fallow	0.53	5.51	5.65	1525	1525
Net area sown	63.38	55.66	45.46	11813	10529
Area sown more than once	36.16	39.13	46.78	12855	12855

While the land area not put under cultivation has been increasing, the net sown area in the region obviously declined over the years i.e., from 63.38 per cent (18618 ha) during 1962-63 to 62.57 percent (18381 ha) during 1972-73, 55.66 percent (16352 ha) during 1982-83, 55.74 percent (16375 ha) during 1992-93 and about 45.46 percent (13354 ha) during 2003-04 periods. The cultivated lands are diverted for non-agricultural uses and it exerts pressure on existing land base to meet the increased need of agricultural products. To meet such increased demand the area sown more than once increased from 10593 ha during 1962-63 to 13744 ha in 2003-04. Even then, the gross sown area showed a mixed downward trend. The gross cropped area was 29241 ha in 1962-63 and 30424 ha in 1972-73 a four percent increase. Later on, it declined to 27846 ha during 1982-83, a decline of 8.47 per cent (Table 3). Between the two periods, 1992-93 and 2003-04, the gross cropped area showed only a marginal decline despite a steep decline in net sown area, due to increased cropping intensity.

Projection of area under non agricultural use for 2015 and 2025

The demand for land as space increased over time because of the increased population and industrialization. Land is demanded for a number of non-agricultural uses like industries, roads, houses, schools, markets, recreation and other infrastructural facilities. With the limited land space availability, it is necessary to look into the current status of land use for non-agricultural purposes as a base to serve for future planning. It is projected that the area under non-agricultural uses will go up from 11224 ha 2003-04 to 16934 ha in 2015 an increase of 50.88 per cent and it is likely to increase again by 28.13 per cent during 2025 (to 21697 ha) if acquisition of fertile cultivated land continues at the present date to meet the increased demands of urbanization and industrial and educational estates (Table 3).

Projection of area under arable land for 2015 and 2025

The projected arable land by 2015 and 2025 for Puducherry region was worked out (Table 3). The projected gross cropped area will be 26781 ha by 2015 (with a decline of 1.17 %) and will remain unchanged by 2025. The cultivable waste land will increase by 44.13 percent and 35.61 percent by 2015 and 2025 period respectively and the other classes of arable land viz., other fallow land, current fallows, net sown area and area sown more than once follow a decreasing trend for the periods 2015 and 2025.

Changing irrigation potential

The Puducherry region, traditionally, has been irrigated by canals, tanks and wells. Recent times have seen a changing trend in the sources of irrigation. The net area irrigated by different sources of irrigation increased from 14598 ha in 1962 to 15407 ha in 1972 with an increase of 5.54 percent area. But, later it showed declining trend with an area of 13966 ha during 1982 and 11625 ha during 2003 (Table 4), a decrease of 9.35 and 16.8 percent respectively. The area under canal irrigation was declining over the decades and no area was under canal irrigation after 1982. The tube wells are the major source of irrigation over the last four decades.The irrigation potential in the region was projected for the years 2015 and 2025 based on the growth of irrigation in the last four decades (Table 4). There will be decrease in the net area irrigated respectively by 7.48 per cent and 6.74 per cent between 2003 - 2015 and 2015-2025. The area under tube well has drastically reduced by 18.51 percent and 27.47 percent during 2003-2015 & 2015-2025, respectively.

Table 4 Changing irrigated area (ha) in the Puducherry region

Source of Irrigation/Years	Changing irrigated area (ha)		
	1962	**1982**	**2003**
Canals	732	0	0
Tanks	6034	100	0
Tube wells	7623	13815	11623
Ordinary well	142	0	0
Other sources	67	51	2
Net Area Irrigated	14598	13966	11625

Projected food demand in Puducherry region

Among the food grains, the requirement of cereals was the highest at 162092 tonnes for the year 2015 and 195930 tonnes by 2025. Milk is the next important food item whose requirement is 52856 MT during 2015 and 63890 MT during 2025 (Table 5).

Awareness to consume higher quantity of fruits and vegetables is increasing. The demand for roots and

tubers, pulses, oils and sugar and jaggeries is also on the increase. The demand for these items shows that, vegetables requirement is 35238 MT and 42594 MT during 2015 and 2025 respectively followed by roots & tubers with a requirement of 17619 MT and 21297 MT during 2015 and 2025 respectively. The projection made for pulses and oils & fats also showed an equal demand of 14095 MT and 17037 MT for 2015 and 2025 respectively. The requirement of sugar and jaggery will be 10571 MT and 12778 MT respectively during 2015 and 2025 period.

Table 5 Projected food demand in Puducherry region (in Tonnes)

Food Items	Projected demand for 2015	Projected demand for 2025
Cereals	162093	195931
Pulses	14095	17037
Vegetables	35238	42594
Roots & Tubers	17619	21297
Milk	52856	63890
Oils & fats	14095	17037
Sugar & Jaggery	10571	12778

Cereal cultivation: Rice is the major cereal crop and its yield ranges from 24 to 37 q/ha. In most soils (Sanyasikuppm-Pondicherry, Bahour-Palayam, Sedarpet-Thutipet, Bahour-Mannadipet, Kuppam, Mannadipet and Bahour-Villianur soil series association) the yield gap is 10 q/ha and less, and the target yield of 45 q/ha can be achieved with proper soil based management of nutrients and plant protection. The net return of rice cultivation is low, about Rs. 372 to 8116. The net return on many soils is less than 50 per cent of the cost of cultivation. In some cases it is even 3 per cent of cost of cultivation. Therefore, rice cultivation is not considered by many as a profitable proposition. The survey also showed that 80 per cent of the farmers do not want to cultivate rice due to availability of better alternative, higher labour requirement and higher cost of cultivation. Cultivating rice is not only the need of the farmers but also need of the nation. Such fertile alluvial lands cannot be permitted to go out of rice cultivation.

Cultivation of rice over a gross area of 18926 ha (2003-04) generates employment to the tune of 2,081,860 man-days. Agriculture engages those rural populations who cannot find jobs in other industries. There are about 20000 farm families of which 75 per cent are marginal farmers. Agriculture, particularly rice cultivation is the livelihood for them.

At the present productivity level rice production is 68134 tonnes, which is 55 per cent of the demand. In order to conserve the existing agricultural lands for meeting the food demands, the Puducherry government has to restrict the conversion of agricultural land to non-agricultural purposes.

Table 6 Suggested area under food crops for Puducherry regions

Particulars	Existing land use (area in ha)	Suggested Land Use (area in ha)	
	2003-04	2015	2025
Cereals	18926	23288	17466
Pulses	585	5822	8733
Oil seeds	2646	5822	8733
Gross cropped area	22157	34932	34932
Cropping Intensity (%)	166	274	274

Note: Net sown area: 13354 ha in Puducherry

Table 7 Food production potential in Puducherry region

Particulars	Existing production(t)	Projected production(t)		Self sufficiency (%)		
	2003-04	2015	2025	2003-04	2015	2025
Cereals	68134	116440	122262	55.2	71.8	62.4
Pulses	562	8733	17466	5.2	62.0	102.5
Oilseeds	4763	17466	34932	44.4	123.9	205.0

Assumptions:
1. Productivity of rice, 5 t/ha in 2015 and 7 t/ha in 2025
2. Productivity of pulses, 1.5 t/ha in 2015 and 2 t/ha in 2025
3. Productivity of oilseeds, 3 t/ha in 2015 and 4 t/ha in 2025

The present level of cropping intensity (166 %) has to be increase to 274 per cent by the year 2015 and maintaining thereafter (Table 6). This is possible by growing rice over an area of 23288 ha in two seasons and pulses in 5822 ha and oilseeds in 5822 ha during any of the non rainy season.

The rice productivity has to improve to the level of 5 tonnes/ha to maintain 70 per cent self-sufficiency in the year 2015. To maintain 60 per cent self-sufficiency in 2025 the productivity is to be improved to 7 tonnes/ha. If we count some loss of area due to conversion, the rice productivity has to be improved to a level higher than 7.0 tonnes/ha which may not be an unrealistic estimate in a well-organized farmer-state co-operated.

Almost all the interviewed farmers reported bemoaned lack of processing, storage facilities and low market prices. Farmers are cultivating rice not only for their livelihood but also for the welfare of the state. Therefore, the state also has a responsibility towards the farmers. Construction of storage facilities, arranging regulated market facility and assuring well thought of support price are the responsibilities of the state.

Cultivation of pulses: Back gram is the major pulse crop grown in rotation with rice and green gram replaces black gram in some farms. However, pulses are grown over a small area, 585 ha, using stored soil moisture. The demand of pulses is about 10,000 tonnes which may grow to 14000 tonnes in 2015 and 17000 tonnes in 2025. The area has to be increased to 5822 ha in 2015 and 8733 ha

in 2025 under pulse production. The average yield obtained is 9.6 q/ha, which is lower than the yield expected for the package of practices recommended. To achieve the self sufficiency of 60 per cent by 2015 and 100 per cent by 2025 the yield level has to be increased to 1.5 and 2 tonnes/ha , respectively (Table 7).

Most of the soils such as Gorimedu -Kalapet, Sedarpet, Kuppam, Sanyasikuppam-Pondicherry, Mannadipet, Bahour-Mannadipet, Bahour-Villianur and Bahour-Palayam series (association) are suitable for pulses. These soils do not have any serious limitation to grow pulses between January and April. Use of residual soil moisture with supplementary irrigation is recommended to improve the productivity of these soils.

The present production of pulses (562 tonnes) can meet just 5 per cent of the demand. Even to meet 25 per cent of the demand, the required production is 3500 tonnes in 2015 and 4300 tonnes in 2025. What is required is increasing the area under pulses to 5822 ha in 2015 and 8733 ha in 2025.The productivity has to be improved to 1.5 t/ha in 2015 and 2 t/ha in 2025. These goals are easier to achieve if concerted efforts are made in the area of crop improvement and soil based management. If these recommendations are realized, Puducherry will achieve 62 per cent self sufficiency in 2015 and 100 per cent in 2025. Providing storage facilities and assuring remunerative support price for any agricultural produce are the responsibilities of the state.

Cultivation of oilseeds: Groundnut is the major oil seed crop grown in the state. Oil seeds occupy about 2650 ha in the region. The average productivity is 18 q/ha. The productivity and net returns vary with soils. The net returns in many cases is much lesser (<50%) than the cost of cultivation. Soil based nutrient and water management will improve the productivity and thus the net returns.

The soils of Puducherry vary in their productivity. The soils (soil series association) namely Gorimedu-Kalapet, Ayyankuttipalayam, Kuppam, Gingee- Penniar, Sanyasikuppam-Pondicherry, Mannadipet, Bahour-Mannadipet, Bahour-Palayam are suitable for groundnut though the productivity may vary slightly.

The current production of oil seeds (groundnut) in Puducherry is 5186 tonnes from 2646 ha whereas the demand of oil 10736 tonnes which works out to about 25000 tonnes of oil seeds. The demand for oil seeds will increase to 35000 tonnes in 2015 and 43000 tonnes in 2025. The state should plan the production to meet atleast 50 per cent of the demand through increasing the area under oilseeds and the productivity as well. The productivity is to be improved from the present 20 q/ha to 30 q/ha in 2015 and 40 q/ha in 2025 through crop improvement and soil based package of practices. The area under oil seeds is to be increased to about 5800 ha in 2015 and 8700 ha in 2025. Storage and processing facilities and remunerative support price are to be provided by the state. Diversification with other oilseed crops like sunflower, soybean can also be useful.

Cultivation of sugarcane: The current productivity of sugarcane varies widely between 87 and 148 t/ha depending on soil characteristics and management. Though the net return is attractive, ranging from Rs, 28000 to 70000/ha, the investment (cost of cultivation) is high, (>Rs. 50000 /ha) and therefore, marginal and small farmers cannot take up this huge investment. Moreover, the area under sugarcane is decided by the requirement of the sugar factory in the area. The productivity of sugarcane can be improved by proper nutrient and water management and the net returns by a remunerative support price.

Cultivation of Vegetables: Cultivation of vegetables is taken in small parcels of the cultivated area. Most of the soils of the area are suitable for vegetable cultivation after the monsoon paddy. The soils delineated as Gorimedu-Kalapet, Ayyankuttipalayam, Sanyasikuppam-Pondicherry, Mannadipet, Bahour-Mannadipet, Bahour-Villiar and Bahour-Palayam are suitable for growing vegetables on residual moisture in the rice fallow with minimum supplementary irrigation.

The current demand of vegetables is about 27000 tonnes and supply about 15000 tonnes. The demand is expected to grow to 35000 tonnes in 2015 and

43000 tonnes in 2025. Provision of cold storage facilities in key villages and establishment of processing industries by the state will encourage farmers to grow vegetables in larger area than at present.

Conclusions

The suggestions made here are biased towards agriculture and long term welfare and livelihood security of local population. Though suitability and need should decide the land use, other considerations seem to influence it in the U.T. of Puducherry. The area under non-agricultural use is projected to increase to 169344 ha in 2015 and 21697 in 2025 leaving only about 8000 ha or less for agricultural use. The conversion of land for non-agricultural uses not-based on actual needs but based on speculative business cannot be covered under scientific land use plan. The Govt. of Puducherry may regulate the conversion through legislation, effective execution and extension methods.

The region is covered by alluvial soils most of which do not have constraints that will limit profitable agriculture. Some soil series such as Thutipet, Gingee, Mannapattu and Kottuchery occurring over a small area have moderate to severe limitations for profitable agriculture. Other soils are suitable for all the crops grown in the area such as paddy, sugarcane, groundnut, black gram, green gram and horticultural crops. Since this region receives high rainfall leading to water stagnation during the Northeast monsoon (October to December) rice is the best suited crop for this season. Appropriate actions to be taken to ensure rice cultivation are: soil based nutrient management, timely plant protection measures, easy availability of Institutional credit, mechanization of transplanting, weeding and harvesting, improving storage and processing facilities, subsidized/free supply of inputs, , increasing minimum support price at regular intervals, free education and transport to farmers families and extension education about the proper land use.

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Received : Aug, 2014 *Accepted : Nov, 2014*