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**Estimation of production of
rural compost in Banaskantha
and Rajkot districts of
Gujarat State - 1967**

ESTIMATION OF PRODUCTION OF RURAL COMPOST IN BANASKANTHA AND
RAJKOT DISTRICTS OF GUJARAT STATE - 1967.

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Introduction.

Eventhough the production of chemical fertilizers in the Country increases and the supply of such fertilizers can meet the demand in future, rural compost will continue to be an important factor as soil correcting agent and as a manure. The importance of increasing production of rural compost and its better utilization does not need any elaboration.

The Ministry of Food and Agriculture has rightly stressed the importance of rural compost in increasing agricultural production and has set up the Central Manure Development Committee, with a view to increasing the manurial resources in the rural areas in the Country.

Although the statistics of livestock number is reliably known the statistics of rural compost which is largely a by-product of this livestock number are not reliably known in the Country. Even no concerted efforts have been made in the past to collect the statistics. The technique for collection of such data was also lacking.

In the present context it is essential to know the base line data from two considerations: (i) it will help in proper planning of the manurial Development programme and (ii) it will supply the basic information in relation to which evaluation of further achievement can be made.

Sampling technique which has played a great role in the past in improving the agricultural statistics in several fields, is the only approach which can be successfully adopted for collecting reliable data on the production of rural compost, as accounting of produce of rural compost will not be only very costly but will be physically not feasible. Such an attempt will go a long way in filling the serious gap in agricultural statistics. It will serve two purposes: (i) It will supply the basic information on the present level of production of rural compost and (ii) it will throw light how the programme for increasing rural compost is progressing in the Community Development Areas.

Such a survey was initially undertaken in Rajkot and Banaskantha districts of Gujarat State in the year 1967.

Object.

The object of the survey was to collect reliable data on the production of rural compost.

Sampling Plan.

Sampling design adopted was one of multistage stratified random sampling with Taluka within the district as stratum, a village within taluka as a primary sampling unit and a pit of rural compost or household as an ultimate unit of sampling.

To keep the work load under manageable limit, it was decided to select seven percent villages from each of the talukas and from each selected village, ten cultivators were selected. The selection of villages in the taluka, and the cultivators in the selected village was done according to simple random sampling method.

Organization of the Field work.

The survey was conducted in Banaskantha and Rajkot districts under the technical control of Directorate of Agriculture, Gujarat State, in Co-operation with the concerned Superintending Agricultural Officers of two divisions viz: Baroda and Rajkot.

The field work of the survey was carried out by the Gramsevaks working under Taluka Development Officer while the supervision was carried out by Compost Inspectors, Assistant Compost Development Officers, and Assistant Statisticians of the two divisions viz: Baroda and Rajkot.

All the field workers were given training in the conduct of the survey at their district headquarters viz: Palanpur and Rajkot respectively.

They were instructed to fill up the information as required in the prescribed schedules. The columns of the schedules were explained in detail so as to avoid ambiguity on any of the items.

The field staff was instructed to visit each of the selected villages six times in a year at the interval of every two months. It was also instructed to have the first visit by the middle of the February and last visit i.e. sixth visit by the middle of December. In all four types of schedules were prescribed to collect the required information.

Schedule-1: It is ment for collecting basic information such as selection of the cultivators, livestock census, geographical area etc.

Schedule-2: It is ment for collecting information on rural compost production in the previous year. It also gives the information about the quantity of rural compost used in different crops, manure purchased from other cultivators, sold to other cultivators etc.

Schedule-3: In schedule 3, information about difference in livestock number has to be recorded at every visit. Similarly the number of heaps/pits are to be counted. Difference of weight observed during successive visits (from pits/heaps) has also to be mentioned in this schedule.

Schedule-4: It is ment for collecting information regarding use of rural compost produced by the cultivators during the year.

The method of estimating production of the rural compost employed was recommended by I.A.R.S., New Delhi. Details of procedure is given below :-

Estimating Procedure:

(a) Estimate of total production(Schedule-3.)

An estimate of annual production of rural compost was obtained separately for the year as a whole. In the first instance a complete balance sheet indicating the production in a pit/heap during the year taking into consideration removals or additions(changes) was prepared separately for each pit/heap. Proceeding in this manner and taking into consideration the withdrawals and initial stock at the beginning of the year and balance at the end of the year, an estimate of total production in pit/heap during the year was worked out. The production in 'k' th pit/heap in the 'j' th village of 'i' th taluka is denoted by 'yijk'. It may be noted here that 'yijk' was computed for each pit/heap including newly dug or those formed between two visits. Let there be 'pij' pits in the sampled households of 'j' th village in the 'i' th taluka during the year. Then 'yij' was computed as $\bar{y}_{ij} = \frac{\sum_{k=1}^{P_{ij}} y_{ijk}}{P_{ij}}$ 'yij'

indicating the estimate of average production per pit/heap in particular village of particular taluka. \hat{M}_{ij} is the

estimate of the total number of pits in 'j' th village of 'i' th taluka. \hat{M}_{ij} is computed as follows. M_{ij1} is the enumerated number of pits in the entire village during first visit. M_{ij1} may not be same as \hat{M}_{ij} which is obtained

after taking into consideration new pits dug. 'dij' is the number of pits in all the sampled households at the time of first visit. 'Pij' is the number worked out after including newly dug pits.

Then $\hat{M}_{ij} = M_{ij1} \times \frac{P_{ij}}{d_{ij}}$

It may be noted here that these pits which had gone out of use during the year are not excluded from M_{ij1}

Since they are counted in computing 'yij'. However, pits gone out of use after first visit have been excluded from M_{ij1}

Since the production from such pits during the year is zero and such pits have been also excluded from 'pij'.

$$\hat{y}_{ij} = \hat{M}_{ij} \times \bar{y}_{ij}$$

Gives estimate of production during the year in 'j' th village of 'i' th taluka. For working out estimate of production for the taluka. Following procedure is followed:

Let 'Xi' be the number of livestock which contributed to the production(bovines or bonines and sheep) according to 1961 livestock census in 'j' th village of 'i' th taluka and 'xi' be the estimate for 'i' th taluka from the same census and

for the same class of animals viz: $X_i = \sum_j X_{ij}$

if there are 100 villages in 'i' th taluka. Let there be 'ni' villages sampled from 'i' th taluka.

$$\text{Then } \hat{P}_i = \frac{\sum_j^{ni} P_{ij}}{\sum_j^{ni} X_{ij}} \times X_i = R_i X_i$$

gives estimate of production for 'i' th taluka. It may be noted here 'x_{ij}' is not number enumerated by the enumerator. Since no estimate from this source is available for entire taluka.

$\hat{P} = \sum_i^T \hat{P}_i$ gives the total production for all the 'T' talukas in a district. Estimates of $V(\hat{P}_i)$ has been worked out

$$X_i^2 \frac{1}{ni(ni-1)} \sum_j^{ni} \frac{(P_{ij} - R_i X_{ij})^2}{X_{ij}^2}, \quad \bar{X}_i = \frac{\sum_j^{ni} X_{ij}}{ni}, \quad V(\hat{P}_i) = \sum_j^T V(\hat{P}_i)$$

(B) Estimate of number of livestock:- Let 'y_{ij}' be the number of livestock (bovines and sheep) as enumerated in the first visit in 'j' th village of 'i' th taluka. Let 'X_{ij}' be the corresponding estimate from 1961 livestock census.

$$\text{Then : } \hat{y} = \frac{\sum_j^T \sum_i^{ni} y_{ij}}{\sum_j^T \sum_i^{ni} X_{ij}} X_i$$

indicates estimate of number of animals in the district (T is the number of talukas in the districts). It may be noted here that 'y_{ij}' is the number enumerated during the first visit. It had to be corrected for the changes in the year and average viz: \hat{y}_{ij} is used in the above formula to get an estimate for the entire year.

Discussion of results:-

(a) Banaskantha district:- Taluka wise number of villages planned and analysed total number of households, particulars of livestock as per 1961 livestock census and cultivated area are shown in table 1-A.

It can be seen from the table 1-A that compilation is based on about 80% of the receipt of the returns. It means data presented in table 1-A, are of only 55 villages out of the total 69 villages planned for the district. Thus there was non response to the extent of 20 %.

In 1961 livestock census 24602 bovines, 6862 sheep and 8756 goats were reported against 4214 households. Out of total geographical area of 93741.15 acres and area of 64923.07 acres was reported under cultivation. This area works out to 69.3 % of the geographical area of the villages under survey.

Information regarding livestock and number of pits/heaps at the time of spot inspection during the year under survey is shown in table 1-B.

It appears that there has been an increase of 0.1% in bovines. Sheep population has registered an increase of 74.5% while the goat population has registered a decline to the extent of 51.7% over that of 1961 census. At the time of survey 4232 pits/heaps were existing in the sampled villages. Thus it works out to an average of 77 pits/heaps per village.

Information in respect of area irrigated and unirrigated area under different crops, receiving F.Y.M. and compost sold and purchased in the previous year, is shown in table-2. Information presented in table-2 is based on about 97.0% of the receipt of returns.

It can be seen from table 2 that in the year 1966 out of the total area under cultivation as much as 17% of the area was under irrigation. In all 2665.702 tonnes of rural compost was applied in an area of about 2977.29 acres. The average dose of rural compost thus works out to 0.895 tonnes per acre. During the previous year 76.7% of the area which received compost manure was occupied by Bajri, Jowar and Wheat crops only. Thus wheat, bajri and jowar are principal crops receiving rural compost. It is reported that 184.678 tonnes of rural compost was given to other cultivators and 103.990 tonnes of rural compost was purchased from other cultivators, during the previous year of the survey. So far withdrawals of compost is concerned it is observed that most of the produce is removed before Kharif season. It is during the months of May to July, that maximum removal is made while for Rabi crops the removal is done in the month of September.

The details of inquiry regarding rural compost production and utilization of rural compost produced in the selected household is presented in table-3. Such an information was collected six times in the year 1967. Information presented in table-3 is based on about 76.4 % of the receipt of returns.

It can be seen from table 3 that number of livestock observed during six visits of the year in selected household was 37349 in which 19936 was bovines. 597 number of pits and heaps were observed and 2060. 113 tonnes of rural compost was produced during year under survey. The average quantity of rural compost per pit/heap works out to 3.451 tonnes. This quantity of rural compost was reported to have been removed for application in the fields covering an area of 1646.37 acres with an average of 1.184 tonnes per acre.

In table No.4, the information in respect of estimation of rural compost livestock and variance of these estimates is given. The method of estimation employed was suggested by I.A.R.S., New Delhi as stated earlier. Information is based on 60.8% of the receipt of returns. Since the receipt position of some talukas was poor, it is not possible to have precise talukawise estimates of annual rural compost production. It was therefore thought proper to group adjoining talukas and groupwise estimate of rural compost was calculated. In all four groups were formed. Group-A comprises of three talukas viz: (i) Palanpur, (ii) Danta, (iii) Vadgam. Group-B, comprises of three talukas viz: (i) Dhanera (ii) Deesa (iii) Vav.

Group-C comprises of three talukas viz: (i) Tharad (ii) Santhalpur (iii) Radhanpur. While Group-D, comprises of two talukas viz: (i) Kankrej (ii) Deodar. Annual production of rural compost in talukas of Group-D, is estimated at 317938.679 tonnes which is highest as compared to other groups of talukas. The annual production of rural compost in the district of Banaskantha is estimated to be 714274.232 tonnes, With 20.0 % S.E. while the total estimated livestock population in the district is 1375825. This livestock population is 6.0 % higher than that of 1961 census. It appears that in Banaskantha, the actual production is much less than the expected on the basis of standards laid down. This can be due to migration of cattle.

Information in respect of frequency distribution of pits according to production per pit of rural compost is presented in table-5. This information is based on about 78 % of the receipt of the returns.

It can be seen from table-5 that out of 596 pits 153 pits have produced less than 1.00 tonnes of rural compost during the year, 144 pits have produced rural compost from 1.001 to 2.000 tonnes., 105 pits from 2.001 to 3.000 tonnes, 56 pits have produced 3.001 to 4.000 tonnes of rural compost, while only 40 pits have produced as high as more than 10.001 tonnes of rural compost. It can be seen that out of the total 596 pits 469 pits, i.e. about 77% of the pits are observed to have produced less than 4.000 tonnes of rural compost during the year.

Information in respect of frequency distribution of pits according to volume of pits in cu.ft. is presented in table-6. This information is based on about 77 % of the receipt of the returns.

It can be seen from table 6 that out of the total 2836 pits which were reported during six visits 782 pits were having volume less than 50 cu.ft. 400 pits from 51 to 100 cu.ft. 297 pits from 101 to 150 cu.ft, 302 pits from 151 to 200 cu.ft. and 209 pits from 201 to 250 cu.ft. while 449 pits were found to have volume of 501 cu.ft. and above.

Rajkot district.

Taluka wise number of villages planned and analysed total number of households particulars of livestock as per 1961 livestock census and cultivated area are shown in table 1-A.

It can be seen from table 1-A, that the information is based on 79 % of the receipt of the returns. It means data presented in table 1-A are for 34 villages out of the total 49 villages planned for the district. The non response was to the tune of about 21. %.

In 1961 livestock census, 19551 bovines, 11518 sheep and 6275 goats were reported, against 2967 households. Out of the total geographical area of 101256.29 acres an area of 72373.22 acres was reported under cultivation. This area worksout to 72% of the geographical area of the villages under survey. Information in respect of livestock and number of pits/heaps

at the time of spot inspection during the year 1967 is presented in table-1-B. While compared to livestock population as shown in table 1-A. according to 1961 census, it can be seen that there has been an increase of 4.2% in bovines population, 10.0% increase in sheep population, While incase of goat population there has been a decrease of 4.5 %. At the time of survey 5189 pits/heaps were found to exist. Thus an average number of pits/heaps works out to be 153 pits/heaps per village.

Table-2 gives information in respect of irrigated and unirrigated area, crop wise area receiving of F.Y.M. or compost sold or purchased in the previous year. This information is based on 88.0 % of the receipt of the returns.

It can be seen from table 2 that out of total area under cultivation only 17.0% of the area was under irrigation. Thus during the year 1967 in the sampled villages 9922,288 tonnes of rural compost was applied in an area of 3934.31 acres. The average dose of rural compost per acre works out to 2.522 tonnes per acre. During the year 1966 the combined area under Bajri, Groundnut and Cotton crops accounts for about 86.9% of the total area receiving F.Y.M. or compost. It is reported that 1239,567 tonnes of F.Y.M. or compost was sold to other cultivators and 1067,676 tonnes F.Y.M. or compost was purchased from other cultivators during the previous year. As far as withdrawal of compost is concerned it is observed that most of the compost produced is removed during kharif season during the months of May-June. While in case of Rabi season it appears that most of the withdrawal is during the month of September.

Details of compost production and utilization of compost production in selected households are shown in table-3. Such an information was collected six times in the year 1967. Receipt position of returns of these visits is far from satisfactory, and tabulation was attempted on the basis of only 36.0% of the receipt. It can be seen from table-3 that number of live stock observed during six visits of the year in selected households was 14317 out of these 6946 were bovines. Total production of compost from 283 pits was 2922,603 tonnes. Thus the average quantity of compost produced per pit works out to 10.327 tonnes per pit. This quantity of 2922,603 tonnes of compost was removed for use in the fields covering an area of 1361.37 acres with an average of 2.146 tonnes per acre.

The average production of compost produced per pit sounds rather high while compared that of Rajkot district, but it can be attributed to following reasons.

(1) In Banaskantha district, an average number of withdrawal per pits is 1.2 during the year under survey while production of rural compost per pit/heap is estimated at 3.451 tonnes. While in Rajkot district on an average there has been 1.9 withdrawal per pit/heap during the year. (2) In Banaskantha district, an average size of a pit is 230 cu.ft. while in Rajkot district it is 260 cu.ft.

Information in respect of estimation of production livestock population and percentage S.E. is presented in table No.4. Due to unsatisfactory receipt position of the returns in Rajkot district the adjoining talukas are grouped into groups A & B. Group A comprises of (1) Jasdai (2)Gondal (3)Kotdasangani (4)Dhoraji (5)Jamkandorna(6)Upleta (7)Jetpur, Group-B comprises of (1) Paddhari(2)Lodhika (3)Malia (4)Mervi (5) Rajkot. Compost production of Group-A-talukas is estimated to be 465493.728 tonnes, while of Group-B talukas is 355583-005 tonnes. Total production of Rajkot district is estimated at 821076.733 with a percentage S.E. 5.7 livestock of Rajkot district is estimated at 925636.

In Rajkot district the actual production even though is less than the expected on the basis of standards laid down the difference is not high. This may be due to higher yardstick for utilization of dung for manure(40 %) rather than due to higher yardstick of average quantity of dung per animal per year.

Frequency distribution of compost pits according to production in tonnes is shown in table-5. This information is based on about 37.0% of the receipt of the returns.

It can be seen from table-5 that out of total 283 pits 50 pits have produced less than 1.00 tonnes of compost in a year. 15 pits from 1.001 to 2.000 tonnes 36 pits from 2.001 to 3.000 tonnes, and 14 pits from 3.000 to 4.000 tonnes. Out of 283 pits 115 pits - i.e. about only 41.0% of the pits are observed to have produced below 4.00 tonnes of compost.

Frequency distribution of compost pits according to volume of pits in cu.ft. is shown in table-6. This information is based on about 43.0 % of the receipt of the returns.

It will be seen from table 6 that out of the total 1253 pits which were observed during six visits 283 pits were having a volume below 50 cu.ft. For 225 pits it was from 51 to 100 cu.ft. In case of 189 pits it ranged from 101 to 150 cu.ft. for 185 pits it was from 151 to 200 cu.ft. and 69 pits it ranged from 201 to 250 cu.ft. while 114 pits have been found to have volume above 501 cu.ft.

It can be seen from table no.7 that the average dose of application of compost manure to crop varies from crops to crops and district to district. In Banaskantha district the average dose of compost/acre in case of Bajri crop is 1.92 tonnes while in Rajkot district it comes to 4.57 tonnes, which is nearly 2.38 times, more than average dose of compost in Banaskantha district. Similarly in case of wheat crop the average dose of compost is 2.23 tonnes, per acre in Banaskantha district while in Rajkot district, it is 4.51 tonnes per acre which is 2.02 times, more than the average dose of compost applied in Banaskantha district.

Summary.

Total geographical area of Banaskantha and Rajkot districts is : $\overset{A}{93746-15} - \overset{G}{}$ and $\overset{A}{101256-29} - \overset{G}{}$ respectively.

While cultivated area is $\overset{A}{64923-07}$ and $\overset{A}{72373-22}$ respectively. Thus the cultivated area in Banaskantha and Rajkot district is 69.2 % and 71.4 % of the geographical area respectively. In Banaskantha district the number of pits/village is estimated to be 77 while in Rajkot district it is 153. In both these districts it is observed that the compost is mainly used in principal crops like Bajri, Jowar, Wheat, Groundnut and Cotton. The average dose of compost applied in cropped area in Banaskantha district is 1.250 tonnes while in Rajkot district it is 2.145 tonnes.

The estimated annual production of compost in Banaskantha district is 714274 tonnes while in Rajkot district it is 821077 tonnes. In Banaskantha district 25.67 % of the pits/heaps are found to be of capacity of 1 tonne and below while in Rajkot district percentage of such pits is 17.67 %. Similarly percentage of pits/heaps of compost possessing capacity below 5 tonnes per pits/heap in Banaskantha and Rajkot district is 81.55 % and 47.35 % respectively.

As regards volume of the pits/heaps it is observed that in Banaskantha 27.57 % of the pits/heaps have volume of 50 cu.ft. and below while in Rajkot district percentage of similar pits is only 22.59 %.

Average size of a pit is 230 cu.ft. and 260 cu.ft. in Banaskantha and Rajkot district respectively while average number of withdrawals is 1.2 and 1.9 respectively.

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Table - 1-A.

District:- Banaskantha.

Year :- 1967.

Particulars ^{of} live stock and area under cultivation.

Sr. No.	Taluka	No. of villages.		Total no. of house holds in the village (bovi-analys-ed.)	Live stock population as per census 1961.			Geograph-ical area of sampled villages.	Cultivated area in the sampled villages.	
		plann-ed.	analy-sed.		Cattle & buffa loes	Sheep	Goats.			Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.	Palanpur	9	5	475	2078	106	624	2808	8036-10	4858-31
2.	Danta	9	9	447	2622	-	1899	4521	7545-34	6239-34
3.	Vadgam	6	6	554	2461	309	551	3321	5924-09	4465-35
4.	Dhanera	7	4	436	3326	1427	981	5734	11769-27	8641-08
5.	Deesa	7	7	518	3303	633	1055	4991	13669-26	8956-29
6.	Kankrej	5	4	275	1813	527	341	2681	5660-20	3971-28
7.	Vav	6	3	166	1305	1056	266	2627	3817-09	3503-16
8.	Tharad	7	5	380	3110	1320	1345	5775	10046-18	6934-20
9.	Deodar	6	6	602	2567	267	738	3572	11885-39	10378-32
10.	Radhanpur	3	2	211	1267	305	574	2146	4621-25	2932-03
11.	Santhalpur	4	4	150	750	912	382	2044	10768-38	4049-11
Total:-		69	55	4214	24602	6862	8756	40220	93746-15	64923-07

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Table. 1-B.

District:- Banaskantha.

Year:- 1967.

Particulars of live stock and rural compost pits and heaps in the selected villages.

Sr. No.	Taluka	Particulars of live stock at the time of first visit.						Total sheep & Goats.	Total livestock (Col.No. 7 + 10)	Total N o.of heaps/pits inthe selected villages.	
		Cattle		Buffaloes		Total No.of cattle &buffaloes (bovi-nes.)					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1.	Palanpur	815	405	504	388	2112	1092	324	1416	3528	523
2.	Danta	1595	808	352	348	3103	1138	698	1836	4939	414
3.	Vadgam	990	216	911	432	2549	461	212	673	3222	629
4.	Dhanera	1574	713	659	494	3440	2403	911	3314	6754	296
5.	Deesa	1479	675	523	305	2982	1902	703	2605	5587	559
6.	Kankrej	783	217	170	129	1299	603	253	856	2155	299
7.	Wao	501	243	237	106	1087	230	34	264	1351	181
8.	Tharad	1458	525	434	245	2662	2080	437	2517	5179	447
9.	Deodar	1552	830	505	327	3214	698	298	996	4210	566
10.	Radhanpur	724	267	136	86	1213	729	192	921	2134	157
11.	Santhalpur	580	166	129	79	954	640	167	807	1761	156
Total:-		12051	5065	4560	2939	24615	11976	4229	16205	40820	4232

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District:- Bahaskantha.

Table . 2

Year:- 1967.

Details of rural compost produced by the selected house holds during the previous years.

Sr. No. of villages No. for which data analysed.	Taluka	Area under cultivation				Total quantity of F.Y.M. used in previous year.		
		Irrigated.		Unirrigated.		Total	Tone Kgs.	
		A.	G.	A.	G.			A.
(1)	(2)	(3)		(4)		(5)	(6)	(7)
1.	9	Palanpur	234.13	617.32	852.05	245.975		
2.	9	Danta	75.02	266.36	341.38	89.750		
3.	6	Wadgam	192.12	189.21	381.33	577.500		
4.	5	Dhanera	98.14	889.08	987.22	412.730		
5.	7	Deesa	399.01	944.33	1343.34	299.450		
6.	5	Kankrej	181.39	321.07	503.06	266.929		
7.	6	Wao	33.07	1267.29	1300.36	385.983		
8.	7	Tharad	292.26	1458.11	1750.37	79.285		
9.	6	Deodar	106.11	938.05	1044.16	189.600		
10.	3	Radhanpur	6.00	406.01	412.01	-		
11.	4	Santhalpur	-	584.34	584.34	118.500		
Total:-			1619.05	7884.17	9503.22	2665.702		

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Table -2- contd....

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Year: 1987.

District: Banaskantha.

Sr. No. of Vill- No. ages for which data analysed.	Taluka	Cropwise area which received rural compost during previous year.						Total rural compost sold in the previous year. Tone Kgs.	Quantity of rural compost produced in the previous year. Tone Kgs.		
		Bajri	Jowar	Wheat	Groundnut	Cotton	Other			Total	
		A. G.	A.G.	A.G.	A. G.	A. G.	A.G.			A. G.	
(1)	(2)	(3)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1.	9	Palanpur	254.35	93.30	119.18	140.18	2.28	53.28	664.37	82.500	4.000
2.	9	Danta	16.28	0.13	21.33	150.06	-	11.01	200.01	10.000	-
3.	6	Wadgam	70.25	50.10	57.06	-	-	22.22	200.23	37.250	16.000
4.	5	Dhanera	146.09	37.37	16.06	-	-	30.14	230.26	14.500	27.000
5.	7	Deesa	391.28	133.20	95.10	-	-	114.07	734.25	2.000	22.000
6.	5	Kankrej	101.27	42.20	60.05	-	16.00	26.37	247.09	11.428	-
7.	6	Wao	210.08	17.30	-	-	-	89.37	317.35	-	-
8.	7	Tharad	107.00	-	28.20	-	-	36.20	172.00	8.000	17.140
9.	6	Deodar	109.13	16.00	31.00	-	-	-	156.13	8.000	-
10.	3	Radhanpur	-	-	-	-	-	-	-	-	17.850
11.	4	Santhalpur	53.20	-	-	-	-	-	53.20	11.000	-
Total:-			1461.33	392.00	429.18	290.24	18.28	385.06	2977.29	184.678	103.990

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Table - 3.

Year:- 1967.

District:- Banaskantha

Details in respect of production and utilization of rural compost in the selected households

Sr. No.	Taluka	No. of analysed village	No. of livestock observed at the time of visit (6 visit)		Total	Total quantity of the manure in the pits/heaps during the year.	Cropped area which received F.Y.M.	Average dose of F.Y.M. per acre of cropped area.	
			Cattle & Buffaloes (Bovines)	Sheep & Goats.					
						No. of pits/heaps.	Quantity of rural compost		
						Tonnes. Kgs.			
1	2	3	4	5	6	7	8	9	10
1.	7	Palanpur	2278	1808	4086	91	339.600	494.29	0.686
2.	7	Danta	3360	2512	5872	73	268.771	133.09	2.017
3.	4	Wadgam	1430	828	2255	58	90.352	42.26	2.118
4.	4	Dhanera	1663	4912	6575	37	407.285	101.10	4.022
5.	6	Deesa	2075	1365	3440	60	128.032	223.20	0.572
6.	3	Kankrej	736	1246	1982	46	41.725	177.20	0.235
7.	4	Wao	1897	343	2240	44	275.800	74.28	3.692
8.	7	Tharad	3182	1736	4918	92	350.073	121.15	2.884
9.	6	Deodar	2189	1014	3203	62	80.466	149.00	0.540
10.	2	Radhanpur	580	1077	1657	19	51.799	25.00	2.072
11.	2	Santhalpur	546	575	1121	15	26.210	104.00	0.252
Total:-			19636	17413	37349	597	2060.113	1646.37	1.250

Thomas/22/4/71/S.

Table No.4.

Statement showing estimated production of compost livestock and variance.

District:- Banaskantha.

Year:- 1967.

Name of Talukas		Estimated production (compost for groups of talukas in tonnes.	Estimated district livestock.	Percentage S.E.
Group-A	(1) Palanpur I			
	(2) Danta I	260881.977	-	26.44
	(3) Wadgam I			
Group-B	(1) Dhanera I			
	(2) Deesa I	317938.679	-	13.71
	(3) Wao I			
Group-C	(1) Tharad I			
	(2) Radhanpur I	61118 .793	-	17.11
	(3) Santhalpur I			
Group-D	(1) Kankrej I			
	(2) Deodar I	74334 .783	-	38.64
Total:-		714274.232	1375825	20.4
		(S.E. 20 %)		

Thomas/22/4/71/S.

Table No.5.

District:- Rajkot.

Year:- 1967.

Statement showing the frequency distribution of sampled pits according to production
of rural compost(in tonnes)

No.of pits under different production.

Sr. No.	Taluka	No.of analy sed vill age.	Below 1tones.	1.001	2.001	3.001	4.001	5.001	6.001	7.001	8.001	9.001	10.001	Total
				to 2.000	to 3.000	to 4.000	to 5.000	to 6.000	to 7.000	to 8.000	to 9.000	to 10.000	& above	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	Jasdan	2	6	3	3	1	4	1	1	2	-	-	9	30
2.	Paddhari	1	3	2	6	3	-	-	-	-	-	-	-	14
3.	Gondal	1	-	2	4	-	3	3	2	-	2	-	3	19
4.	Lodhika	1	-	-	-	-	-	-	-	-	-	-	20	20
5.	Kotada sangani	1	26	-	-	-	-	-	-	-	-	-	-	26
6.	Malia	-	-	-	-	-	-	-	-	-	-	-	-	-
7.	Wankaner	5	4	4	10	7	4	6	4	4	1	4	20	68
8.	Dhoraji	2	-	-	-	1	-	1	2	1	2	1	12	20
9.	Jam - Kandorna	2	-	1	3	1	2	-	2	2	-	3	26	40
10.	Upleta	1	1	1	8	-	4	-	2	1	-	-	-	17
11.	Jetpur	-	-	-	-	-	-	-	-	-	-	-	-	-
12.	Morvi	1	-	-	-	-	-	-	-	-	-	-	12	12
13.	Rajkot	1	10	2	2	1	2	-	-	-	-	-	-	17
Total:-		18	50	15	36	14	19	11	13	10	5	8	102	283

Thomas/22/4/71/S.

Table No. 5.

District:-Banaskantha

Year :- 1967.

Statement Showing the frequency distribution of Sampled pits according to production of rural Compost (in tonnes)

Sr. No.	Taluka	No. of analysed village.	Below 1 tones.	No. of pits under different production.										Total
				1,001 to 2,000	2,001 to 3,000	3,001 to 4,000	4,001 to 5,000	5,001 to 6,000	6,001 to 7,000	7,001 to 8,000	8,001 to 9,000	9,001 to 10,000	10,001 & above	
1.	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	Palanpur	7	-	23	31	10	7	5	5	6	1	-	3	91
2.	Danta	7	21	7	11	8	8	-	3	5	4	1	5	73
3.	Wadgam	4	17	21	8	2	-	-	-	-	-	-	-	58
4.	Dhanera	4	1	4	-	2	2	-	3	1	2	3	19	37
5.	Deesa	6	13	21	15	7	-	1	1	1	-	1	-	60
6.	Kankrej	3	33	8	2	2	-	-	-	-	-	-	-	45
7.	Wao	5	2	10	7	2	2	-	6	2	3	3	7	44
8.	Tharad	7	11	37	9	14	7	3	3	1	-	1	6	92
9.	Deodar	6	41	10	5	4	1	1	-	-	-	-	-	62
10.	Radhanpur	2	6	3	4	2	-	2	-	1	1	-	-	19
11.	Santhalpur	2	8	-	3	3	1	-	-	-	-	-	-	15
Total :-		53	153	144	105	56	28	12	21	17	11	9	40	596

Table -6.

District: Banaskantha

Year: 1967.

Statement showing the frequency distribution of sampled pits according volume of pits
in Cub.ft.

Sr. No.	Taluka	No. of analysed villages	No. of pits under different volume in Cub.Ft.											Total
			Below 50	51 to 100	101 to 150	151 to 200	201 to 250	251 to 300	301 to 350	351 to 400	401 to 450	451 to 500	501 & above	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	Palanpur	7	65	50	34	77	42	29	16	20	6	11	52	402
2.	Danta	8	173	55	44	27	20	34	20	12	11	1	43	445
3.	Wadgan	4	117	57	56	34	19	15	1	3	2	-	-	304
4.	Dhanera	4	11	11	9	6	12	10	5	14	4	5	130	217
5.	Deesa	6	33	37	29	73	62	22	13	4	4	2	16	294
6.	Kankrej	3	58	33	6	20	13	-	-	6	-	-	5	141
7.	Wao	5	87	13	23	11	6	11	5	4	2	3	105	270
8.	Tharad	7	44	51	38	18	12	14	12	12	11	4	62	278
9.	Deodar	6	139	65	38	21	14	5	4	8	1	4	3	302
10.	Radhanpur	2	13	16	11	10	2	10	2	3	2	-	26	95
11.	Santhalpur	2	42	12	9	5	7	4	1	3	2	-	3	88
Total:-		54	782	400	297	302	209	154	79	89	45	30	449	2836

Thomas/22/4/71/S.

Table No.1-A.

Year 1967.

District:- Rajkot.

Particulars of livestock and area under cultivation.										
Sr. No.	Taluka	No. of villages		Total house hold in the village analysed.	Live stock population as per census 1961.				Geographical area of the village (acre)	cultivated area in the village / Sampled
		Planned.	Analysed.		Cattle and buffaloes (Boviness)	Sheeps	Goats	Total		
1	2	3	4	5	6	7	8	9	10	11
1.	Jasdan	5	2	195	2162	953	680	3795	5682-26	4496-39
2.	Paddhari	3	3	371	1801	1290	700	3791	11248-33	7552-06
3.	Gondal	4	3	255	937	418	201	1556	6694-29	4560-30
4.	Kotax Lodhika	3	3	147	757	647	243	1647	3815-17	2438-05
5.	Kotada- Sangani	3	2	247	1299	1422	302	3023	7176-29	4495-01
6.	Malia	3	3	304	1217	1058	285	2560	8578-22	6147-13
7.	Wankaner	5	5	352	2594	2120	1296	6010	9300-12	4855-19
8.	Dhoraji	3	2	448	1542	404	533	2479	12493-32	9994-09
9.	Jam Kandorna	3	1	60	242	569	172	983	2522-22	1621-17
10.	Upleta	3	3	923	4219	973	713	5905	14291-36	11926-21
11.	Jetpur	3	2	176	636	226	196	1508	4106-00	3103-16
12.	Morvi	6	4	410	1737	883	717	3337	12968-25	9820-29
13.	Rajkot	5	1	79	408	555	237	1200	2376 -26	1861-17
Total:-		49	34	3967	19551	11518	6275	37344	101256-29	72373-22

Thomas/22/4/71/T.

Table-1-B.

District:- Rajkot.

Year: 1967.

Particulars of live stock and rural compost pits and heaps in the selected villages.

Sr. No.	Particulars of live stock at the time of first visit.						Total no. of cattle and buffaloes (boviness)	Sheeps & Goats.		Total sheeps and goats.	Total livestock (col.7 + 10)	Total No. of pits/haeps in the selected villages.
	Cattle		Buffaloes		Sheeps.	Goats.						
	above 3 yrs.	Below 3 yrs.	Above 3 yrs.	Below 3 yrs.								
1	2	3	4	5	6	7	8	9	10	11	12	
1. Jasdani	603	246	187	103	1139	572	503	1075	2214	105		
2. Paddhari	1189	527	212	175	2103	1989	568	2557	4660	423		
3. Gondal	828	278	119	105	1330	752	608	1360	2690	303		
4. Lodhika	1081	406	111	74	1672	594	171	765	2437	130		
5. Kotda Sangani	784	211	112	87	1194	1898	772	2670	3864	498		
6. Malia	594	172	227	153	1146	1678	359	2037	3183	315		
7. Wankaner	1209	541	429	327	2506	1860	574	2434	4940	441		
8. Dhoraji	872	411	192	113	1578	868	1	869	2447	1014		
9. Jam Kandorna	177	63	38	26	304	352	122	474	778	87		
10. Upleta	2626	974	605	272	4477	692	169	861	5338	1211		
11. Jetpur	506	215	96	64	881	224	36	260	1141	256		
12. Morvi	805	292	313	200	1610	988	296	1284	2894	396		
13. Rajkot	272	78	50	34	434	306	48	354	788	10		
Total:-	11546	4414	2681	1733	20374	12773	4227	17000	37374	5189		

Thomas/22/4/71/S.

..Contd... Table-2/-

...2/-

Year : 1967.

District:- Rajkot											
Sr. No. for which data analysed.	No. of villages	Taluka	Crop wise area which received rural compost during previous year.							Total rural compost sold in the previous year Tone.Kgs.	Quantity of rural compost produced in the previous year. Tone.Kgs.
			Bajri:	Jowar:	Wheat :	Ground:	Cotton:	Other :	Total		
			A.G.	A.G.	A.G.	nut A.G.	A.G.	A.G.	A.G.		
1	2	3	8	9	10	11	12	13	14	15	16
1.	5	Jasdan	38.16	58.07	31.32	273.20	33.32	8.28	444.15	267.400	106.000
2.	3	Paddhari	62.34	63.39	33.32	427.04	33.32	12.16	634.01	382.400	192.000
3.	4	Gondal	23.02	4.00	2.12	141.14	35.32	7.34	214.14	25.000	20.000
4.	3	Lodhika	57.00	24.29	39.05	267.08	1.00	32.05	415.07	70.500	48.000
5.	3	Kotda Sangani	34.05	5.38	5.16	240.39	20.08	7.16	314.02	11.500	-
6.	3	Malia	59.06	2.27	-	104.04	89.05	5.36	260.38	88.000	42.000
7.	5	Wankaner	45.21	-	19.07	11.20	6.01	7.27	89.36	78.500	143.000
8.	2	Dhoraji	28.07	-	2.00	82.20	2.00	6.20	121.07	12.000	-
9.	2	Jam Kandorna	12.00	2.00	2.00	150.00	22.00	3.18	191.18	4.642	142.142
10.	3	Upl.eta	18.25	4.20	3.20	226.37	94.14	8.26	356.22	225.000	277.000
11.	3	Jeipur	74.25	43.02	-	440.08	2.10	24.32	584.37	13.000	19.000
12.	5	Morvi	101.32	13.15	4.00	20.10	106.37	13.00	259.14	53.625	66.925
13.	2	Rajkot	5.26	0.28	2.00	31.24	-	8.24	48.20	8.000	9.000
Total:43			554.39	223.05	145.04	2417.08	447.11	147.02	3934.31	1239.567	1065.067

Thomas/22/4/71/S.

Table.2.

District:- Rajkot.

Year: 1967.

Details of rural compost produced by the selected house holds during the previous years.

Sr. No. of villages No. for which data analysed.	Taluka	Area under cultivation			Total quantity of F.Y.M. used in previous year. Tones-Kgs.	
		Irrigated A.G.	Unirrigated A. G.	Total A.G.		
1.	5	Jasdan	117.24	674.08	791.32	1393.240
2.	3	Paddhari	162.36	1101.25	1264.20	2193.240
3.	4	Gondal	113.22	419.28	533.10	1024.000
4.	3	Lodhika	89.18	352.33	422.11	1024.000
5.	3	Kotda Sangani	22.24	298.21	321.05	-
6.	3	Malia	36.31	397.23	434.14	8.000
7.	6	Wankaner	116.05	582.11	698.16	362.000
8.	2	Dhoraji	53.08	184.13	237.21	444.000
9.	2	Jam Kandorna	85.00	362.00	447.00	-
10.	3	Upleta	277.25	120.18	398.03	3035.000
11.	3	Jetpur	69.18	512.29	582.07	201.350
12.	5	Morvi	65.18	949.01	1014.19	96.658
13.	2	Rajkot	60.03	252.08	312.11	141.000
Total: 43			1269.31	6207.18	7477.09	9922.488

Thomas/22/4/71/S.

(contd.....2/-)

Table No.3.

Year : 1967.

District:- Rajkot .

Details in respect of production and utilization of rural compost in the selected house holds.

Sr. No.	Analy- sed. No. of village analy sed.	Taluka	No. of livestock observed at the time of visit (6 visits.)		Total	Total quantity of the manure in the pits/ heaps during the year No. of pits/ heaps.	Quantity of rural compost. Tonnes.Kgs.	Cropped area which recei- ved F.Y.M.	Average dose of F.Y.M. per acre of cropped area.
			Cattle & buffaloes (bovines)	Sheep & Goats.					
1	2	3	4	5	6	7	8	9	10
1.	Jaxdan 2	Jasdan	831	645	1476	30	301.600	321.00	0.939
2.	1	Paddhari	254	6	260	14	31.062	52.36	0.587
3.	1	Gondal	277	136	413	19	120.500	36.20	3.301
4.	1	Lodhika	347	170	917	20	527.000	236.02	2.232
5.	1	Kotda Sangani	322	24	346	26	0.331	219.00	0.002
6.	-	Malia	-	-	-	-	-	-	-
7.	5	Wankaner	2273	6082	8355	68	494.960	103.28	4.772
8.	2	Dhoraji	605	32	637	20	305.500	72.04	4.238
9.	2	Jam- kandorna	729	-	729	40	696.100	175.27	2.525
10.	1	Upleta	237	-	237	17	64.600	59.00	1.094
11.	-	Jetpur	-	-	-	-	-	-	-
12.	1	Morvi	335	126	461	12	354.950	21.24	16.432
13.	1	Rajkot	736	150	886	17	26.000	64.16	0.403
Total: 18			6946	7371	14317	283	2922.603	1361.37	2.145

Thomas/22/4/71/8.

Table- 4.

District:- Rajkot

Year : 1967.

Statement showing estimated production of compost live stock and variance.

Name of Talukas	Estimated production (compost for groups of talukas in tonnes)	Estimated district livestock.	Percentage S.E.
Group- A.			
(1)Jasdan	465493.728	-	7.25
(2)Gondal			
(3)Kotdasangani			
(4)Dhoraji			
(5)Jam Kandorna			
(6)Upleta			
(7)Jetpur			
Group- B.			
(1)Paddhari	355583.005	-	11.74
(2)Lodhika			
(3)Malia			
(4)Morvi			
(5)Rajkot			
Total:-	821076.733	925636	5.7
	(S.E. 5.7)		

Thomas/22/4/71/S.

Table No. 6.

District:- Rajkot

Year:- 1967.

Statement showing the frequency distribution of sampled pits according volume of pits
in Cu.ft.

No. of pits under different volume in Cu.ft.

Sr. No.	Taluka	No. of analysed villages.	Below 50.	51 to 100	101 to 150	151 to 200	201 to 250	251 to 300	301 to 350	351 to 400	401 to 450	451 to 500	501 & above	Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	Jasdan	4	39	38	33	73	5	8	7	17	3	2	18	249
2.	Lothika	2	34	38	36	30	13	16	12	12	11	5	33	240
3.	Kotada Sangani	1	-	10	13	9	13	3	2	-	1	-	-	51
4.	Wankaner	5	87	32	24	16	7	15	15	4	2	3	19	224
5.	Dhoraji	2	43	54	23	-	-	-	-	-	-	-	-	120
6.	Upleta	1	-	-	1	4	-	-	1	-	-	-	6	12
7.	Jam-Kandorna	2	20	14	19	29	19	22	2	4	-	-	33	162
8.	Paddhari	1	13	13	17	10	8	5	-	1	3	-	-	67
9.	Gondal	1	23	13	12	5	6	3	-	-	-	-	-	62
10.	Rajkot	1	23	12	9	8	1	4	-	1	-	-	2	60
11.	Morvi	1	1	1	2	1	-	4	-	-	-	-	3	12
12.	Malia	-	-	-	-	-	-	-	-	-	-	-	-	-
13.	Jetpur	-	-	-	-	-	-	-	-	-	-	-	-	-
Total:-		21	283	225	189	185	69	80	39	39	20	10	114	1253

Thomas/22/4/71/S.

Table No.7

dose of
Statement showing the average/application of compost manure in tone per acre

District	Bajri	Wheat	Jowar	Groundnut	Maize
(1) Banaskantha	1.92	2.23	1.79	-	1.57
(2) Rajkot	4.57	4.51	-	1.88	4.00

22/4/71/Thomas/S.