Evaluation Study No. 18

DEVELOPMENT OF COMPOST PRODUCTION

An

Evaluation Study

ISSUED BY

BUREAU OF STATISTICS & EVALUATION
GOVERNMENT OF PONDICHERRY

INTRODUCTION

The Evaluation Report on Development of compost production is the eighteenth issue in the Evaluation series of this Bureau. The report critically deals with the achievements under compost development programme. Apart from the information supplied by the Department of Agriculture, additional data were also collected by conducting case study in two sample villages in Pondicherry region.

The willing co-operation extended by the Directorate of Agriculture, Pondicherry, the Assistant Soil Chemist, the Mayors of Pondicherry, Mudaliarpet, Ariankuppam and Villianur communes and the Government of Tamil Nadu is gratefully acknowledged.

It is hoped that this publication will be useful to those who are concerned with the Evaluation of plan schemes.

Pondicherry,
Dated : 20th February 1973.

S. MUTHUBASAVAN,
Director.

REPORT ON THE EVALUATION STUDY ON DEVELOPMENT OF COMPOST PRODUCTION

For better utilisation of the available local manurial resources and to increase the production of compost manure, one of the important organic manures, two schemes viz., " Development of local manurial resources " and " Urban compost " are being implemented in this territory from the Third Plan period.

The object of the urban compost scheme is to convert night-soil and other available waste material like municipal rubbish, slaughter house waste etc. in urban areas to good quality compot on scientific basis by giving monetary assistance to the municipal bodies for the purpose. The scheme was in operation during the Third Plan period through Pondicherry and Karaikal Municipalities which have got regular conservancy arrangements. Two Compost Development Inspectors were appointed by the Agriculture Department to supervise the composting work by the municipalities. The municipalities which took up the production of compost were each given a subsidy of Rs. 1,220 per year for meeting the cost of composting. During the Third Plan period only 2,200 metric tonnes of compost was produced in Pondicherry which is evidently not satisfactory. With a view to increase the production of urban compost in the municipalities and to educate the farmers in its utilisation for the production of crops, the scheme is being continued in the Fourth Plan.

The compost yards of Pondicherry Municipality are located at Sengeny Amman Koil area and Sanyasi Thoppu. Production of compost is carried on under the technical supervision of the Compost Development Inspector. Composting is done at the yards with the daily collections of rubbish and night-soil by ' heap ' method on scientific basis. The dimensions of the heap usually adopted (as reported by the compost Development Inspector) are 15 feet (length), 8 feet (breadth) and 3 feet (height). First, the rubbish is placed upto a height of 1 foot over which a thin layer of night-soil is added by sprinkling it over the layer of rubbish. The layering is repeated three times. The whole heap is covered with a layer of earth, about six inches in thickness. The compost is ready for use after five or six months.

With a view to popularise and increase the utilisation of urban compost among the ryots, incentives like transport subsidy were given at the rate of 50 paise per tonne of urban compost transported to a minimum distance of 3 miles away from the compost yard. A sum of Rs. 1,000 per annum was given as transport subsidy to ryots in Pondicherry during the years 1967–68 and 1968–69. During this period

production of super-digested compost was also undertaken at the Sanyasithoppu compost-yard. A sum of Rs. 1,000 per year was spent for the purchase of superphosphate utilised in the production of super digested compost.

Although provision was made towards long-term loan assistance for the purchase of tractors and trailors and for acquiring sites for locating the compost yard, the Pondicherry municipality has not availed of such assistance despite continued persuasion by the Department.

The physical targets and achievements in Pondicherry under this scheme are given below :—

(METRIC TONNES)

Year	*Target*	*Achievements*
1966–67	8,000	7,560
1967–68	8,000	8,250
1968–69	10,000	10,335
1969–70	12,000	12,194

It may be seen that except in 1966–67 the actual production of compost slightly exceeds the target.

Rural Compost :

The scheme 'Development of local manurial resources' is being implemented in this Territory from the Third Plan onwards. The scheme is to increase the production of compost in the rural areas and step up production of night-soil compost in the rural communes (akin to major panchayats elsewhere) by conserving all available rubbish, waste material etc., by means of demonstrations and propaganda and by giving financial assistance in the shape of long-term loan. The following measures are contemplated in the scheme :

(i) Subsidy to the rural communes for the production of compost to meet the cost of production at the rate of Rs. 1,000 per commune per year. The rural municipalities will be given the subsidy only if they produce a minimum quantity of 500 metric tonnes of compost.

(ii) Long-term loan to the rural communes at the rate of Rs. 3,600 per commune for meeting the expenditure on purchase of equipments.

The production of night-soil compost was taken up in the smaller municipalities of Mudaliarpet, Ariankuppam, and Villianur. In these municipalities, if sufficient night-soil waste is not available, green leaves are used.

The physical targets and achievements under rural compost production scheme are given below :—

1. PRODUCTION OF NIGHT-SOIL COMPOST IN SMALLER MUNICIPALITIES

(METRIC TONNES)

Year	*Target*	*Achievement*
1966–67	1,500	1,510
1967–68	1,500	1,560
1968–69	1,500	1,580
1969–70	1,500	1,570

The production target of 1,500 metric tonnes per annum has been worked out at the rate of 500 metric tonnes per municipality for the three municipalities viz., Mudaliarpet, Ariankuppam and Villianur. The actual production is uniformly in excess of the target.

Particulars of subsidy to the smaller municipalities which have produced a minimum quantity of 500 metric tonnes of compost in a year are given in the following table :—

Year	*Name of Municipality*	*Amount (Rupees)*
1968–69	Mudaliarpet	1,000
1969–70	Do.	1,000
1969–70	Ariankuppam	1,000
1969–70	Villianur	1,000

The Ariankuppam municipality was given a loan assistance of Rs. 3,600 during 1969–70 for meeting the expenditure on purchase of equipments in addition to the subsidy mentioned above.

In the rural areas, 400 compost pit demonstrations per year were conducted during 1967–68 and 1968–69 for popularising production and use of rural compost. These demonstrations purport to teach the ryots above the adoption of standard pit dimensions and scientific methods of composting. The cost of each demonstration is Rs. 6.

The particulars of compost production in the rural areas by individual ryots are shown below :—

(METRIC TONNES)

Year	*Target*	*Achievement*
1966–67	12,000	12,840
1967–68	15,000	15,760
1968–69	20,000	20,750
1969–70	25,000	25,650

It may be seen that the achievements are slightly higher than the targets for all the years.

Sample Study :

Apart from the information supplied by the Department of Agriculture on compost development programme, data was also collected through a case study in which two villages in Pondicherry region, namely Agaram and Coodapakkam, were taken up. The lists of compost pit owners in these two villages were obtained from the Project Agricultural Officer and from those lists, 40 from Agaram and 60 from Coodapakkam were selected for the study.

Suitable questionnaire was drawn up by the Evaluation Cell of the Directorate of Statistics and Evaluation. Field work was carried out by two Statistical Inspectors.

Findings of the study :

The general particulars about the compost pit owners such as literacy, ownership of land, size of operational holdings, land utilisation and area under crops were also collected along with the data on compost pits and production of compost.

The following table shows the percentage disribution of compost pit owners according to literacy status :—

	Agaram	*Cooda-pakkam*	*Both the villages*
(1)	(2)	(3)	(4)
Literate	85	60	70
Illiterate	15	40	30

The percentage distribution of compost it owners according to the size of their holdings is given in the table below :—

Size of holding (Acres)	*Agaram*	*Cooda-pakkam*	*Both the villages*
(1)	(2)	(3)	(4)
Less than 2	30.0	48.3	41.0
2 to 4	32.5	10.0	19.0
4 to 6	17.5	11.7	14.0
6 to 8	10.0	3.3	6.0
8 to 10	7.5	6.7	7.0
Above 10	2.5	20.0	13.0
	100.0	100.0	100.0

It can be observed from the above table that 41% of Compost pit owners possess less than 2 acres each and the percentage decreases with the size of holding, except that 13% of compost pit owners possess above 10 acres.

The percentage distribution of cultivators according to ownership of land is shown in the following table :—

	Agaram	*Cooda-pakkam*	*Both the villages*
(1)	(2)	(3)	(4)
Owner—cultivators	15.0	15.0	15.0
Tenant cultivators	37.5	41.7	40.0
Owner and tenant cultivators ..	45.0	36.7	40.0
Non-cultivators	2.5	6.6	5.0
Total ..	100.0	100.0	100.0

It may be seen that 15% of compost pit owners are owner-cultivators, 40% tenant cultivators, another 40% are owner as well as tenant cultivators i.e. they cultivate their own lands and also leased lands. The remaining 5% do not possess any land, nor do they cultivate leased lands.

The particulars of land utilisation are given below :—

(ACRES)

	Agaram	*Cooda-pakkam*	*Both the villages*
(1)	(2)	(3)	(4)
Net area sown	143.25	352.75	496.00
Area sown more than onee ..	126.00	255.25	381.25
Total cropped area	269.25	608.00	877.25

The following table deals with the area under crops in the holdings of the sample compost pit owners :—

Serial No. and name of crop	*Agaram*	*Cooda-pakkam*	*Both the villages*
(1)	(2)	(3)	(4)
1. Paddy I Crop	7.75	3.00	10.75
,, II Crop	105.25	225.50	330.75
,, III Crop	99.75	213.50	313.25
,, Total	212.75	442.00	654.75
2. Ragi	14.75	33.00	47.75
3. Sugarcane	13.50	63.00	76.50
4. Groundnut	12.50	37.00	49.50
5. Tapioca	12.50	27.00	39.50
6. Cumbu	2.00	3.00	5.00
7. Other crops	1.25	3.00	4.25
All Crops ..	1269.25	608.00	877.25

From the above table it may be seen that the total area under paddy in both the villages is 654.75 acres which is nearly 75% of the total cropped area.

Distribution of sample ryots according to the number of pits owned by them :

Out of 40 ryots selected for the study in Agaram village, two possess two pits each and the remaining 38 own one pit each. In Coodapakkam, out of 60 ryots, eight own two pits each and 52 one each.

Distance of compost pits from cattle shed :

Out of 40 ryots who own compost pits in Agaram village 25 (62.5%) reported that the compost pits were situated very near their cattle sheds whereas the remaining 15 (37.5%) were having their compost pits within half a kilometre from the cattle shed. In Coodapakkam village, the compost pits of all the 60 sample ryots were situated very near their cattle sheds.

Compost production :

All the sample ryots reported that the dimensions of their compost pits were according to the requisite standard, namely 15 feet length, 8 feet breadth and 3 feet depth. The total quantity of compost produced by the sample ryots was reported to be 947 cartloads in Agaram village and 1,394 cartloads in Coodapakkam Village. The average quantity produced by a sample ryot was nearly 23 cartloads each in Agaram and Coodapakkam. All the sample ryots who do agriculture stated that they have used the entire compost produced by them in their own fields and most of them added that the quantity of compost produced by them could not meet their requirements and so they used to purchase some additional quantity. The 5% of pit owners who neither own lands nor cultivate leased lands are obviously selling the compost produced by them.

Use of fertilisers and compost :

As mentioned in the previous paragraph, all the sample ryots used compost during the last year.

The following table gives the data on the use of compost and fertilisers by the sample cultivators :—

Serial No. and particulars	*Agaram*		*Coodapakkam*	
	Quantity used	*Area (acres)*	*Quantity used*	*Area (acres)*
(1)	(2)	(3)	(4)	(5)
1. Compost (Cart loads) ..	1,167	143.25	2,451	352.75
2. Nitrogenous fertilisers :				
(i) Ammonium Sulphate.	6,895	143.25	11,175	324.25
(ii) Urea	3,505	87.25	14,280	251.50
3. Chemical fertilisers (Kg.) mixed fertilisers	36,725	143.25	98,365	352.75

From the above table it may be seen that the quantity of compost used was 1,167 cart-loads in Agaram and 2,451 cart-loads in Coodapakkam. But, as mentioned in the previous paragraph, the quantity of compost produced by the sample cultivators was only 947 cart-loads

in Agaram and 1,394 cart-loads in Coodapakkam. The difference of 220 cart-loads in Agaram and 1,057 cart-loads in Coodapakkam has been made up by the sample ryots by purchasing compost from other sources. The views of the sample ryots about the use of compost were also obtained. Most of them stated that they preferred compost to chemical fertilisers as the latter would adversely affect the fertility of the soil when used continuously for some years.

Green manure :

The total area under green manure in the holdings of the sample cultivators was 52.25 acres in Agaram and 138 acres in Coodapakkam. Almost all the cultivators reported that the entire area under green manure was ploughed back into the soil and that they did not use green manure for composting. They also reported that a major portion of the cattle dung from their cattle shed was used for composing except a small proportion used for fuel.

Farm animals

As cattle dung is one of the essential ingredients for compost, information was collected on the number of farm animals owned by the sample ryots. The following table shows the distribution of sample ryots according to the number of farm animals owned by them :

	Percentage of ryots owning farm animals		
	Agaram	*Cooda-pakkam*	*Both the villages*
(1)	(2)	(3)	(4)
No animal	10.0	—	4
1 to 3 animals	27.5	40	35
4 to 6 animals	40.0	15	25
7 to 9 animals	7.5	20	15
10 and above	15.0	25	21
	100.0	100	100

It may be seen from the above table that only 4% of sample ryots do not own any farm animals.

The percentage distribution of sample ryots owning different kinds of farm animals is given in the table below :—

	Percentage of ryots owning farm animals		
	Agaram	*Cooda-pakkam*	*Both the villages*
(1)	(2)	(3)	(4)
Cows	70.0	63.3	66
Calves	10.0	51.6	35
Bulls	65.0	63.3	64
Buffaloes	12.5	6.6	9
Sheep	35.0	26.6	30
Pigs	—	1.6	1

Nearly two thirds of the sample ryots own cows and bulls, only 9% own buffaloes and 30% own sheep. The total of percentages of ryots owning different kinds of animals do not add to 100 because the same ryot is owning more than one kind of animal.

The distribution of the sample compost pit owners according to the size of family is given in the following table :—

Serial No. and family size group	*Number of sample compost pit owners at*		
	Agaram	*Cooda-pakkam*	*Total*
(1)	(2)	(3)	(4)
1. 1 to 3	11	8	19
2. 4 to 6	16	31	47
3. 7 to 9	10	17	27
4. 10 and above	3	4	7
Total ..	40	60	100

From the above table it may be seen that 19% of families have 1 to 3 members, 47% have 4 to 6 members, 27% have 7 to 9 members and only 7% have 10 members and above.

The following table deals with the distribution of compost pit owners according to their annual income.

Serial No. and income group	Number of sample compost pit owners at		
	Agaram	Cooda-pakkam	Total
(1)	(2)	(3)	(4)
1 Below Rs. 500	6	17	23
2 Rs. 501 to 1,000	12	13	25
3 Rs. 1,001 to 2,000	6	8	14
4 Rs. 2,001 to 3,000	4	4	8
5 Rs. 3,001 to 4,000	3	2	5
6 Rs. 4,001 to 5,000	6	6	12
7 Rs. 5,001 and above ..	3	10	13
Total ..	40	60	100

From the above table it may be seen that 48% of the sample compost pit owners have an annual income of below Rs. 1,000, 14% Rs. 1,001 to 2,000, 25% Rs. 2,001 to 5,000 and 13% Rs. 5,001 and above.

Agency for collection of compost :

The survey revealed that no sample farmer engaged paid labourers specially for collection and production of compost. They reported that the nature of work is such that it did not require the services of a full time labourer.

In the case of most of the sample compost pit owners, the family members themselves did the work. Pannayals who were employed for agricultural work were also engaged for this purpose by some of the

compost pit owners who were rich. The above details are shown in the table below :—

Serial No. and particulars	*Number of compost pit owners at*		
	Agaram	*Cooda-pakkam*	*Total*
(1)	(2)	(3)	(4)
1. Family member	25	36	61
2. Pannayal	7	19	26
3. Family member and Pannayal	8	5	13
Total ..	40	60	100

No sample compost pit owner reported that shortage of labour was a problem which adversely affected the collection and production of compost, and hence, no one was of the view that he could increase the compost production if more labour was made available to him.

Conclusion :

Although the compost development programme is popular among the ryots who are conscious of the utility of the compost, still they do not seen to bestow enough care and attention to the proper and scienctific method of compost production. On enquiry it was found that most of the sample ryots collected the cattle dung, green leaves and rubbish as and when they were available and simply dumped them in the compost pit without following any scientific method. It is, therefore, pointed out that the Compost Development Inspector who is incharge of supervising composting work in villages should see that the ryots are effectively drawn to scientific methods in preparing the compost.

COMMENTS OF THE DIRECTOR OF AGRICULTURE, PONDICHERRY

It has been stated in page No. 2 while describing the method adopted for the preparation of compost that " First the rubbish is placed at a height of 1 foot, then 9 " layer of night soil is added. This may be corrected to read as " first the rubbish is placed upto the height of 1 foot over which a thin layer of night soil is added by sprinkling the same over the layer of the rubbish ".

It has been mentioned in the last para of page No. 3 that cowdung and green leaves are used in the Municipalities of Mudaliarpet, Ariankuppam and Villianur as sufficient night soil is not available for the preparation of night soil compost. Cow dung is not used in the preparation of night soil compost. The statement given in the report may be modified.

It has been mentioned in page No. 10 of the report as "few of the sample ryots opinion about the use of compost were also obtained. Most of them stated that they prefer compost to chemical fertilisers as the latter would adversely affect the fertility of the soil if used continuously for some years". It is to be noted in this connection that the ryots are forced to use chemical fertilisers in view of the shortage of adequate quantities of organic manures. This department also advocates only a judicious combination of in-organic and organic fertilisers. It is with this view that the scheme for the development of different organic manures are being taken up. It has also been established after intensive research that continuous use of chemical fertilisers do not affect the fertility of the soil. Eventhough most of the ryots follow scientific methods for the preparation of rural compost, scarcity of labour is a limiting factor in the proper adoption of all the techniques involved. Anyhow the department is taking all steps in increasing the production of rural compost on scientific basis. Specific targets have also been fixed for the Compost Development Inspectors.

It is seen from the Evaluation report that the scheme has been reviewed taking into account the size of land holdings, literacy of the villagers, distance between the residence of the villagers to compost centres, etc. This department is of the opinion that rather than the literacy of the villagers the availability of the labour or the strength of the farmers' family should have been the main criteria for the evaluation. The economic condition of the ryots also is to be assessed while evaluating the progress.

APPENDIX

NOTE ON THE RESULT OF THE ANALYSIS OF N.P.K. CONTENT OF DIFFERENT SAMPLE COMPOSTS

General Analysis :

In the first instance classification of the sample composts as furnished by the Assistant Agricultural Chemist, Coimbatore according to different grades has been shown.

It is pointed out in this regard that grading of the compost is made solely on the basis of the total Nitrogen content of the compost. In other words, the other two components viz. Phospherous and Potassium are not taken into account for purposes of grading. In the table below the grading of compost with reference to the Nitrogen content is shown :—

Sl. No.	*Grading*	*Percentage of Nitrogen content*
1.	Poor	Below 0.39
2.	Average ..	0.40—0.74
3.	Good	0.75—0.99
4.	Very Good ..	Above 1.00

Based on the above table the following grading has been assigned to the three sample composts.

Serial No. and Nature of Sample Compost	*Percentage of Nitrogen Content*	*Grading*
1. Rural Individual ryot	1.29	Very Good.
2. Rural Municipal	0.84	Good.
3. Urban Municipal	1.04	Very Good.

Comparative Analysis :

The most important comparative finding of the result of the N.P.K. content of the sample compost is the superiority of rural compost of the individual ryot over that of the rural compost of the Municipality of Villianur. In other words, the N.P.K. content of the compost prepared by the individual ryot is significantly higher than that of the rural

municipal compost prepared by the Villianur Municipality. This will be evident from the table below :—

Serial No. and constituents of N.P.K.	*Percentage of N.P.K. Content*		*(+) or (—) of column 3 over column 4.*
	Sample individual rural compost	*Sample Municipal rural compost*	
(1)	(2)	(3)	(4)
1. Nitrogen	1.29	0.84	(+) 0.45
2. Phosphorous	0.47	0.32	(+) 0.15
3. Potassium	1.39	1.10	(+) 0.29

It will be clear from the table below that N.P.K. content of the sample individual rural ryot and rural municipal are significantly higher compared to the average content of N.P.K. normally used by cultivators. The percentage of all the 3 constituents viz. Nitrogen, Phosphorous and Potassium are higher in these two sample compost.

Serial No. and Constituents of N.P.K.	*Average content of N.P.K. used normal by the cultivators (%)*	*Actual content of the sample individual rural ryot (%)*	*Actual content of rural sample Municipal Compost (%)*	*(+) or (—) of Column 4 over Column 3*	*(+) or (—) of Column 5 over Column 3*
(1)	(2)	(3)	(4)	(5)	(6)
1. Nitrogen	0.50	1.29	0.84	(+) 0.79	(+) 0.34
2. Phosphorous ..	0.20	0.47	0.32	(+) 0.27	(+) 0.12
3. Potassium	0.50	1.39	1.10	(+) 0.89	(+) 0.60

A similar comparative value of the N.P.K. content as between the sample urban compost of the Pondicherry Municipality and a well de-composed odourless material of town compost prepared from Katchara and night-soil are furnished below :—

Serial No. and Constituents of N.P.K.	*Percentage of N.P.K. Content**		(+) *or* (—) *of Column* 4 *over Column* 3.
	A well prepared town compost	*Urban Compost of Pondicherry Municipality*	
(1)	(2)	(3)	(4)
1. Nitrogen	1.40	1.04	(—) 0.36
2. Phosphorous	1.00	0.67	(—) 0.33
3. Potassium	1.40	0.93	(—) 0.47

* Source : " Manures and Fertilizers " second revised edition by K. S. Yawalkar, J. B. Agarwal and S. Bokde.

The above table points out the fact that the sample urban compost of the Pondicherry Municipality is slightly inferior in its N.P.K. content compared to a well de-composed odourless material of town compost prepared from Katchara and night-soil.

The following conclusion emerges from the above analysis :—

1. The N.P.K. content of the sample individual rural compost is superior over that of the sample, rural municipal compost.

2. The N.P.K. content of the sample individual rural compost and municipal rural compost are rich compared to the average N.P.K. content of compost normally used by the cultivators.

3. The N.P.K. content of the sample urban compost of the Pondicherry Municipality is slightly inferior to a well de-composed odourless material of town compost prepared from Katchara and night-soil.