

CHAPTER 3

AGRICULTURE

The Union Territory of Pondicherry has been experiencing a significant shift in its economy since the seventies. As the Pondicherry economy has grown, economic activity has moved away from agriculture to industries and services. Agriculture now accounts for less than 10 per cent of GSDP in Pondicherry as opposed to 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, i.e 25 per cent of the workforce¹ still depends on agriculture and allied activities. A key objective of the government's agenda for future development should be to achieve balanced and sustainable growth in this sector with a more diversified agricultural base integrated with environmental safeguards.²

While reviewing the recent achievements and current agricultural situation in the Pondicherry, this chapter highlights the potential of the sector and its constraints, and outlines future development perspectives. The perceptions outlined foresee possibilities to achieve major improvements in agricultural production, employment, and incomes through further increases in yields and intensification, and diversification of production systems particularly focused on the development of agro-processing enterprises.

Growth and Employment

The agricultural sector has registered a declining relative contribution to NSDP over the last few decades and a declining absolute contribution as well in the recent past. While

¹ In 1991, 35 per cent of the workforce were in agriculture. The indication is, therefore, that the nineties has witnessed a significant shift in the occupational structure away from agriculture. Though it is likely that agricultural employment might decrease further, in absolute terms a sizeable per cent of the workforce will still remain part of agriculture.

² There are significant differences in terms of the percentage of people employed in agriculture and allied activities in the four regions of Pondicherry. In the Union Territory as a whole, 36.35 per cent of the total workforce is engaged in agriculture. In Pondicherry region 35.35 per cent are engaged in agriculture, whereas in Karaikal 46.12 per cent are engaged in agriculture. The percentage of people engaged in agriculture in Mahe and Yanam is 8.33 per cent and 29.74 per cent respectively. These figures pertain to the 1991 Census as no data are yet available from the 2001 Census. However, Mahe and Yanam are considered to be totally urban in 2001.

the agricultural sector accounted for 34.46 per cent of total NSDP in 1970-71, it declined to 18.61 per cent in 1980-81, 12.70 per cent in 1990-91 and 7.08 per cent in 1998-99.³

The absolute value of agriculture has in fact also declined between 1993-94 and 1998-99. Whereas the value of agriculture was Rs. 13,559 lakh in 1993-94, it was only Rs. 10,483 lakh in 1998-99.⁴ The growth, therefore, during this period was -5.54 per cent (Table 3.1) This negative growth rate was due primarily to the negative growth of agriculture and animal husbandry (-7.75), but also the decline of fisheries (-4.06). Only forestry and logging grew, namely at 2.46 per cent.

Table 3.1
Estimates of GSDP (Rs. Lakh) and Growth Rates (%) for Agriculture,
1993-94 to 1998-99

Items/Year	1993-94	1998-99	Growth Rate
Agriculture & Animal Husbandry	7319	5597	-7.75
Forestry & Logging	869	979	2.46
Fishing	6577	5186	-4.06
Mining & Quarrying	-	-	-
Primary Sector	14765	11762	-5.54

This decline has not been matched by an equal decline in terms of its contribution to employment. Although the percentage of main workers engaged in agriculture declined from 49.96 per cent of the total workforce in 1971 to 39.23 per cent in 1991, the decline has been a relatively modest ten percentage points as compared to the more than 20 Percentage point drop in terms of contribution to GSDP. In absolute terms, Moreover, the number of people engaged in agriculture in fact rose from 70,461 to 1,02,709 between 1971 and 1991.

³ The relative contribution of the agricultural sector to NSDP between 1970-71 and 1990-91 was based on data provided by the Directorate of Economics and Statistics, Govt. of Pondicherry and was calculated using 1980-81 constant prices. Though we have generally used CSO data for calculating NSDP growth rates, this data was not available for the earlier period. This should not make much of a difference in terms of relative contribution. The sectoral contribution of agriculture in 1998-99 was, however, calculated using CSO data.

⁴ The 1998-99 value was calculated at 1993-94 constant prices.

Recent NSS data show, however, that agricultural employment has decreased from 1,06,847 in 1993-94 to 94,230 in 1999-2000 as would be expected with negative growth rates in GSDP. The annual growth rate was -1.78. In terms of total employment, the contribution of agriculture declined from 34.81 in 1993-94 to 25.83 in 1999-2000 (Table 3.2). As can be seen from Table 3.2, the decline in agricultural employment was due to the decline in agriculture in urban areas.

Table 3.2
Employment in Agriculture, 1993-94 to 1999-2000

Employment/Year	1993-94		1999-2000	
	Number	% of Total Employment	Number	% of Total Employment
Agriculture	106847	34.81	94230 (-1.78)	25.83
Agriculture - Rural	76512	64.76	81672 (0.94)	59.90
Agriculture - Urban	30335	15.82	12558 (-11.84)	5.51

Source: Calculated from NSS 50th and 55th Rounds.

Note: The numbers in parentheses are the growth rates between 1993-94 and 1998-99.

Land Use

Despite the negative overall growth rate in agriculture, it remains an important source of livelihood for people in Pondicherry and must register significant growth rates in order to improve the standard of living of those engaged in it. In order to examine how this may be brought about, it is necessary to identify both the constraints faced by agriculture and its potential. The decreasing relative contribution of agriculture to GSDP is partly due to the decreasing area under agriculture. Net sown area has declined substantially from 29,908 ha or 63.88 per cent of total area in 1980-81 to 24,863 ha or 50.90 per cent in 1997-1998. The area under non-agricultural use now constitutes 15,069 or 30.85 per cent as opposed to 11,211 ha (23.94 per cent) in 1980-81. Moreover, fallow land has increased from 1,751 ha (3.74 per cent) to 4,975 ha (10.18 per cent), suggesting that more of the land might remain uncultivated (Table 3.3).

Table 3.3
Land Use in the Union Territory of Pondicherry, 1980-81 and 1997-1998

Category/Year	1980-81	1997-98
Non-Agricultural Use	11,211 (23.94)	15,069 (30.85)
Barren and Uncultivable Lands	82 (0.18)	114 (0.23)
Grazing and Permanent Pastures	73 (0.16)	27 (0.06)
Miscellaneous Trees	2,379 (5.08)	832 (1.70)
Culturable Waste	1,418 (3.03)	2,962 (6.06)
Other Fallows	352 (0.75)	3,273 (6.70)
Current Fallows	1,399 (2.99)	1,702 (3.48)
Net Area Sown	29,908 (63.88)	24,863 (50.90)
Total Area	46,822 (100.00)	48,842 (100.00)

Operational Holdings

In addition to a declining area under agriculture, operational holdings are very small in size (Table 3.4). Out of total operational holdings, 75 per cent are less than one hectare (marginal) and another 15 per cent between 1 and 2 ha (small).

Table 3.4
Operational Holdings in Pondicherry, 1999-2000

Size of Holdings	No. of Holdings	% to Total Holdings	Area	% to Total Area
< 1	26,096	75.48	9,299	27.94
1-2	5,011	14.49	7,105	21.35
2 +	3,468	10.03	16,874	49.81
Total	34,575	100.00	33,278	100.00

Source: Government of Pondicherry, Abstract of Statistics, 2000-2001.

The reasons for such small size holdings are both decreasing area under agriculture and fragmentation of existing operational holdings. It is unlikely, therefore, that agriculture can benefit from any economies of scale at present. Nevertheless, with proper technology and choice of crop, small holdings can be made quite productive. Hence, despite these constraints, the potential for agriculture remains. As mentioned above, Pondicherry has certain natural advantages in terms of agriculture. The Union Territory is endowed with abundant rainfall due to it receiving both the southwest and northeast monsoons. It also has abundant water for irrigation. While Pondicherry is mainly dependent on groundwater, Karaikal is fed by the Cauvery River system. Moreover, the Pondicherry and Karaikal regions have mostly deep, red alluvial soils of relatively good fertility levels.

These advantages have meant that three cropping seasons are the norm in the Union Territory. Paddy, the principal crop, is cultivated during *kuruvai*, *samba* and *navarai*. In the *kuruvai* season (known as *sornavari* in the Pondicherry region), short duration crops are grown between June and September. In the *samba* season, long duration varieties are grown - white ponni being the most common paddy variety. *Navarrai* is the summer crop grown between February-March and June-July.

STATE OF AGRICULTURE

Although agricultural growth has been negative in the nineties, it has made considerable progress on a number of fronts which bodes well for the future. Improved crop production technologies have been adopted, crop and irrigation intensities have increased and a network of support institutions and infrastructure have been developed.

However, for agriculture to grow in the future, these achievements must be seen alongside certain disconcerting trends. Agricultural productivity has remained low and not increased perceptibly during the last ten years. In addition, there are emerging signs of land degradation, poor soil management and excessive exploitation of water resources. This section examines the overall performance of agriculture with a view to the future.

Cropping and Irrigation Intensity

A number of indicators are often used to examine the performance of agriculture. Two among them are the cropping intensity and the irrigation intensity. Table 3.5 gives details of net and gross cropped area, net and gross irrigated area and cropping and irrigation intensities. As can be seen, both the gross cropped and gross irrigated areas have declined over time, most probably because of the decline of net sown area. While the gross cropped area has declined from 53,981 ha in 1980-81 to 42,398 ha in 1999-2000, the gross irrigated area has declined from 26,046 ha to 21,628 ha. Cropping and irrigation intensities have also declined though they have picked up slightly from 1990-91 onwards. This seems to suggest that the productive potential of the land has declined. Nonetheless, the percentage of irrigated area which stands at 79.35 per cent is far higher than in neighbouring Tamil Nadu where the percentage of irrigated area was only 51.84 per cent in 1996-97.⁵

Table 3.5
Cultivated and Irrigated Area in Pondicherry, 1980-81 to 1999-2000

Item/Year	1980-81	1990-91	1999-2000
Net Area Cultivated	29,908	27,294	24,402
Gross Area Cultivated	53,981	43,738	42,398
Cropping Intensity Ratio	1.80	1.60	1.74
Net Irrigated Area	26,046	22,435	21,628
Gross Irrigated Area	42,005	33,525	33,643
Irrigation Intensity Ratio	1.61	1.49	1.56

Sources of Irrigation

Despite Pondicherry's achievements in terms of irrigation (reflected by relatively high irrigation intensities), the fact that the intensity ratio has actually declined over time

⁵ While the proportion of irrigated area is considerably higher in Pondicherry than in Tamil Nadu, it is worth pointing out that it has not increased (in percentage terms) over the last three decades.

suggests that there are certain constraints in terms of irrigation. The different regions of the Union Territory not only have different sources of irrigation, but are also confronted with different problems. While Karaikal depends significantly on canal irrigation, tank irrigation is more prominent in the Pondicherry region. Groundwater irrigation, however, has become the major source of irrigation in the Union Territory as a whole.

Canals

Approximately 25 per cent of irrigated area in the Union Territory is under canal irrigation. Canal irrigation is prominent in Karaikal as the Cauvery River flows through the region. Due to the availability of canal irrigation, almost all the land in the Cauvery delta is under paddy cultivation.

A number of emerging problems, however, are there in terms of canal irrigation. First of all, as water flows to Karaikal from Tamil Nadu, the availability of water is increasingly becoming problematic. Inadequate water is often released from the Mettur Dam. This is likely to continue in the future given the on-going inter-state dispute over the amount of water to be released by Karnataka. It will be necessary, therefore, for farmers downstream to change their cropping pattern in the future to less water intensive crops.

Other emerging problems in Karaikal are those of poor drainage downstream and salinization. The former has resulted in siltation and flooding. Salinization is due to excessive pumping of water and consequently sea water ingress. Both these problems will require managerial initiatives which involve local irrigation organisations in the use and management of water resources as well as the establishment of water use regime which takes into account the actual availability of water.

Tanks and Ponds

There are 84 tanks distributed in the Pondicherry and Karaikal regions of the Union Territory which irrigate land in 61 revenue villages and an area of approximately 5,000 ha. Out of the 84 tanks, there are 54 system tanks and 25 non-system tanks. The system tanks receive water from two major rivers, viz. the Gingee and Ponnaiyar rivers and three

major tributaries, viz. the Pambai, Malattar and Kuduvaayar rivers. Moreover, there are certain tanks which irrigate ayacuts in Pondicherry which are located in Tamil Nadu.

The ayacut of many of these tanks has decreased steadily over the years. Only in 40 of the 84 tanks in Pondicherry is the whole ayacut under cultivation. Five tanks are on the verge of extinction and the Usteri tank, one of the largest system tanks with a total ayacut of 1,538 ha, has lost almost one-third of the ayacut area.

Tanks have fallen into a state of disrepair for a couple of reasons. A main reason is that tank beds have been either been encroached upon for cultivation purposes or converted for non-agricultural purposes. The former is more so the case in rural areas and has happened because traditional tank irrigation management organisations have become dysfunctional. The conversion of tanks for non-agricultural purposes is more so the case in urbanising areas.

The neglect of ponds is equally important but has received less attention. Ponds are prominent both in the Pondicherry and Karaikal area and can be an important source of irrigation in the future. Tanks can also help recharge groundwater. Moreover, both tanks and ponds, moreover, are important not only in terms of irrigation, but also in terms of allied activities such as fisheries.

Given the rich heritage of tank and pond irrigation in the Union Territory, it is imperative that both these sources are revived. Currently, a European Commission scheme to revitalise tanks is underway. Central to the success of this scheme and any other scheme is the involvement of local communities in the management process.

Groundwater

Since the seventies, groundwater irrigation has expanded phenomenally in Pondicherry. There are over 8,000 tubewells in the Pondicherry and Karaikal regions. Most of these tubewells are deep tubewells averaging a depth of 100 meters and often being as deep as 200 meters. The net area commanded by the wells is about 15,000 ha. Thus, for every 2 ha there is a tubewell. Getting an electrical connection for the tubewells is quite easy. Moreover, now most of the tubewells are with submersible pumpsets and electricity

supply is available 24 hours a day. Groundwater is, therefore, often used without any restrictions.

A recent study by the Agriculture Department revealed that about 40 per cent of excess water is utilised which has resulted in the decline of the water table. Besides for declining water tables, excessive pumping of groundwater can result in intrusion of sea water in the coastal areas. This is slowly becoming a major issue of concern in both the coastal belts of Pondicherry and Karaikal. Although groundwater use is very difficult to monitor, effective steps will have to be taken if the depletion of the groundwater table is to be stopped in the future such as charging for use of electricity.

Pollution

Groundwater

The quality of groundwater has also deteriorated, especially near industrial areas. Industrial pollution confronts agriculture in two ways: through groundwater pollution and surface water pollution. The problem in Pondicherry is particularly bad because industrial areas are spread throughout the Pondicherry and Karaikal regions and often are located close to agricultural areas. For example, groundwater resources of the Pillyarkuppam-Kirumambakkam region is contaminated with toxic chemicals such as arsenic, mercury, nickel and lead.

Major polluting industries include the paper, paint and sugar industries. Paper mills are releasing untreated effluents in closed conduits; effluents consequently seep through pipes and mix with the groundwater. The paint industry has stocked coal tar (a raw material) in open areas which have leached into the groundwater. Other negative externalities also exist. In areas where industries are manufacturing calcium chloride, water has a strong chlorine smell and is white in colour.

Surface Water

Surface irrigation systems are also being polluted. The major culprit in terms of surface water pollution has been sugar mills. Sugar mills have been releasing effluents into canals which are feeding irrigation tanks. In one case, effluents have been released into a canal which is feeding 21 irrigation tanks in the region and the adjoining Villupuram district

tanks. While these are individual examples, they are symptomatic of the wider problem of industrial pollution which needs to be addressed so that agriculture does not have to bear the brunt of the negative externalities.

Fertilizers

The intensity of fertilizer use in Pondicherry is also very high. Generally, increases in productivity have been associated (at least partly) with increasing use of chemical fertilizers. What is noticeable in the case of Pondicherry is that despite the declining area under agriculture, the use of fertilizers has increased from the late eighties to the present. Table 3.6 gives details of the amount of fertilizers used in the Union Territory.

Table 3.6
Quantity of Different Fertilizers Used in Pondicherry (in tonnes)

Year	Nitrogen	Phosphorous	Potassium	Total
1988-89	10,033	3,259	4,896	18,188
1990-91	11,180	4,291	6,430	21,905
1993-94	11,526	3,820	3,933	19,269
1996-97	13,760	4,109	4,356	22,225
1999-2000	12,469	5,673	5,177	23,319

Source: Directorate of Economics and Statistics, Government of Pondicherry, Various issues of the Abstract of Statistics.

While in the short run, chemical fertilizers might indeed increase overall productivity, in the long-run there are potential negative effects of too much fertilizer use, especially in terms of declining land productivity, but also in terms of other negative externalities such as water pollution. The indication already is that the benefits of chemical fertilizer use have been exhausted and the negative impact increasingly apparent - something which needs more attention.

Cropping Pattern

Given this base line scenario of agriculture in Pondicherry, it is important to assess how agriculture has actually performed in the Union Territory over time. Commercialization of agriculture is often considered some sort of a sign of modernization and the switch to non-foodgrains a proxy for commercialization. As can be seen from Table 3.7, foodgrains continue to dominate. Paddy continues to be the main crop, accounting for 60.01 of total

gross cropped area, slightly more percentage-wise than in 1980-81. Millets, however, have declined significantly in terms of gross cropped area. Pulses, which accounted for 12.21 per cent in 1980-81 constituted 13.39 per cent in 1999-2000. What is also evident, however, is that the area under horticultural crops increased from about 10 per cent to over 15 per cent with significant increases in vegetables, fruits and tree crops such as casuarina.

There has been some sign, therefore, of a cropping pattern change which will have long-term commercial potential. Having said that, irrigated crops such as paddy and sugarcane continue to be the most important crops. Given the constraints on water which are likely to arise, it will be necessary to diversify further.

Table 3.7
Cropping Pattern (in ha) in Pondicherry Union Territory, 1980-81 and 1999-2000

Crop/Year	1980-81		1999-2000	
	Extent	% of Total	Extent	% of Total
Paddy	31,722	58.77	25,444	60.01
Millets	3,973	7.36	300	0.71
Pulses	6,591	12.21	5,677	13.39
Groundnut	2,983	5.53	898	2.12
Other Oilseeds	774	1.43		
Sugarcane	1,853	3.43	2,798	6.60
Cotton	826	1.53	357	0.84
Coconut	1,599	2.96	2,214	5.22
Tapioca	752	1.39	365	0.86
Cashewnuts	367	0.68	210	0.50
Bananas & Mangos	494	0.92	499	1.18
Select Vegetables	402	0.74	522	1.23
Other Horticultural Crops	1,645	3.05	3,114	7.34
Total	53,981	100.00	42,398	100.00

Source: Directorate of Economics and Statistics, Government of Pondicherry, Abstract of Statistics, 1980-81 and 1999-2000.

Note: Other horticultural and floricultural crops include certain fruits and vegetables and tree crops such as casuarina. As there is no separate category for fruits and vegetables, this has been calculated by us.

Productivity

Another important indicator relating to the status of agriculture is productivity. Given the large percentage of area under irrigation and the relatively fertile quality of land and soil in Pondicherry, it could be expected that productivity would be high and would have increased over time. Table 3.8 gives details about area and yield of major crops in Pondicherry in 1970-71, 1980-81 and 1999-2000. As can be seen from the table, there are significant differences amongst crops and fluctuations over time. The yield of paddy, has only increased slightly over time from 2,200 kg/ha in 1970-71 to 2,340 kg/ha in 1999-2000. The yield of pulses has also increased slightly. The yield of blackgram and greengram (the main pulses) have increased from 500 kg/ha to 780 kg/ha and 450 kg/ha to 530 kg/ha respectively. The yield of groundnut has increased more significantly from 2,170 kg/ha to 2,800 kg/ha. In the case of sugar cane, however, yields have decreased from 93.83 t/ha in 1970-71 to 84.92 t/ha in 1999-2000. There are signs, therefore, that more water intensive crops such as paddy and sugarcane have not fared well over time.

Table 3.8
Yield (kg) Per Hectare of Major Crops in Pondicherry Union Territory,
1970-71, 1980-81 and 1999-2000

Crop/Year	1970-71	1980-81	1999-2000
Paddy	2,200	2,479	2,340
Blackgram	500	513	780
Greengram	450	499	530
Sugarcane	93.83	78.47	84.92
Groundnut	2,170	1,364	2,800

Note: Sugarcane yield is in tonnes.

Compared to other southern states, Pondicherry's overall record in terms of irrigated crops is mixed. Table 3.9 gives details of yields across southern states for two main crops, paddy and sugarcane. As can be seen, both paddy and sugarcane yields are far greater in Tamil Nadu. In fact, Pondicherry fares worse than all the southern states except for Kerala in terms of paddy yield. In the case of sugarcane yield, Pondicherry fares the same as Karnataka but better than Andhra Pradesh.

It is unlikely, given resource constraints, that productivity of irrigation intensive crops will increase much in the future - even if new hybrid varieties are introduced. On

the other hand, dry land crops might have significant potential. Thus, the emphasis must be on improving hybrid varieties of dry land crops.

The above analysis is important in the context of current agricultural policy in Pondicherry. The main emphasis of government policy is to improve productivity (yield). While there might be potential to do so with new varieties, there appear to be constraints as well. It would appear that it is more likely that yields of dryland crops can be improved. In the case of wet land crops, attention should be paid to groundnut and identifying why yields have stagnated over time for paddy and sugarcane.

Table 3.9
Paddy and Sugarcane Yields in Southern States, 1999-2000

Place/Crop	Paddy (Kg/ha)	Sugarcane (T/ha)
Pondicherry	2,340	94
Tamil Nadu	3,485	134
Andhra Pradesh	2,707	67
Karnataka	2,515	93
Kerala	2,250	-

Source: Varadarajan (2002).

Animal Husbandry and Poultry Farming

Agriculture allied activities such as livestock rearing and fisheries have historically played an important role in the Pondicherry economy. In the early seventies, when agriculture contributed approximately 30 per cent to NSDP, the livestock economy played an important role in terms of manure, milk and draught power and a source of meat, hides and skins. As Table 3.10 indicates, however, the total livestock population has decreased from 3,32,733 in 1972 to 2,41,985 in 1997. This decline has had two distinct phases, between 1982 and 1987 and between 1992 and 1997. In the first phase, the decline in livestock was due primarily to the decline in livestock other than cattle, namely poultry, goats, sheep, buffaloes and pigs. In the second phase, the decline has been mainly due to the decline in cattle.

The main reason for the overall decrease is less availability of land for agriculture and the increasing amount of land under non-agricultural use. The decline of cattle, buffaloes and sheep in particular must be understood in terms of urbanisation and a shift

in the rural economy away from agriculture and allied activities. The decline in terms of poultry could perhaps be because of the large poultry industry in Namakkal.

Table 3.10
Livestock Population in Pondicherry, 1972-1997

Year	Cattle	Buffaloes	Sheep	Goats	Pigs	Poultry	Total
1972	89602 (26.93)	12110 (3.64)	7056 (2.12)	41731 (12.54)	1891 (0.57)	180343 (54.20)	332733 (100.00)
1982	93526 (28.19)	9042 (2.73)	9030 (2.72)	52531 (15.83)	2537 (0.76)	165126 (49.77)	331792 (100.00)
1987	88717 (36.21)	10072 (4.11)	5449 (2.22)	32707 (13.35)	700 (0.29)	107367 (43.82)	245012 (100.00)
1992	92730 (34.10)	7152 (2.63)	3994 (1.47)	44016 (16.19)	849 (0.31)	123198 (45.31)	271929 (100.00)
1997	72769 (30.07)	4042 (1.67)	1923 (0.79)	40719 (16.83)	1256 (0.52)	121276 (50.12)	241985 (100.00)

Source: Government of Pondicherry, Various Issues of the Livestock Census

Although the total livestock population has decreased due to the decline mainly in the numbers of 'desi' cattle, buffaloes, sheep, pigs and poultry, there have been notable improvements in this sub-sector. Crossbred livestock population and dairy development have shown impressive growth. At present, there are some 44,000 crossbred high quality dairy animals accounting for over 80 per cent of the total cattle population. Productivity and production of milk have doubled from 2.5 to 4.7 litres per animal and from 8,400 to 15,800 litres per day respectively over the last 10 years. There have been some shifts as well in the poultry industry with increased focus on broiler production.

Animal husbandry has to be, therefore, a major thrust area of agriculture and allied activities in the future. A continued focus of animal husbandry should be to improve the productivity of livestock so that livestock enterprise becomes economically viable. Poultry farming, on the other hand, can be boosted if the government provides inputs at nominal rates to farmers, making the industry more competitive.

Fisheries

Pondicherry, having a coastal line of 45 km, also has had significant potential in fisheries. Fish (including marine and inland fisheries) production has recorded a sizeable increase

from about 900 tonnes in the mid-fifties to about 4,33,000 tonnes in 2001 although as stated at the outset it has registered a negative growth rate in the nineties.

One would expect, therefore, given its locational advantage, that fisheries in Pondicherry can grow. There is a fishing harbour in Pondicherry which will encourage the development of coastal fisheries. Also with tanks and ponds, there is substantial potential in terms of inland fisheries as well.

A New focus for the future

Given this fairly well-established network of organisations meant to promote agriculture, it should be possible to make agriculture grow in the future despite negative growth rates in the recent past. The fact, moreover, that over 30 per cent of the population still depends on it means that it requires a new thrust. Though signs are (given the scarcity of agricultural labourers) that rural people are getting jobs in other sectors in rural areas, agriculture itself has potential which needs to be tapped.

The newly released Vision 2010 document for agriculture sets forth a number of broad strategies for the future: increasing productivity of agriculture, further diversifying the cropping pattern towards horticultural crops and tree crops, rationalising the use of water resources (including tanks) and strengthening the marketing infrastructure available to the farming community. These are not only viable strategies, but also ones which could provide the necessary stimulus to boost agriculture.

However, for these goals to be translated into practice, they will have to be part of a more comprehensive agricultural policy which aims to establish a new cropping pattern regime and promote a more diversified agricultural sector. For this to be the case, agricultural policy must address both the input and institutional constraints which hamper growth. Input constraints are broadly speaking constraints due to declining productivity of land, soil and water resources. Excessive use of fertilizers and intensive cultivation has resulted in the land losing its productivity. Water, as mentioned above, is becoming polluted due to industrial growth as well as being overexploited by farmers who treat it as a free good. Moreover, while irrigation intensities have increased, traditional sources of

irrigation such as tanks have been neglected. Added to this is the problem of increasing salinization of groundwater due to sea water intrusion.

Institutional problems are of different types. Farmers have been supported with heavy subsidies so that input costs are kept low, artificially boosting a cropping pattern regime which is both water intensive and commercially not viable. On the other hand, where the farmers require support in terms of access to institutional credit, remunerative prices etc., they have not received it adequately. More attention has to also be given to capital formation in agriculture and maintenance of existing assets.

A number of steps to tackle input and institutional constraints are highlighted below - steps which will help make agriculture more productive as well as diverse in nature.

Increasing Productivity through Inputs

As more agricultural land is likely to be converted to non-agricultural use in the future, Pondicherry's thrust must be on productivity-induced growth. Recent crop trials and demonstrations conducted in farmers' fields point to the immediate possibility of doubling current crop yields through: (a) promoting the cultivation of HYVs suited to 'prevailing agro-environmental conditions'; (b) increasing the coverage of the area under the certified quality seeds programme; and (c) adoption of already known improved 'agronomic practices'.

As water is likely to be a constraint in the future, efforts should be made to reduce agriculture's dependence on perennial irrigation sources. The most likely way to do so is to promote the adoption of high yielding hybrid varieties which require less water and chemical fertilizers and are resistant to disease. These varieties can ensure the same or better yields and thus higher income.

Seeds are also a vital input which determine the productivity level of crops. The Department of Agriculture has made efforts to improve the quality of seeds used by farmers. In an attempt to produce quality seeds within the Union Territory, two state seed farms have been set up, one at Madagadippattu (10 ha) in the Pondicherry region and another at Madur (14 ha) in Karaikal. The state seed farm in Madur specialises in the

production of quality paddy seeds, whereas the state seed farm at Madagadippatu is engaged in the multiplication of seeds of paddy, pulses, millets, vegetables etc.

Over the years, new seeds have been distributed to farmers. However, this has been restricted mostly to the seeds of paddy. A lot of scope exists for increasing the usage of certified quality seeds for other crops such as groundnut, pulses, vegetables etc. In fact, the Union Territory has recently set up a Seed Certification Agency to certify seeds which is expected to become functional soon.

Diversifying the Cropping Pattern

Agricultural policy in Pondicherry has clearly focused primarily on paddy cultivation, in other words on irrigated agriculture. While paddy is important to the foodgrain economy, high yielding varieties require a lot of water. The signs are, as illustrated above, that productivity has tapered off and that excessive use of chemical fertilizers has resulted in declining soil quality. Moreover, the promotion of paddy has resulted in the neglect of less water intensive crops such as millets. Pondicherry's main thrust area, therefore, should be to diversify its cropping pattern to less water consuming crops which are more remunerative and risk free, namely horticultural and floricultural crops

Horticultural and floricultural crops can provide more diversity, improve per unit productivity and increase incomes of farmers. The Draft 10th Five Year Plan for Pondicherry stresses the need to increase the area under horticultural crops to 20 per cent of total gross cropped area. Horticultural crops should be introduced in a manner so that inter-cropping and multi-cropping are emphasised. Processing units can be established so that value added products are produced and consequently higher remunerative prices are given to farmers.

The choice of crops will have to be regionally specific. The cultivation of vegetables and groundnut can be given more importance particularly in the Mannadipet, Ariyankuppam and Koravallimedu belts. Floriculture crops like crosanthra and jasmine can be given more importance in the Kalapet, Ariyankuppam and Mannadipet belts and perhaps would have export potential. Fruits such as guava and sapota are also picking up. Vegetable cultivation along the banks of the six rivers in Karaikal could have potential.

Also in the Karaikal region, black gram and other grams can be cultivated with the available moisture after the samba paddy harvest during the month of June. Whereas one acre of paddy yields a net income of approximately Rs. 2,000/, black gram is said to give a net income of Rs. 10,000/-.

Organic Farming

The use of fertilizers and pesticides also needs a new focus. The Union Territory, as mentioned above, is the second highest per capita consumer of fertilizers in the country. Part of the reason for this is the low availability of lands to grow green manure. The consequence of excessive use of fertilizer is declining quality of soil. Farmers need to be motivated to use organic manure, green manure and bio-fertilisers to improve the physical quality of soils and consequently reach high productivity levels once again.

The same is the case for pesticides. Regular use of chemical pesticides leave chemical residues in agricultural produce and decreases resistance to prevailing pests and disease causing germs. Pondicherry has already made efforts in the last 10 years to reduce pesticide use through an integrated management practice. This needs to be continued to reinvigorate the fertility of the soil. Bio-pesticides are eco-friendly and have a higher benefit-cost ratio. They are also compatible with bio-fertilizers. In fact, initiatives are already under way. PASIC has started a bio-pesticide manufacturing unit. Bio-pesticides need to be popularized.

The adoption of bio-fertilisers and pesticides should be part of a move towards organic farming. Organic farming as a concept is slow growing. For it to grow faster, support needs to be given to market the organic produce. The Agriculture Department and PASIC need to help promote organic farming by making it more remunerative for farmers. Organic farming can not only be economically viable, but will also be much more sustainable in the long-run given the declining quality of agricultural land.

Infrastructure and Extension

For many of these changes to take place, the state will have to play a facilitating role. This can be done in a number of ways: by ensuring sufficient and timely inputs, by promoting new technologies, by providing better information to farmers and by enhancing marketing and credit infrastructure. Agriculture and allied departments have a

major role to play in promoting new cropping pattern regimes which will be environmentally more sustainable and potentially more remunerative in the long-run.

Providing Information to Farmers

In order to promote a new cropping pattern regime, farmers should be more aware of its potential benefits. One key aspect to that is making sure farmers have access to better information. Strengthening farm clinics to act as a two-way channel for disseminating agricultural technologies to the farmers and also giving feedback information from the farmers to Krishi Vigyan Kendras. These clinics, moreover, could undertake the documentation of area specific packages and give recommendations for specific areas. Documentation of indigenous technology and sharing it across areas through the use of internet in villages is a possibility. “*Uzhavar Udhaviyagam*” have been established to provide single window assistance to farmers.

The spread of information could be facilitated by the introduction of e-governance. The Draft 10th Five Year Plan has highlighted the need to maximise the use of IT and to train staff to utilise computer systems effectively. Farms clinics should have computers made available to them and data bases must be built up.

Ensuring availability of Inputs

Most inputs for agriculture are made available through PASIC. The timely availability of these inputs is crucial for farmers. At present, when depots have sufficient inputs, there is less demand and vice versa. In order to avoid this type of scenario, organisations such as PASIC should work more closely with farmers organisations such as tank associations, canal water user associations and micro finance groups who can ensure better distribution of these inputs at the right time and also ensure the availability of these inputs to the more needy.

The nature of inputs required itself might be changing. As more and more people are leaving agriculture, there is often a scarcity of farm labourers available. Moreover, with less and less land being available for agriculture, it is necessary for the government to consider popularising mechanisation through implements such as transplanters, harvesters and threshing machines which could increase productivity. The agricultural college could come out with modified farm implements to suit the needs of marginal and

small farmers. As the main constraint to adopting machinery is its high cost, the government should in particular look into the possibility of introducing some capital subsidy.

Other inputs which the state can provide to farmers include threshing floors and threshing cum drying floors. Though both the Agriculture Department and Block Development Office have constructed a number of such threshing and drying floors, farmers need to be provided better access to them. At present, farmers are utilizing well-developed village roads and even major roads for threshing and drying because threshing floors are not being maintained properly. Community owned and managed floors can be promoted as it will help in the long-term management and maintenance of them. Special attention needs to be given to ensuring that marginal farmers reap the benefits of these structures.

The government should focus on improving farm roads so as to reduce the burden on the farmers. Many problems arise for farmers in transporting agricultural produce from the field to the main road. Many fields have to be crossed to reach main roads. Here too emphasis can be placed on community managed roads.

Post-Harvest Technology and Marketing

As is well-known, post-harvest operations are also critical. Significant produce is lost because of poor godown facilities. Considerable scope exists for rural godowns in Pondicherry. Moreover, in the future with more vegetable and fruit cultivation, equal importance should be given to setting up cold storage units for storing perishables and semi-perishables. As many farmers are coming forward for commercial seed production, a need arises for seed processing units and storage units. Finally, with an increasing area under fruits such as guava and sapota, priority should be given to small-scale processing units for horticultural crops. This will serve the twin purpose of offering better prices to growers and better quality to consumers.

Strengthening of agricultural marketing also needs to receive attention. A welcome development in terms of regulated markets has been the introduction of “*uzhavar sandhai*” (farmers' markets). *Uzhavar Sandhai* have encouraged many farmers

to grow vegetables particularly in the Ariyankuppam and Kalapet areas. One or two more of these sandhai can be started depending on the facilitating factors. The scope of these sandhai too need to be enlarged.

Along with this, the agricultural marketing wing of the department should be strengthened. Necessary legislation for regulation of agricultural produce markets should be enacted to protect the farmers from private traders. Though the regulated markets are functioning well, there is a need to set up regulated market committees in all the communes. These committees should be empowered with regard to auction, grading, extensions services, storage and financing. Strict monitoring is a must.

Access to Credit

Flow of credit to farmers at reasonable rates of interest is a problem in Pondicherry too. Although banks have money to lend, since repayment is often a problem for farmers, bank credit does not flow to the required extent. The other problem is that bank loans are often not timely.

Given these constraints, the dependency of the farmers on local moneylenders for credit is very high. There are a lot of pawnbrokers who lend money after taking assets as collateral. The major financiers in Pondicherry are the rice mill owners. In return for financing, they procure the entire paddy from the farmers at low rates. Thus, although farmers are able to get credit, they miss out on a significant amount of income they could earn if they were able to market their produce elsewhere.

There is a need, therefore, to improve the availability of credit to farmers from formal banking institutions. The best scenario would be one where government institutions and non-government organisations play a joint role in making credit available to farmers. Cooperative banks should play an important role. Pondicherry State Cooperative Bank (PSCB) with its 19 branches mainly caters to the requirements of short-term credit covering seasonal operations. These should be further strengthened. NABARD recently signed a memorandum of understanding (MOU) with the Pondicherry Government to look into the health of cooperative credit institutions such as their viability, organisation and management and recovery performance. The government

should act on the forthcoming recommendations. Primary Agricultural Cooperative Societies (PACS), of which there are 55, can also be activated to play a bigger role.

Other existing schemes should also be promoted. At present a new Kisan Credit Card scheme has been implemented. A group insurance scheme for agricultural labourers was recently introduced. Both these schemes should be intensified. At present, however, insurance can only be claimed when there is a total crop failure. These guidelines should be reviewed and made area specific.

There is also vast scope for promoting micro-finance groups (MFGs) for farmers. These groups can consist of 15 to 20 farmers who can save and lend money on a fortnightly or monthly basis. This will help generate savings locally as well as make money available timely. These MFGs/cluster of MFGs should be linked with local and commercial banks for credit. The banks can support these groups after evaluating their performance. NGOs can help in group promotion. They can also help mobilize initial support finances from funding agencies.

Irrigation Management

Irrigation is crucial to agriculture in Pondicherry. Eighty-eight per cent of net sown area was irrigated and the irrigation intensity was 1.56 in 1999-2000, much higher than in most states of the country. Increased and assured irrigation leads to higher productivity, greater investment by farmers and an intensification of agriculture. Although Pondicherry must move toward a cropping pattern regime which is less water intensive, irrigation will continue to be a major factor. Not only will the long-term viability and sustainability of agriculture depend to a great extent on the availability of irrigation and the quality of it, but assured irrigation supply will have positive externality effects in terms of potential potable water as well.

Despite a high irrigation intensity and wide coverage of irrigation in the Union Territory, there are signs that water is becoming a problem. Not only is widespread salinization taking place, especially along the coastal belt but, as stated earlier, also important sources of irrigation such as tanks have become almost completely defunct. A major thrust of agriculture policy, therefore, must be aimed at sound irrigation

management which aims not only at increasing/revitalising irrigation systems but also improving their efficiency.

Allocating and Regulating Water use

With the changing rural-urban scenario in the Union Territory, the priorities in terms of water use are also changing. While irrigation will continue to be important for agriculture, it is still necessary for the government to determine the quantum of water to be allocated for irrigation purposes. Consequent to this, it will also be necessary to value water properly keeping in mind sustainability and equitable access.

Farmer-Organisation based Irrigation Management

To improve the efficient use of water allocated to irrigation, the main thrust must be to promote a decentralised irrigation management system. Involving stake holders is the best way forward in this regard. Efforts are already underway in Pondicherry to do so. The rehabilitation of all irrigation tanks is in progress in the Pondicherry region, an initiative in which the European Commission provides both financial and technical support. Tank associations are being promoted at the village level and these associations will in turn be responsible for tank rehabilitation work and in the long run will also undertake maintenance and management of these irrigation tanks. Farmers are receptive to this, but the work needs to be speeded up. A similar participatory approach is being tried in the Karaikal region where canal irrigation is the major source. Water user associations are being promoted. They are responsible for the effective use of canal water for irrigation and also for the management and maintenance of the system. A scheme of matching grants for farmers is being implemented in Karaikal in which the Agricultural Department is matching the tank associations contribution for tank maintenance. A similar scheme can be introduced for the Pondicherry region as well.

A decentralised system is not the solution on its own. Within a decentralised system first of all steps will have to be taken to regulate water use by user associations. Moreover, particular measures should be encouraged to make decentralised use more efficient. Regulators across rivers and canals can also serve as a means to store water, recharge groundwater and arrest the intrusion of sea water in the coastal area. Open wells, which are at present in disuse, can be reactivated by promoting rainwater harvesting.

Planting trees along the banks of canals can arrest encroachment into feeder channels. Irrigation management associations can be enticed to grow trees by sharing revenue with them.

Another problem which results in wastage is poor drainage. This is especially common in the coastal areas where the slope of land is less and there is little scope for drainage, a problem particularly severe during the northeast monsoon. Efforts should be made to improve drainage channels, so that unnecessary flooding does not occur and that fertilizers and pesticides do not percolate into wells. Drainage channels, after improvement, can be later maintained by water user associations. All these measures will help prevent wastage of water and simultaneously help in raising the ground water table.

Federation of Farmers Tank Associations

The tank associations and canals associations need to be federated into clusters so that they take up the regular maintenance of the canals with the help of government funding. Presently there are about 15 tank associations in the Pondicherry region. The Tank Rehabilitation Project will cover all the 90 irrigation tanks by the end of 2004 and for each tank an association will be formed. These 90 tank associations can be further grouped into a higher institution called the tank cascade association which would be a chain of tanks. There are possibilities of promoting eight such cascade associations. The cascade association will include all the interstate tanks of Villupuram and Cuddalore districts as well which benefit from the same feeder canal. These cascade associations can be responsible for water sharing between tanks in the cascade and maintenance of their feeder canals. These cascade and tank associations can together form a district level federation of tank associations and can be the focal point for interactions with government departments. In the Karaikal region, federations of canal user organisations, as distinguished from tank associations, can be started.

Pondicherry can learn from similar experiences elsewhere. The Dhan Foundation, a non-governmental organisation based in Madurai, has promoted similar federations for tank associations which are now becoming self-reliant and sustainable. The federation of tank associations has got sanction for tank rehabilitation work from the district administration and farmers themselves have executed rehabilitation work.

Over a period of time, these associations in Pondicherry can take on more and more responsibilities. Strengthening of these associations through training and exposure visits would help in building up their capabilities.

Irrigation through Small Ponds

There are about 500 ponds in the Pondicherry region and about 400 ponds in the Karaikal region. About 100 of these ponds in the Pondicherry region, mostly in the coastal belt, have been used for irrigation. These ponds are showing a declining trend in their performance efficiency largely because the yearly maintenance of these ponds has stopped over the last 20 years. These ponds need to be rehabilitated through the promotion of pond user farmer associations. Just like tank associations, the ponds associations would be responsible for the maintenance and management of ponds. In the Karaikal region, the ponds located in the fields (approximately 50) can also be developed for supplying irrigation water. There is also scope to develop farm ponds. The Department of Agriculture is already helping farmers do so with a 75 per cent subsidy scheme. Desilting of all the ponds and linking the field drainage channels and tank surplus channels should be a priority.

Conjunctive use of Groundwater and Tank water

In the Pondicherry region, there is ample scope for using both tank water and groundwater optimally. This will also help prevent the reduction in the extraction of groundwater. Training should be given to tank associations and water user associations with regard to conjunctive use.

Irrigation from Drainage channels

Drainage channels such as Mullodai channel are potential irrigation sources. Water from the fields in the uplands get drained and collected in this channel. Farmers pump out the drainage water collected to raise crops. The potential of channels like this need to be explored in depth and rehabilitation can be planned and executed by promoting water user associations which need to be promoted. The Tank Rehabilitation Project has in fact already started doing so - such efforts need to be expanded.

Community Tubewells for Small and Marginal Farmers

As a large percentage of farmers in Pondicherry are either small or marginal, they are often unable to have their own tubewell and often are not adequately accounted for in water user associations. There is ample scope for community tubewells where the groups of small and marginal farmers can own and manage them. PASIC, at present, helps in the maintenance of these tubewells.

Regulating Industrial Pollution

As highlighted earlier, many of the problems faced by the agricultural sector originate in the industrial sector. Better water management, therefore, will require preventing the many negative externalities that industrial growth brings with it. In order for this to be done, action must be taken first of all to collect necessary data with regard to industrial pollution. There is a Department of Science, Technology and Environment which is meant to scrutinise industrial applications for the issue of no objection certificates (NOCs) and in fact to monitor and evaluate industries performance with regard to specific indicators. But granting of licenses is a formality and enforcement is particularly poor at present. In recognition of the need to do more, however, the Department of Science, Technology and Environment has put forward a scheme to start a separate Department of Environment. The department should play a pivotal role in coordinating the collection of 'relevant' data. The Pollution Control Board should make sure that standards are complied with to a satisfactory extent.

Promoting Allied activities

Allied activities must be promoted in the future so that farmers have sufficient supplementary sources of income. This is especially important given the small-scale nature of agriculture in Pondicherry. A number of allied activities, namely animal husbandry, poultry farming and fisheries can be promoted.

Animal Husbandry

The dairy sector can be an important thrust area as it is a sector which is growing quite quickly in India as a whole due to the evergrowing demand for milk and milk products. Also, with the substantial reduction in agricultural subsidies worldwide due to the WTO, Indian dairy products will become more competitive on the world market.

While the cattle population has declined in Pondicherry over the last few decades, due no doubt to less cultivable land and grazing and pasture land, there is still a sizeable cattle population, especially in the Pondicherry and Karaikal regions. Pondicherry's climate, moreover, is favourable for high yielding hybrid varieties of cows. The ratio of veterinarians too is high in Pondicherry. There are at present two veterinary hospitals, 15 veterinary dispensaries, 3 mobile veterinary dispensaries and 61 key village units. In other words, despite certain constraints, a platform exists for promoting the dairy industry.

The government's main focus should be on productivity enhancement. The Directorate of Animal Husbandry, Rajiv Gandhi College of Veterinary and Animal Sciences and Pondicherry Cooperative Milk Producers Union have already come out with a concept paper on 'improving productivity of dairy cattle in Pondicherry'. The thrust areas identified for further attention are identification and registration of cattle, setting up baseline data through surveys, monitoring based on the baseline information, market information on animals for sale and the management of animals. In the Karaikal region, a dairy plant is being planned at present.

One important issue which needs to be addressed in the dairy sector is fodder supply. There is at present a lack of green fodder and area for fodder cultivation. Efforts are, however, underway to improve fodder supply. The Pondicherry Cooperative Milk Producers Union has taken steps to give seeds and fertilizers free to farmers to cultivate fodder crops. At present, 200 farmers are cultivating fodder crops in a total area of 24 acres.

Once a market emerges for fodder crops, more farmers will most likely choose to grow them. In the long run, the emphasis should be on extension work aimed to promote these crops as opposed to subsidies. Dairy cooperative societies (DCSs) can take a lead role in marketing the fodder in the village itself.

Another crucial issue in the dairying sector relates to the storage of milk. In milk processing, the crucial factor is the time between milking and storing in cold storage

units. The government should plan for many chilling centers in the rural areas for easy and effective storage of milk.

Poultry Farming

Although poultry farming has not picked up in Pondicherry, partly due to the proximity of Namakkal (which is a big poultry centre), there are no natural constraints as such which prevent poultry farming in terms of both egg and meat production from developing in the Union Territory and becoming an important source of supplementary income. Poverty alleviation programmes such as IRDP can be used as a means to target interested beneficiaries. Inputs can be supplied to poultry farmers at reasonable prices.

The government support structure, however, will have to be improved considerably. Though there is a poultry development programme aimed at providing technical inputs and training, it is not operational. More research will have to be undertaken and the possibility of setting up a Livestock and Poultry Development Corporation looked into seriously.

Fisheries

The potential for fisheries is substantial in Pondicherry. The four sub-regions of Pondicherry have a coastline of 45 kms with 675 sq. kms of inshore waters, 1,347 ha of inland water and 800 ha of brackish water.

Irrigation tanks and ponds can be tapped for commercial fish rearing. More than 50 irrigation tanks and about 200 ponds have the potential for fish rearing in Pondicherry. Even drainage channels like Mullodai and Bahour tank surplus courses are good sources for inland fisheries. Already fish breeding centres are being set up which can act as training and demonstration centers.

In the Karaikal region as well, there are about 400 ponds, many of them belonging to temples. Also farm ponds are developing which have fish potential as well. A few years ago, the Fisheries Department initiated programs for developing inland fisheries but the program was subsequently dropped. These programs should be revived. There is a good market for fish and on average the net income is 1.5 to 2 times the investment.

Tank associations can take up fish rearing activity and share the revenue with commune panchayats. Since the tank associations will have many women self help groups within them, these women's groups can be given the responsibility of rearing fish.

Agro-Industrial Development

As the present Industrial Policy affords high priority to agro-processing, an opportunity exists for this industry to grow (see Industry Chapter). Several agri-business enterprises specialized in processing, packaging, transportation and distribution of agro-industrial products already exist in the Union Territory.

Supporting Agricultural Growth

There is an organisational set-up to promote agriculture and allied activities so that it grows in the future. There are a number of departments engaged in agriculture and allied activities. The Agriculture Department is the main department, but there is also a Animal Husbandry Department and a Fisheries Department. These department have extension workers who are field based and interact regularly with local farmers. Moreover, over the last few years, i.e. since the Ninth Five Year Plan, the Agriculture Department has started a commune and area level interface with farmers aimed at identifying area specific needs of farmers.

There are also farm clinics which are experimental stations for testing and promoting different crop varieties. Farm clinics are meant to be the nucleus of all extension development programmes of the Agriculture Department. There are at present 17 farm clinics in the Union Territory, 9 in Karaikal and 8 in Pondicherry. Farmers can draw immediate benefits from these clinics as they provide inputs directly to farmers.

A seed certification agency has been started recently in Pondicherry and will soon become operational. Once it is operationalised, it will be possible for new seeds to be certified locally instead of having to be certified in Tamil Nadu. This will also help in promoting the distribution of new seeds to farmers.

In addition to these line departments, there are other centres promoting agriculture in the Union Territory. The Krishi Vigyan Kendras, now called the Perunthalaivar Kamaraj Krishi Vigyan Kendras were started as far back as 1974 for the purpose of

testing crops, seeds, pesticides and fertilizers before introducing them in farms. These kendras are also meant as centres for training farmers and rural youths. Another such kendra has recently been started in Karaikal.

There is one agricultural college in the Union Territory of Pondicherry. The Agricultural College (PAJANCOA) was started in Karaikal in 1987-88. The main purpose of PAJANCOA was to develop human resource capability with regard to new technologies. Besides having an undergraduate and graduate programme, the college also concentrates on research projects aimed at solving local problems. A number of other colleges now exist in the Union Territory. If channeled properly, they can provide an important research and development base for agriculture.

There is also significant support for farmers from other bodies. Pondicherry Agro Service and Industries Corporation (PASIC) provides a distribution network for agricultural inputs like seeds, fertilizers, organic manure, plant protection chemicals and equipment. PASIC, moreover, has established over 40 retail outlets. In addition to this, PASIC plans to diversify its activities to groundwater consultancy, executing civil works, and production of organic manure amongst other things.

In terms of marketing, there are four market committees in the four regions of the Union Territory. These market committees came into effect with the Pondicherry Agriculture Produce Market Act, 1973. They are meant primarily as a means for farmers to get a reasonable price for their produce. In 2000, these market committees were supplemented with *uzhavar sandhai*. *Uzhavar Sandhai* are meant primarily to provide remunerative prices to fruit and vegetable growers. These will be important in the future if horticultural crops are promoted.

The Road Ahead

The challenge that lies ahead, therefore, for Pondicherry is to once again make agriculture and allied activities grow. Given agriculture's poor performance in the recent past, a two per cent growth rate over the next 20 years is a realistic target. If agriculture was to grow at two per cent, agriculture's contribution to NSDP would increase from Rs. 10,483 lakh in 1998-99 to Rs. 16,207 lakh in 2020 (in 1993-94 prices). In terms of

employment, it is likely that about two-thirds of the rural workforce will continue to be in agriculture, whereas agricultural employment in urban areas would disappear altogether. With a projected rural workforce of around 1,50,000 in 2020, one could expect approximately 1,00,000 people to remain in agriculture.

The government will have to pursue a different course for agriculture to grow. There is little scope for increasing agricultural production through expanding the net area under cultivation in the Union Territory. Given the current escalation in use of cultivable land for housing, roads, industries and other non-agricultural purposes, the extent of the cultivable land might even shrink further during the next few decades. Therefore, future growth in the agricultural sector has to come from the following: (1) increases in the present crop yields; (2) further crop intensification; (3) expansion of agribusiness activities; (4) improvements in the output of livestock, fish and horticultural products including vegetables and fruits and (5) crop diversification. While the possibility of achieving higher agricultural growth in the near future through changes such as crop diversification and the introduction of less water consuming crops are perhaps limited, there should be a concerted effort to make such crops remunerative in the longer run.

At present, there are several factors which are constraining the possibilities for raising productivity through balanced application of improved inputs and better farm management practices in the Union Territory. These include: limited availability of quality HYV seeds, application of fertilizers not based on soil test values for specific crop varieties and poor adoption of integrated nutrient and pest management (IPM) practices. Furthermore, the present development focus is predominantly on irrigated rice production. Relevant package of practices for improving the productivity of other crops including paddy grown in less irrigated/low moisture holding areas have not yet been sufficiently developed and popularized.

Water management is also a critical issue. Water tables have started falling throughout Pondicherry due to excessive exploitation of groundwater resources. Recent investigations have revealed that this is resulting in the intrusion of seawater especially in some coastal areas in the Pondicherry region. Existing surface irrigation systems suffer from some inherent weaknesses that need rectification. Several of the tanks and ponds ,

formerly used for storing rain and surplus river water and irrigating a major proportion of the cultivated area falling into a state of disrepair. The efforts to revive these systems will have to be speeded up considerably.

Pondicherry will, moreover, have to depend on agro-industries considerably. The Union Territory offers a number of advantages which can be exploited to speed up the growth of such industries. First, Pondicherry has an excellent record of attracting private sector investment for industrial development because of its proximity to large markets in the adjoining states, tax policies, good infrastructure and a growth inducing industrial policy. Second, as mentioned above, a number of agri-businesses already exist in Pondicherry. Their experiences could be tapped for planning and development of new enterprises. A number of potential enterprises have been identified, namely seeds production and processing; forage production and cattle, poultry and fish feed manufacturing; dairy development; indigenous medicinal plants processing; and broiler production. Thirdly, Pondicherry will have to meet the requirements of the World Trade Organisation (WTO) if its agricultural products are to be exported. A WTO cell needs to be created in government to study the WTO requirements for both agriculture and industry.

The vision also recognises that present policy protects farmers in the wrong way, namely by providing heavy subsidies in terms of water, power, fertilizers and pesticides. This not only has artificially protected agriculture and inhibited farmers from deriving the benefits of the market, but also resulted in long-term damage to land and water resources. While the government has a crucial role to play in the primary sector, it needs to be much more focused on research and development, helping small and marginal farmers by providing better access to credit and marketing, and equipping local farmers' organisations and panchayat bodies so that they can play a more significant role in land and water management. The government can also make credit more easily available and thus encourage investment by individual farmers, allow farmers to obtain remunerative prices, and promote diversification of agriculture and allied activities. Finally, the government must play a regulatory role in terms of use of natural resources and price resources such as water so that its use is rationalised.