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**NATIONAL AGRICULTURAL TECHNOLOGY
PROJECT**



**STRATEGIES FOR ENHANCING THE
PRODUCTIVITY OF PIGS FOR THE
FARMING COMMUNITY**

**ANNUAL REPORT (2001-2002)
(COMPILED)**



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COLLEGE OF VETERINARY AND ANIMAL SCIENCES
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ANNUAL COMPILED REPORT ON THE PROGRESS OF RESEARCH PROJECT FUNDED UNDER NATP

Details of the Project:

1. Title of the Project : Strategies for enhancing the productivity of pigs for the farming community
2. Code No. : NATP/AED (A&H)/PSR/99
SE/24-00- 01/99/VC/NATP.
3. Name of Agro Ecosystem : Coastal Agro-Eco system.
4. Mode of Research : PSR
5. Period covered under the Report : 1-4-2001 to 31-3-2002
6. Date of start of the Project : 1-10-1999
7. Name of the PI : Dr. T.V. Viswanathan
8. Name of the Lead Centre : Centre for Pig Production and Research
Kerala Agricultural University
Mannuthy
9. Name of the participatory centres :
 - i. Livestock Research Station, Kattupakkam
 - ii. University of Agricultural Sciences, Bangalore
 - iii. Central Agricultural Research Institute, Port Blair
 - iv. ICAR Research Complex, Goa

Executive summary

The project was undertaken to identify the present problems and prospects of pig production system in rural sector and to improve the system by effective utilization of resources, establishment of pig farmers co-operatives and by integration to other production systems. An effective random field survey was conducted on the present pig production system adopted by the farmers and also the resource potential of the area for pig production after making a preliminary awareness of the project in the study area. The result of the survey varies in different co-operating centers. Efforts were taken to identify low cost unconventional pig

feed and to assess their nutritional value and formulation of an economic pig ration using locally available feed resources. Interventions were also made for genetic improvement of local Desi pig by cross breeding with exotic pigs in certain centres. The work was undertaken as part of postgraduate research programme in one centre thereby helping for effective implementation. The findings in the study in various centres helped for clear understanding of the rural pig production systems, its problems and prospects, areas needing interventions formulation of low cost pig feed and thereby contributing a lot to the achievement of final objectives of the core project.

Pig co-operatives were established in certain centres for effective management of the field units and marketing. Health coverage of Pigs was given due consideration with adoption of preventive vaccination programme. Training on strategic management of pig for progressive farmers was organized in most of the centres. Project reports were issued to farmers for giving financial assistance and technical guidance was given to farmers. Farmers were encouraged to bring the animals under insurance coverage.

Research achievements:

1. Lead Centre : Centre for Pig Production and Research, Mannuthy

A preliminary awareness of the project was created in the identified Grama panchayaths through all possible media. Based on the interest shown by the local bodies two Panchayaths viz. Kaiparampu and Kuzhur in Thrissur district were identified for the implementation of the Project. An effective random field survey was conducted on the present pig production system adopted by the farmers and also the resource potential of the area for pig production, based on a well designed questionnaire prepared with the assistance of local bodies and experts from Department of Extension, College of Veterinary & Animal Sciences, Mannuthy.

Thirty-four progressive farmers identified from the two Panchayaths were given a one-day intensive training on pig production and management organized at the NATP training centre. Project reports were issued to needed farmers for getting financial assistance. A total of 110 animals were distributed as field units to 20 progressive farmers in two panchayaths and the data on their performance are being collected.

A nucleus herd of exotic pigs consisting of 15 males and 42 females were purchased from CPPR, Mannuthy for establishing the nucleus breeding stock for NATP and also for the preliminary study of bottlenecks in establishing the field units. The progenies obtained for the nucleus stock were used for distribution among the farmers.

A pig farmer's co-operative society was established at Kuzhur panchayath and envisaged in the Technical Programme for monitoring the various activities in pig rearing in the panchayath especially marketing of pork and pork products.

Three M.V.Sc. research programmes were completed under the project and there are two Ph.D. and one M.V.Sc. ongoing projects.

Research Projects

M.V.Sc.

1. Nutritional evaluation of prawn waste for growth in Large White Yorkshire Pigs by U. Madhukumar under the guidance of Dr. T. V. Viswanathan.

Aquatic animal (prawn) waste is an unconventional feed source, which can be exploited to a large extent as a livestock feed ingredient. Kerala stands first among Indian states in production of seafoods. The export oriented shrimp based seafood industry is one of the organized fish processing industries in India. The extent of fish landings in Kerala is around three lakh tones annually. The annual availability of prawn waste in Kerala is estimated to be 0.9 lakh tonnes. Handling of prawn waste encounters problems of disposal due to their high moisture content, quick deterioration and offensive odour. Improper disposals of the waste lead to pollution hazards. The common practice in Kerala is to use the major portion of the prawn waste as manure or to throw back into sea.

Prawn waste has been subjected to series of feeding experiments in different species of animals in the Department of Nutrition, College of Veterinary and Animal Sciences, Mannuthy after converting into silage with proper additives. Prawn waste was found to be a potential source of nutrient such as protein and minerals for cattle.

Though prawn waste is found to possess potential nutrients such as proteins and minerals, very little work has been done to find out the suitability of prawn waste as a protein supplement for pig

Materials and methods

Thirty female Large White Yorkshire pigs with an average body weight of 31.0 kg belonging to the Centre for pig production and Research, Mannuthy were used as the experimental animals. The pigs were divided into three groups of ten each, as uniformly as possible with regard to age, sex and body weight. Ten pigs in each treatment were randomly

distributed into five replicates of two pigs each. The three groups of pigs were randomly allotted to three dietary treatments (T₁, T₂ and T₃). Each replicate was housed in different pens and were maintained under identical condition of management. All the animals were dewormed before the experiment.

The pigs were fed with rations formulated to contain 16% and 14 % crude protein, 3080 kcal and 3030 kcal of digestible energy, during the growing and finishing period, respectively. They were fed the grower ration until they attained an average body weight of 50 kg and there after changed to the finisher ration until the animals were slaughtered. The ingredient composition of the experimental feed is given in Table 1

Table 1 Percentage ingredient composition

Ingredient	Grower ration			Finisher ration		
	(T ₁)	(T ₂)	(T ₃)	(T ₁)	(T ₂)	(T ₃)
	I	II	III	I	II	III
Yellow maize	34.0	49.0	54.0	30.0	45.0	57.0
Rice polish	20.0	7.0	3.5	26.5	19.0	6.0
Wheat bran	25.5	23.0	21.5	29.0	20.0	18.0
GNC (Expeller)	9.5	9.5	-	6.5	6.0	-
Fish meal	9.5	-	-	6.5	-	-
Prawn waste	-	10.0	20.0	-	9.0	17.5
Min. Mix	1.0	1.0	1.0	1.0	1.0	1.0
Salt	0.5	0.5	0.5	0.5	0.5	0.5

Vitamins and additives added as recommended

Animals in group I, II and III were allotted to the following three dietary treatments, namely.

- 1) T₁ – Control
- 2) T₂ – 25% of the total protein in T₁ replaced by protein from prawn waste
- 3) T₃ – 50% of the total protein in T₁ replaced by protein from prawn waste.

The method described in Association of Official Analytical Chemists (AOAC, 1990) was followed to estimate the chemical composition of the diets.

The prawn waste (used in T₂ and T₃) was collected from prawn feeding sheds situated around the coastal area in Kochi. The Sodium azide (Na N₃) at 0.065% was used as preservative. The prawn waste was steam cooked and mixed well with the feed before it was given to animals.

Feeding trial

Animals were fed in the morning (9.00 A.M.) and evening (4.30 P.M.) and were allowed to consume as much feed as they could with in a period of one hour. The pigs were weighed once in fortnight to record the gain in bodyweight. Data is being analyzed.

Digestibility trial

Digestibility trial was conducted at the end of the experiment to determine the digestibility coefficients of nutrients of the experimental diets. The feed and fecal samples collected during the digestibility trial were analyzed for proximate principles.

Four animals from each treatment were selected randomly and slaughtered at the end of the experiment for evaluation of the carcass traits.

The chemical composition of the experimental diet is given in Table 2

Table 2 Percentage chemical composition on dry matter basis

Item	Grower ration			Finisher ration		
	(T ₁)	(T ₂)	(T ₃)	(T ₁)	(T ₂)	(T ₃)
	I	II	III	I	II	III
Dry matter	89.2	88.8	89.0	88.8	90.1	89.7
Crude protein N x 6.25	16.1	16.0	16.1	14.0	14.1	14.2
Ether extract	5.4	5.6	5.7	6.0	6.2	6.3
Crude fibre	6.2	6.1	5.8	7.8	7.9	7.6
NFE	61.1	60.3	59.8	62.1	59.9	59.9
Total ash	11.2	12.0	12.6	10.1	11.9	12.0
AIA	5.4	4.8	4.6	6.0	4.2	4.1
Ca	0.98	1.21	1.22	1.02	1.51	1.45
P	0.70	0.63	0.67	0.68	0.80	0.73

Proximate Composition of Prawn Waste

Proximate composition is presented in Table 3.

Table 3 Average per cent chemical composition of prawn waste on dry matter basis

Item	Average* with SE (%)
Dry matter	21.2 ± 0.3
Crude protein	38.5 ± 0.6
Ether extract	4.8 ± 0.0
Crude fibre	14.6 ± 0.4
Nitrogen free extract	12.4 ± 2.4
Total ash	29.5 ± 2.1
Acid insoluble ash	1.5 ± 0.15
Calcium	9.96 ± 0.35
Phosphorus	1.52 ± 0.16

* Average of six values

Live Weight Gain and Feed Conversion Efficiency

The result on the mean values of body weight of pigs under the three dietary treatments T₁, T₂ and T₃, recorded at fortnightly intervals are presented in Table 4.

Table 4 Fortnightly body weight (kg) of pigs maintained on three dietary treatments^a

Fortnights	Treatments		
	T ₁	T ₂	T ₃
0	31.4* ± 0.3	31.4* ± 0.2	31.4* ± 0.4
1	37.7* ± 0.4	37.9* ± 0.4	36.8* ± 0.9
2	44.5* ± 0.5	45.0* ± 0.6	43.0* ± 0.6
3	50.2* ± 0.7	51.5* ± 1.0	49.5* ± 0.8
4	55.9* ± 1.2	57.0* ± 1.0	55.6* ± 1.0
5	61.5* ± 1.3	62.5* ± 1.1	61.0* ± 0.8
6	66.1* ± 1.5	67.3* ± 1.9	65.7* ± 0.9

* Not significant

a Mean of ten values with SE

The data on fortnightly average daily gain and fortnightly feed conversion efficiency are presented in tables 5 and 6 respectively.

Table 5 Fortnightly average daily gain (g) of pigs maintained on three dietary treatments^a

Fortnights	Treatments		
	T ₁	T ₂	T ₃
1	419.99 [*] ±24.67	399.99 [*] ±10.11	359.99 [*] ±50.68
2	453.33 [*] ±21.80	473.33 [*] ±23.85	416.66 [*] ±27.64
3	379.99 [*] ±24.67	433.33 [*] ±26.24	426.66 [*] ±15.34
4	380.10 [*] ±36.93	363.93 [*] ±22.36	410.00 [*] ±25.4
5	373.33 [*] ±22.90	370.00 [*] ±21.39	356.66±39.79
6	306.6 [*] ±19.20	319.99 [*] ±54.44	316.66 [*] ±14.14

* Not significant

a Mean of ten values with SE

Table 6 Feed conversion efficiency of pigs maintained on the three dietary treatments at fortnightly intervals (Mean ± SE)

Fortnights	Treatments		
	T ₁	T ₂	T ₃
1	3.57±0.20	3.75±0.10	4.16±0.70
2	3.28±0.15	3.16±0.17	3.60±0.29
3	5.26±0.30	4.61±0.27	4.80±0.16
4	5.26±0.55	5.50±0.30	4.87±0.26
5	5.36±0.32	5.40±0.30	5.60±0.47
6	6.53±0.47	6.00±0.76	6.31±0.36

Significant (P<0.05)

Cumulative average daily gain and feed conversion efficiency of animals of the three dietary treatments are furnished in table 7 and figure 1.

Fig.1.Fortnightly average daily gain of pigs maintained on the three dietary treatments

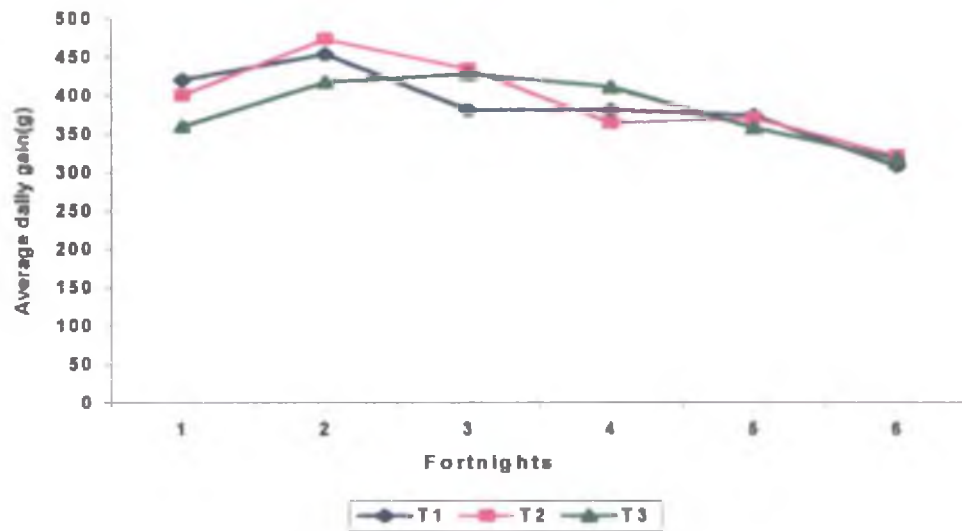


Table 7 Cumulative average daily gain and feed conversion efficiency of pigs maintained on three dietary treatment (Mean \pm SE)

Item	Treatments		
	T ₁	T ₂	T ₃
Initial body weight (kg)	31.4 \pm 0.39	31.4 \pm 0.28	31.4 \pm 0.45
Final body weight (kg)	66.1 \pm 1.51	67.35 \pm 1.99	65.75 \pm 0.94
Body weight gain (Kg)	34.7 \pm 1.28	35.95 \pm 1.77	34.55 \pm 1.04
Total feed intake (kg)	165.00	150.00	139.50
Average daily gain (g)	386 \pm 18.41	393 \pm 20.32	381 \pm 16.13
Feed conversion efficiency(Kg feed/kg gain)	4.87 \pm 0.45	4.73 \pm 0.41	4.89 \pm 0.36

The average value for body weight gain of animals belonging to the groups T₁, T₂ and T₃ were 34.7, 35.95 and 34.35 kg, respectively.

Digestibility Coefficient of Nutrients

The chemical compositions of faeces of pig fed with different experimental diets are shown in Table 8.

Table 8 Per cent chemical composition of faeces of pigs fed on three dietary treatments^a

Item	Treatments		
	T ₁ (%)	T ₂ (%)	T ₃ (%)
Moisture	65.2	68.1	64.0
Crude Protein (N x 6.25)	11.7	11.7	13.1
Ether extract	5.5	6.0	7.3
Crude fibre	18.2	13.2	13.9
Nitrogen free extract	35.7	40.0	32.8
Total ash	28.6	28.8	32.7
Acid insoluble ash	17.9	14.5	11.3

a - Average of ten values on dry mater basis

Data on digestibility coefficient of nutrients of the three experimental diets T₁, T₂ and T₃ are presented in Table 9.

Table 9 Average digestibility coefficient of nutrients of the three dietary treatments (Mean ± SE)^a

Nutrients	Treatments		
	T ₁	T ₂	T ₃
Dry matter*	58.5 ^b ± 0.3	62.4 ^c ± 1.5	61.2 ^{cd} ± 0.6
Crude protein**	65.1 ^b ± 0.3	68.4 ^c ± 1.23	62.1 ^d ± 1.7
Ether extract	33.6 ± 0.6	37.9 ± 2.54	33.2 ± 1.3
Crude fibre	25.2 ± 0.8	26.6 ± 1.30	26.4 ± 1.2
Nitrogen free extract**	76.2 ^b ± 0.2	75.5 ^b ± 1.05	79.6 ^c ± 0.3

a, - Mean of ten values

b, c,d -Means with different superscripts within the same row differ significantly

* Significant (P<0.05)

** Significant (P<0.01)

The digestibility coefficient of dry matter of T₁, T₂ and T₃ were: Dry matter 58.5, 62.4 and 61.2; crude protein 65.1, 68.4 and 62.1; Ether extract 33.6, 37.9 and 33.2; crude fibre 25.2, 26.6 and 26.4; and nitrogen free extract 76.2, 75.5 and 79.6 respectively.

Carcass Characteristics

Data on carcass characteristics of pigs maintained on the three experimental diets T₁, T₂ and T₃ are furnished in table 10.

Table 10 Carcass characteristics of pigs fed on three dietary treatments^a

Item	Treatments		
	T ₁	T ₂	T ₃
Live body weight (kg)	64.2 ± 2.0	64.5 ± 2.5	64.7 ± 1.4
Dressed weight without head(kg)	47.8 ± 2.1	46.2 ± 3.0	48.2 ± 0.7
Head weight (kg)	4.6 ± 0.1	4.3 ± 0.1	4.6 ± 0.06
Carcass length (cm)	66.5 ± 1.3	67.0 ± 0.4	65.2 ± 1.1
Back fat thickness (cm)	2.6 ± 0.1	2.5 ± 0.2	2.7 ± 0.1
Ham weight	7.0 ± 0.3	7.0 ± 0.5	4.6 ± 0.1
Dressing percentage	74.3 ± 1.9	71.6 ± 2.9	74.9 ± 0.4
Lion eye area (cm ²)	21.4 ± 0.3	23.3 ± 0.2	24.9 ± 0.5

a - Mean of four values with SE

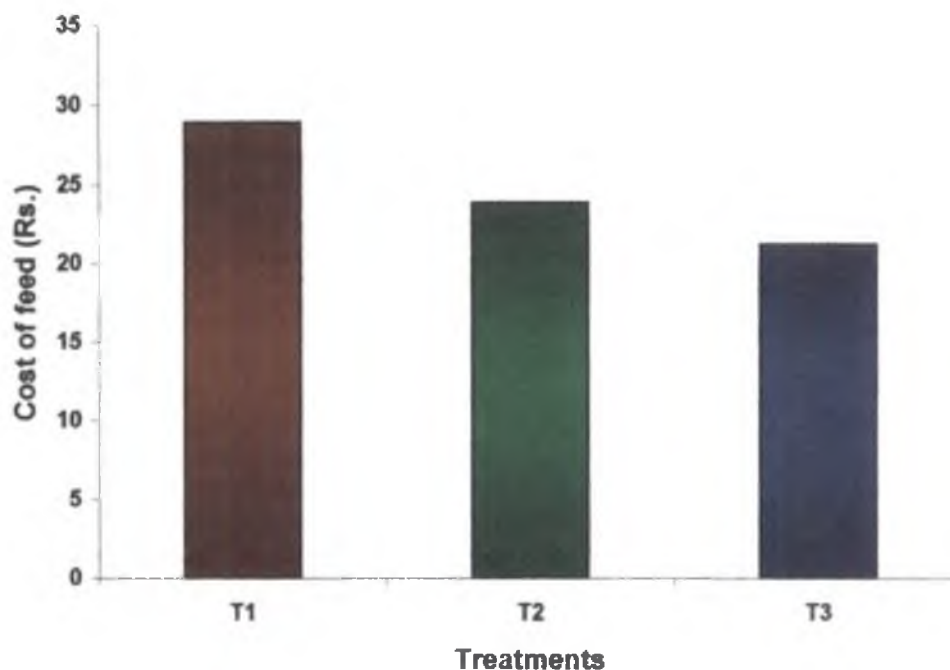
Economics of Gain

Data on cost of feed per kg body weight gain of pigs maintained on the three dietary treatments are presented in Table 11 and figure 2. The values were Rs. 28.95, Rs. 23.84 and Rs. 21.15 for T₁, T₂ and T₃ respectively.

Table 11 Cost of feed (Rs) per kg body weight gain of pigs maintained on different dietary treatments

Item	Treatments		
	T ₁	T ₂	T ₃
Cost/kg of grower ration(Rs)	6.46	5.43	4.33
Cost/kg of finisher ration(Rs)	5.96	5.10	4.40
Cost of feed per kg body weight gain(Rs)	28.95	23.84	21.18

Fig.2. Cost of feed per kg weight gain of pigs maintained on the three dietary treatments



2. Productivity and feasibility of pig production systems in rural sector by S.Harikumar under the guidance of Dr. Joseph Mathew (Part II)

The second part of the research programme was a comparative study on the performance of pigs under organized farms and field conditions. For this, animals maintained at Centre for Pig Production and Research, Mannuthy and those in field units in rural sector were used.

Twenty four Large White Yorkshire piglets were randomly selected from the Centre for Pig Production Research, Mannuthy. They were divided into four groups of six each, as uniformly as possible with respect to age, sex and body weights. All the four groups consisted of three males and three females. Males in the entire group were castrated at the time of weaning. Each group was allotted randomly to one of the following four treatment

Treatment I

Maintained at the Centre for Pig Production and Research, Mannuthy under the feeding and management condition prevailing in the farm.



Rural low cost pig styes madeup of locally available cheap materials suited for small holder pig production system

Treatment II

Maintained at the Centre for Pig production and Research, Mannuthy were fed twice daily with swill collected from hostels of Veterinary College campus. Management other than feeding was similar to treatment I group.

Treatment III

Pigs in this treatment was maintained under the feeding and management conditions prevailing in a larger farm in field, where holding capacity is not less than 100 adult pigs at a time.

Treatment IV

This group was maintained as single unit in the field where holding capacity is less than 10 adult pigs at a time.

On attaining eight months of age all the pigs were be slaughtered and the growth performance, carcass characteristics like dressing percentage, carcass length, loin eye area, back fat thickness and meat- bone ratio were studied.

Economics in all of the four treatment group were worked out.

Observations

Table 1. Mean body weight of pigs maintained as four dietary treatments (kg)

Age	T1	T2	T3	T4
2 months	7.9 ± 0.1	8.1 ± 0.2	7.8 ± 0.1	7.5 ± 0.2
3 months	15.3 ± 0.4	17.8 ± 0.6	17.6 ± 0.7	17.8 ± 0.5
4 months	28.5 ± 0.7	28.8 ± 1.2	29.3 ± 2.1	29.3 ± 0.2
5 months	38.6 ± 0.9	37.5 ± 1.7	42.5 ± 3.3	42.0 ± 1.7
6 months	48.6 ± 1.2 ^a	45.5 ± 2.0 ^b	49.6 ± 3.6	55.0 ± 2.4 ^{ab}
7 months	57.8 ± 1.3 ^a	52.8 ± 2.4 ^b	58.8 ± 3.8	66.1 ± 3.1 ^{ab}
8 months	65.3 ± 1.9 ^a	60.0 ± 2.7 ^b	65.4 ± 4.5	73.6 ± 3.1 ^{ab}

Figures having same superscript in lower case in a row are significantly different at P<0.01

Table 2. Average daily gain (g) of pigs maintained as four dietary treatments gain

Month	T1	T2	T3	T4
3	336.11 ± 14.54	322.22 ± 15.90	327.78 ± 23.04	341.67 ± 15.96
4	344.44 ± 11.11	366.67 ± 33.33	388.89 ± 47.66	383.33 ± 28.22
5	338.89 ± 20.03 ^b	288.89 ± 0.49 ^{Aab}	438.89 ± 45.87 ^a	422.22 ± 18.59 ^a
6	333.33 ± 32.20 ^a	266.67 ± 14.90 ^a	300.00 ± 21.08 ^b	433.33 ± 4.34 ^{ab}
7	305.56 ± 10.24	244.44 ± 22.22 ^a	306.67 ± 22.11	372.22 ± 29.08 ^a
8	250.00 ± 23.95	238.89 ± 18.08	220.00 ± 29.94	250.00 ± 18.76
Mean	318.98 ± 11.09 ^a	287.96 ± 15.23 ^b	320.00 ± 24.68	367.13 ± 16.64 ^{ab}

Figures having same superscript in lower case in a row are significantly different at P<0.01

Table 3. Daily feed intake (kg) of pigs maintained as four dietary treatments

Age in months	T1		T2		T3		T4	
	FW	DM	FW	DM	FW	DM	FW	DM
3	0.970	0.863	0.890	0.225	1.080	0.283	1.250	0.305
4	1.110	1.077	2.980	0.754	3.010	0.775	3.000	0.736
5	1.410	1.255	4.180	1.058	4.080	1.056	4.330	1.072
6	1.980	1.762	5.200	1.316	6.010	1.578	5.920	1.448
7	1.990	1.770	6.100	1.544	6.590	1.735	6.670	1.647
8	2.000	1.779	6.500	1.645	7.270	1.869	7.580	1.815
Mean	1.576 ± 0.19 ^{abc}	1.417 ± 0.16	4.308 ± 0.86 ^a	1.090 ± 0.21	4.073 ± 0.97 ^c	1.216 ± 0.25	4.792 ± 0.97	1.170 ± 0.23 ^b

FW- Fresh weight basis

DM- Dry matter basis

Figures having same superscript in lower case in a row are significantly different at P<0.01

Figures having same superscript in upper case in a row are significantly different at P<0.05

Table 4. Feed Conversion Efficiency (DM basis)

Month	T1	T2	T3	T4
5	3.773 ± 0.24	3.776 ± 0.33	2.577 ± 0.33	2.565 ± 0.12
6	5.551 ± 0.56	5.013 ± 0.28	5.358 ± 0.34	3.391 ± 0.18
7	5.826 ± 0.20	6.614 ± 0.66	5.788 ± 0.46	4.583 ± 0.41
8	7.437 ± 0.67	7.112 ± 0.61	8.936 ± 0.98	7.443 ± 0.50
Mean	4.469 ± 0.16*	3.850 ± 0.25	3.894 ± 0.31	3.221 ± 0.15*

* S.E. LFU - Large Field Unit SFU - Small Field Unit CO- Chicken Offal RW - Restaurant Waste

Table 5. Proximate analysis of feed samples

Item	Concentrate	Chicken waste	Restaurant waste	Hostel waste
Moisture	11.0 ± 0.3	70.79 ± 1.1	78.7 ± 0.6	74.6 ± 1.57
Crude protein*	17.8 ± 0.2	35.6 ± 2.7	10.9 ± 0.4	9.9 ± 0.4
Crude fibre*	8.1 ± 0.4	8.6 ± 2.8	4.6 ± 0.5	4.92 ± 0.6
Ether extract*	8.1 ± 0.4	30.9 ± 2.3	20.4 ± 1.3	18.3 ± 1.5
Ash*	10.1 ± 0.1	7.0 ± 0.7	10.3 ± 0.8	6.0 ± 0.5
NFE*	55.7 ± 1.0	15.6 ± 1.8	53.5 ± 2.0	60.7 ± 1.2
Acid ins. Ash*	4.1 ± 0.2	2.7 ± 0.3	0.9 ± 0.1	0.9 ± 0.0

* On DM basis

Table 6. Carcass characteristics of pigs fed different experimental diets

Organs (kg)	T1	T2	T3	T4
Live weight	65.33 ± 1.74 ^a	60.0 ± 2.79 ^b	65.4 ± 4.07	73.66 ± 3.15 ^{a b}
Heart	0.21 ± 0.01	0.22 ± 0.03	0.20 ± 0.01	0.23 ± 0.01
Lungs	0.83 ± 0.02	0.73 ± 0.04	0.91 ± 0.07	0.87 ± 0.53
Liver	0.915 ± 0.03 ^c	0.79 ± 0.02 ^{a d}	1.01 ± 0.04 ^{a b}	1.17 ± 0.05 ^{b c d}
Kidney	0.14 ± 5.48	0.15 ± 7.6	0.16 ± 0.11	0.18 ± 0.01
Stomach & intestine	7.45 ± 0.30	7.35 ± 0.35	6.66 ± 0.21	7.7 ± 0.57
Head	4.31 ± 0.2	4.5 ± 0.11	4.41 ± 0.10	4.89 ± 0.2
Bone	5.23 ± 0.12 ^b	5.65 ± 0.20	5.27 ± 0.21	5.9 ± 0.2 ^b
Carcass weight	47.66 ± 1.64 ^b	44.16 ± 2.4 ^a	49.0 ± 3.69	55.66 ± 2.49 ^{a b}
Hot deboned meat	37.83 ± 1.55 ^b	35.66 ± 2.41 ^a	39.9 ± 3.8	45.91 ± 1.95 ^{a b}
Carcass length	63.2 ± 0.2 ^b	63.0 ± 0.77 ^c	61.5 ± 0.95 ^a	65.0 ± 0.83 ^{a b c}

Figures having same superscript in lower case in a row are significantly different at P<0.01

Table 7. Cost of production in four treatments (Rs.)

ITEMS	T1	T2	T3	T4
CAPITAL COST				
Cost of housing	45795.00	45795.00	7000.00	4500.00
Interest on capital cost	2290.00	2290.00	350.00	225.00
OPERATIONAL COST				
Cost of piglets (@ Rs 90 per kg)	4275.00	4406.00	4228.00	4093.00
Cost of feed	12260.00	-	-	-
Labour charge	2250.00	2250.00	850.00	700.00
Treatment charge	250.00	250.00	300.00	350.00
Miscellaneous (transportation etc.)	100.00	190.00	260.00	220.00
RECEIPTS				
Sale of pigs	11759.00	10800.00	11772.00	13259.00
Cost of manure	250.00	100.00	100.00	100.00
COST OF PRODUCTION				
Cost of production	21425.00	9386.00	5988.00	5588.00
Cost of production (per kg live weight)	54.66	26.07	15.26	12.64
Profit/loss	-9415.00	+1514.00	+5884.00	+7771.00

3. Evaluation of boar semen extended in Belt's Ville thaw solution by Kantharai under the guidance of Dr.K.V.Athman (Mv.Sc.Programme)

An experiment was conducted to study the effect of natural service and artificial insemination on reproductive performance of pigs and to assess the fertility and preservability of boar semen extended in Belt's ville thaw solution.

Twenty-four Large White Yorkshire (LWY) gilts, twenty four sows and six LWY boars were selected for the study. Out of six boars, three boars were used for natural service and other three maintained for artificial insemination purpose.

A total of 52 ejaculates were collected from boars maintained for artificial insemination purpose at weekly intervals by the gloved hand technique. Among these boars, no significant differences were found for most of the semen characteristics except proximal and distal protoplasmic droplet, which were significantly different among boars ($P<0.05$). Negative correlation between total volume of ejaculate and sperm concentration was observed. No significant correlation between total sperm abnormalities and live sperm count could be detected.

Twenty ejaculates from these boars were used for preservation studies. No significant variation in the preservability of spermatozoa could be detected between boars, whereas, there was a highly significant difference ($P<0.01$) in the preservability of spermatozoa between hours of preservation.

Twelve LWY gilts and twelve sows (Group-I) and three boars were used for natural service. Each gilt and sow was mated twice during the oestrus. Twelve gilts and twelve sows (Group-II) were artificially inseminated twice during the oestrus with the semen diluted in BTS.

There was a significant difference ($P<0.05$) in the duration of oestrus between gilts and sows. There was a marginal difference in the conception rate between naturally served and artificially inseminated gilts and sows. The farrowing rate was 100 percent for both naturally served and artificially inseminated gilts and sows. There was a significant difference in the gestation length between artificially inseminated gilts and sows. There was a significant variation in the litter size between naturally served and artificially inseminated gilts and sows.

It could be concluded from the study that artificial insemination in pigs can be well performed under commercial farming conditions for effective disease control and increased productivity.

4 . *Study on management information system in institutional swine farm. Bindu P. under the guidance of Dr. Joseph Mathew (Mv.Sc.Programme - on going)*

Objective of the study

1. To study the merits and demerits of the management information system (MIS) presently available in the farm
2. To formulate an MIS based on computer software which may improve managerial efficacy and decision making process in swine farm
3. To evaluate the relative merits of the developed MIS in comparison to the traditional system.

Outline of technical programme/plan of study

A detailed study on the merits and defects of present MIS will be undertaken by conducting a survey in Centre of Pig Production and Research (CPPR), Mannuthy using a well designed questionnaire and interview. The data will be analysed and meaningful conclusions will be drawn on the defects and merits of the MIS. Based on this a computer based MIS will be developed in appropriate package incorporating all the components in the farm such as animals, its production and reproduction details, feeding, breeding, human resource components, labour management, administration, financial implications, research, teaching and extension activities, profit and loss account, productivity of each element and all other related elements. The technical program for the software development includes Output design, Input design, File design/Database design, Program coding, Software testing and Implementation of the software. The developed software will be studied by on farm trial run in the farm for a reasonable period within the study limit and defects if any will be rectified and then it will be recommended as a model MIS for other farms if required.

5 . *Utilization of pig manure for preparation of vermi compost*

Pig farming is gaining more popularity in our state as a profitable enterprise. One of the most important constraints in pig farming is the problem of disposal of manure. Some farms do not have enough land to effectively deal with the manure produced. Even when quantities are

not excessive, management problems can arise as the manure is treated as waste rather than as a potential resource. The mismanagement of manure has led to a series of pollution problems, including water contamination, air pollution and soil pollution. By the proper management of manure we can not only reduce these pollution problems, but also it will add to the profit of pig rearing.

The role of earth worm as a biological agent in the degradation of organic waste is already recognised. Vermicomposting is an important aspect of biotechnology involving the use of earthworms as bioreactors for recycling of organic waste. The most important component of vermicomposting is the vermicomposting which is the bioconversion of organic waste material to nutritious vermicompost through earth worm consumption.

It is in the light of above facts, the present study was taken up with the objective of standardizing an economically feasible method of vermicomposting by which the pig manure can be converted into an enriched organic fertilizer.

Materials and methods

The present study was conducted at Kerala Agricultural University, Centre for Pig Production and Research, College of Veterinary and Animal Sciences, Mannuthy. Pig manure collected from the centre was subjected to following three treatments.

T₁ – Dried pig manure - Pig manure was collected from the pens once daily. Drying of pig manure was done under sunlight. During the process of drying it was not exposed to rain or washing with water.

T₂ – Compost - Compost was made with pig manure and dried leaves. The proportion was 10:1. For each 10 kg pig manure 1 kg dried leaves were added and it was kept inside a tank and allowed to decompose.

T₃ – Vermi culture – Here also the primary steps were same as that of compost preparation. First, manure and dried leaves were mixed at 10:1 proportion. After a certain degree of decomposition the worms were added. Rate of Addition of worms was 800-1000 worms per Tonne of compost.

The samples from the three treatments were collected and chemical analysis was conducted for Nitrogen (using Kjeldhal method), Phosphorus and Potassium (using Diacid digestion method).

Results and Discussions

Results obtained by the chemical analysis of dried pig manure, compost and vermicompost are furnished in Table 1.

Table 1. chemical analysis of dried pig manure, compost and vermi compost

Treatment	N %	P %	K %
Pig manure	0.616	0.397	0.029
Compost	1.400	0.690	2.270
Vermicompost	1.792	0.920	2.780

Relatively high Nitrogen, Phosphorus and Potassium content was noticed in vermicompost. The higher degree of decomposition and mineralisation in vermi-compost may be one of the reasons for the high Nitrogen content in vermicompost. Increased number of Nitrogen fixing bacteria in worm casts can also contribute to the high Nitrogen content in vermicompost. Nitrogenous excretions from the worms can also enrich the compost from organic waste. Micro organisms in the gut of some earth worm species using mucus secreted from the gut epithelium as an energy source may fix atmospheric Nitrogen as source of nitrogen for plant growth. The higher Phosphorus content in the vermicompost may be due to the greater mineralisation of organic matter with the aid of microflora associated with earthworms. The mechanism behind the effect of the earth worms were thought to partly due to enhanced microbial and phosphatase activities and partly to the physical breakdown of the plant material and trituration of the mineral fraction and partly to intimate mixing of ingested particles with soil in earth worm casts. Earthworm increase the availability of Potassium by

shifting the equilibrium among the forms of Potassium from relatively unavailable forms to more available forms.

Conclusion:

An attempt was made to utilize earthworms as biological agents in preparing an enriched organic fertilizer from pig manure, which otherwise create a lot of environmental pollution problems. The findings in the study indicated that the overall manurial value of pig manure could be improved by vermicompost technology.

6 *Influence of rendered fat in the diet of Large White Yorkshire sows on litter performance (Mv.Sc.Programme)*

Objectives

1. To study the effect of the supplemented rendered fat as added energy source in the diet of LWY sows during late gestation and lactation on litter performance till weaning
2. To make effective use of the agro industrial or animal byproduct waste
3. To arrive at the economics in utilizing in rendered fat as added energy source in the diet of LWY sows

Outline of the Technical programme

1. 32 LWY sows at late gestation (around 100 days) were taken for the study
2. The experimental animal were divided into 4 equal groups with 8 replicates each. Each pregnant sow was housed individually in separate farrowing pen till weaning
3. The animals in group I, II III and IV were randomly allotted to one of the following dietary treatments

T₁ – control (Standard ration)

T₂ – control ration with 5% supplemental rendered fat

T₃ – Control ration with 10% supplemental rendered fat

T₄ - Control ration with 15% supplemental rendered fat

All the animals were maintained on their respective diets from late gestation to weaning of piglets (56 days of birth). Digestibility trial was conducted at the end of the experiment

Table 1 Composition of the control ration (18 % CP)

Yellow maize	40%
Rice polish	26.5%
Wheat bran	17%
Soyabean /GNC	7%
Dried fish	8%
Mineral mixture	1%
Salt	0.5%

Main items of observation

1. Chemical composition of ration
2. Dam's wt. At post partum
3. Litter size and litter weight at birth
4. No. born alive / litter
5. No. still born / litter
6. Dam's wt. At weaning
7. Litter size and litter wt. At weaning
8. Economics of pig let production

Table 2 Production performance of Pigs fed different experimental diets

Parameters	T ₁ (Control)	T ₂ (5% fat)	T ₃ (10% fat)	T ₄ (15% fat)
No. of observation	8	8	8	8
Avg. litter size at birth	9.6	9.5	10	9
Avg. birth wt pig ling(kg)	1.46	1.40	1.38	1.54
Avg. post partum wt. of sow (kg)	155.3	135.0	145.0	134.1
Avg. litter size at weaning	7.5	7.5	7.75	7.4
Avg. weaning wt. of pigling	7.96	8.90	8.27	8.95
Avg. wt. of sow at weaning	134.64	119.3	132.8	131
Avg. body wt. loss during lactation till weaning	20.7	15.7	12.2	11
Mortality % of piglets/sow	21.2	20.7	21.2	16.7

Table 3 Economics

Additional cost (Rs.) for supplemented fat	-	99	198	297
Profit for an higher weaning wt. of pigling and lower wt. loss of sows during lactation	-	743	543	954
Net profit per sow (Rs.)	-	644	345	657

7 . Influence of rendered fat in the diet of LWY weanling pigs on growth performance

Objectives

1. To study the effect of supplemented rendered fat in the diet of LWY weanling pigs as added energy on the growth performance till marketing
2. To arrive at the optimum level of the rendered fat to be supplemented in the diet of LWY pigs during growth period
3. To arrive at the economics

Technical programme

18 weaned female piglets of 3 months each were taken for the study. The animals were divided into 3 equal groups with 6 replicates each. All the 6 piglets in each group were housed altogether in a pen and were group fed with the following rations

Group I- control (6 animals)

Group II – Control ration with 10% supplemental rendered fat (6 animals)

Group II- Control ration with 15% supplemental rendered fat (6 animals)

All the animals were maintained in their respective ration from 3 months of age to 8 months

Composition of control ration (14 % CP)

Yellow maize	50%
Rice Polish	16.5%
Wheat bran	10%
Soyabean / BNC	12%
Dried fish	10%
Mineral mixture	1%
Salt	0.5%

Body wt. Gain at regular intervals were recorded

Results

Item	T ₁	T ₂	T ₃
Avg. initial body wt.	26.42	21.41	21.41
Avg. final body wt.	76.17	82.33	85.83
Avg. wt. Gain	54.75	60.92	64.42

8 . *Effect of papaya (carica papaya) on nutrient digestibility in pigs*

Objectives

1. To study the effect of solar dried papaya on digestibility of nutrients in pigs
2. To arrive at the economics

Technical programme

Twelve LWY adult pigs from CPPR, Mannuthy will be divided into 2 groups of 6 each and each group will be randomly allotted to one of the following treatments

Treatment I – Standard Ration (Control)

Treatment II – Diet with 5 % solar dried papaya

A digestibility trial will be conducted by indicator method (Chromic Oxide) by the end of the experiment. Economics of utilization of dried papaya as feed additive will be worked out

Main items of observation

1. Chemical composition and excreta
2. Daily feed consumption of pigs
3. Data on digestibility trial at the end of the experiment to arrive at the digestibility coefficient of nutrients by indicator method
4. Body wt. at beginning and end of the experiment

9 . *Evaluation and Improvement of integrated pig farming system in Kerala (Ph.D. Programme)*

Objectives of the study

1. To study the existing pig farming system in Kerala.
2. To evolve appropriate integrated pig farming system.
3. To evaluate the productivity and economics of developed integrated pig farming systems.

Outline of Technical Programme

A survey will be conducted to study the existing pig farming systems in different agro-climatic zones of Kerala using a well-designed questionnaire as per NATP guidelines. Stratified Random Sampling will be employed to take 200 samples from five different agro-climatic zones as defined by ICAR-NATP (1989). The data will be collected and analyzed to assess the problems and prospect of pig farming system in Kerala. Models of integrated pig farming systems will be identified.

The productivity and feasibility of the integrated pig farming systems will be studied by experimenting the models in two selected panchayaths under NATP in Trichur District. For this study, four farmers will be selected from each panchayaths and each farmer will be supplied with eight LWY grower pigs, which will be reared in different combination as follows:

1. Pig farming alone
2. Pig + Vegetable/crops
3. Broiler Chicken + Pig +Fish +Vegetables/crops

All the animals will be fed with swill and waste generated by the other components. All technical support for study in the farming system will be provided by NATP. During the observation period of two-fattener crop, data will be collected and analyzed for assessing the economic feasibility and productivity of the system. Two pigs from each farmer will be randomly selected for the slaughter studies at Meat Technology Unit, KAU, Mannuthy



Pig farming integrated with fish culture

Bio gas plant working on pig manure-slurry used for paddy cultivation



Economic pig rearing based on local resources-integration with cash crops

Main items of observations to be made

- I. Monthly body weight of the animals.
- II. Feed intake of animals
- III. Proximate Principles of collected feed samples
- IV. Carcass characteristics
 - a. Dressing percentage
 - b. Back fat thickness
 - c. Loin eye area
- V. Monthly body weight of pigs and Fish
- VI. Yield of crop and bio-mass production
- VII. Incidence of diseases

The economics of integrated farming systems will be worked out by calculating Yield/unit input, Net income and Income shared by pig and other integral units.

10. *Economics and production performance of Large White Yorkshire and Crossbred (LWY X Desi) pigs in field and farm conditions (Ph.D Programme)*

Samples of LWY and crossbred pigs belonging to Centre for Pig Production and Research (CPPR) will be utilized for the study. Thrissur district will be chosen as the study area for field study. Forty-two weaned piglets each from Large White Yorkshire and crossbreds will be selected uniformly as far as possible with respect to age, sex and body weight.

Twelve weaned piglets will be randomly selected from each of the above two mentioned groups and will be maintained in the feeding and management conditions prevailing in CPPR till slaughter weight is attained.

The remaining thirty weaned piglets each, from the designated group will be randomly allotted to the farmers in the field identified NATP so that each farmer unit gets a minimum of three piglets from both the group. Ten such farmers will be selected. A preliminary study utilizing the data available in the farm will be conducted to find out the ideal slaughter



A locally designed farrowing crate



Body weight recording of pigs in the field units-new technique developed



Slaughter house waste under heat processing for using as pig feed



Pig farming integrated with agriculture

Women pig farmers at work



Food waste being unloaded at the farm by the farmers

weight/age for purebreds and crossbreds. The experimental animals will be maintained till that time.

The growth characteristics of the experimental animals from weaning upto the end of the study will be monitored and compared. The various components of cost and the management systems will be adequate, assessed and compared. The cost of production under the two systems will be worked out. Socio-economic profile of the farmers and its effect on production performance will be studied.

A representative sample of animals from both the field and the farm will be slaughtered to study the carcass qualities. The data will be analyzed statistically.

2. Livestock Research Station, Kattupakkam

Research Accomplishments

A total of 123 piggery units were identified to study the prevailing status of piggery farming in Kancheepuram District of Tamil Nadu. The socio-economic status of the pig farmers in Kancheepuram district was studied. It is found that pig rearing in this district is traditional.

Information regarding the nutrition, housing patterns, performance characteristics and management were collected. Pigs are reared only as scavenging animals as the economic status of most of the farmers does not permit them to offer any alternative feed formulations. The housing pattern is still in primitive stage. During the field visits, farmers were given relevant information pertaining to different managerial practices in piggery to be adopted to overcome various problems. Weighments of piglets at different age groups are recorded at regular intervals and health coverage undertaken.

Table 1. Number of field units identified

Sl.No	Name of the Village	No.of units
1	Uthirmerur	05
2	Malayankulam	05
3	Maduranthagam	10
4	Thirukkazhukundram	10
5	Mahabalipuram	10
6	Salavakkam	10
7	Appayanallur	05
8	Kannikulam	02
9	Valajabad	10
10	Karukkupettai	06
11	Manambathy	05
12	Nelvoy	03
13	Kakkalapetti	05
14	Choonambedu	20
15	Sriperumpudur	06
16	Kancheepuram	06
17	Surrounding Livestock Research Station, Kattupakkam	05

SOCIO-ECONOMIC STATUS OF PIGGERY FARMERS

METHODOLOGY

After specifying the objectives and defining the concepts, the methodology of study was designed with regard to sample selection, data collection and specification of tools of analysis. This presents information on :

1. Choice of study area
2. Sampling designs
3. Operationalisation of variables and their measurement
4. Method of data collection, and
5. Statistical tools and techniques used for analysis of data

1. Choice of study area

Kancheepuram district of Tamil Nadu was purposively selected / chosen for the study, as this area is fertile with more of livestock activities and familiarity of the area to the researcher. The district contains more than 400 piggery farmers. More over, Livestock Research Station, in which the scheme is functioning, is also situated in the same district; hence it has been selected considering the easy approachability of the farmers.

2. Sampling procedure

Kancheepuram district comprised eight taluks and thirteen blocks. Among the thirteen, six blocks viz., Kattankulathur, Madhuranthagam, Acharapakkani, Thirukkalukundram, Walajabad and Sriperumpudur were selected. Fifteen piggery units from each block were selected and constituted 90 samples. The selected blocks are also shown in Figure 1.

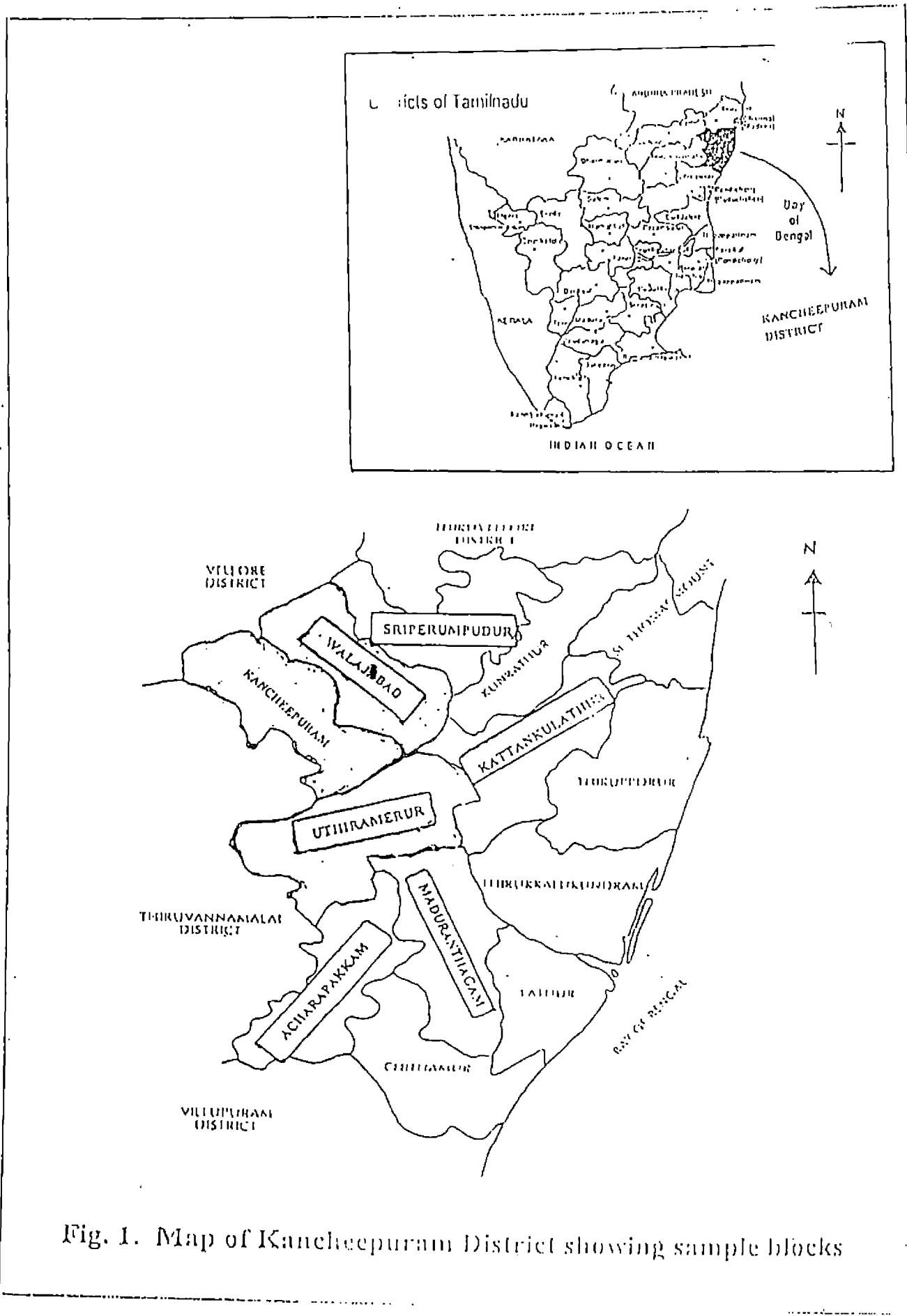
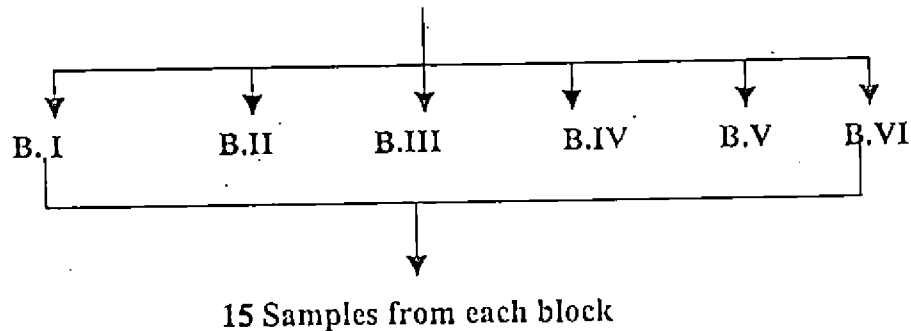


Fig. 1. Map of Kancheepuram District showing sample blocks

SAMPLING DESIGN

KANCHEEPURAM DISTRICT (13 BLOCKS)



3. Operationalisation of variables and their measurement

1. Age

Age was operationalised as completed age of a respondent at the time of enquiry and chronological age was taken as a measure. The age classified as young (up to 35 years), middle (36 to 45 years) and old (above 45).

2. Location

It refers to place or area in which piggery farmers are living. The respondents were categorized into four categories viz., Urban, Semi-urban, Peri-urban, and Rural.

3. Community

Community denoted hierarchical status conferred up on members of a society from the time immemorial according to law of "Manu", and measured by direct interview schedule. The farmers were categorized into Scheduled tribe, Scheduled caste, Most backward caste, Backward caste and General.

4. Education

The educational status was assessed as the number of years of schooling the respondents had undergone and classified as illiterate, primary, middle, secondary and collegiate for the purpose of interpretation of results. The scoring procedure followed was as follows:

Category	Score
Illiterate	0
Primary (up to 5 th standard)	1
Secondary (6 th to 10 th standard)	2
Higher Secondary (11 th to 12 th standard)	3
Collegiate (Degree and above)	4

5. Nature of the family

Nature of the family includes the type and size of the family. Type of family referred to nuclear or joint family. The size of the family referred to the number of individuals of both sexes living together in a household. The scoring procedure is as follows:

Type	Score	Size	Score
Nuclear	2	Up to 5 members	2
Joint	1	Above 5 members	1

6. Occupation

One's usual or principal work or business especially as means of earning a living is termed as occupation of respondent. The respondents were categorized into five occupational groups for the purpose of present study.

1. Labour
2. Caste occupation
3. Business
4. Cultivation
5. Service

7. Livestock possession

It was operationalised as the number of animals including poultry maintained by the respondents at the time of enquiry. For the purpose of calculation, all animals/poultry were converted into cattle units as per the report of II meeting of FAO / WHO expert panel, 1963, Rome, as follows

1 Cattle	1.00 cattle unit
10 Sheep or goat	0.10 cattle unit
1 Chicken or 1 duck	0.01 cattle unit
1 Pig	0.20 cattle unit

A unit score of one was assigned to each cattle unit. The score obtained in each item were summed to arrive at the livestock possession score of each farmer. They were classified into low, medium and high based on Mean and Standard error.

8. Land holding

It refers to the number of acres owned and cultivated by an individual at the time of enquiry. Based on the guideline of New Projects (1974), two acres of dry-land was equated to one acre of irrigated land and the total extent of land was arrived at. The respondents were classified as follows.

Category	Classification
Landless labour	0 acres
Marginal farmers	0.1 to 2.5 acres
Small farmers	2.5 to 5 acres
Big farmer	Above 5 acres

9. Income

It refers to the gross earning of a respondent from dairy farming and other occupations in one year. Each 1000 rupees of income was assigned a unit score. It was classified as low (below 25,000), medium (25,001 to 50,000) and high (above 50,000) for the purpose of interpretation.

10. Farming experience

It refers to the number of years of experience, one had in the piggery farming activities and each year of experience was assigned a unit score of one. It was classified

as low (1 to 10 years), medium (11 to 20 years) and high (21 years and above).for the purpose of interpretation.

11. Material possession

It refers to the material possessed by the respondent family which are likely to enhance their social status and improve stand of living of the family. For each possession like bullock cart, radio, furniture, television and A.H. implements, the respondents were assigned score (Trivedi, 1963). The summation of scores of all these materials gave total score of material possession.

12. Extension agent contact

To measure the degree of utilization each respondent was asked to indicate on a four-point continuum. As to how often he / she got information about improved pig rearing practices from each of the listed sources. The scoring procedure for the response was as follows:

Regularly	Some times	Occasionally	Never
3	2	1	0

The score of an individual respondent was obtained by adding the scores over different sources.

13. Economic motivation

It was operationalised in terms of profit maximization and relative value placed by an economic ends. This was measured by using the scale developed by Supe (1969) with slight modification. The scale consisted of four statements. The response for each statement was rated on a three point continuum viz., agree, undecided and disagree and scores assigned were 3,2 and 1 respectively. The scores of all the statements were summed up to compute the economic orientation score of each respondent.

14. Mass media exposure

To measure the degree of utilization of mass-media sources, each pig owners was asked to indicate on a four point continuum as to how he / she got information about improved animal husbandry practices from each of sources. The scoring procedure for the response was as follows:

Regularly	Some times	Occasionally	Never
3	2	1	0

15. Social participation

Social participation referred to the degree of involvement of the respondent either as a member or as an office bearer in formal organizations. The scoring procedure as adopted by Subramanian (1992) was used with slight modification to measure their variable

Category	No participation	Office bearer	Member
Score	0	1	2

The scoring for all items were summed up and the total score on social participation was worked out. Based on mean and standard error the respondents were classified into low, medium, and high.

16. Scientific orientation

According to Supe (1969), scientific orientation is the degree, to which a farmer is oriented to the use of scientific methods in farming and decision making as well as their attitude towards innovations. There were five positive statements and one negative statement. It was measured with the help of a scale developed by him with suitable modifications. The final score for scientific orientation was arrived at by summing up all the corresponding response scores. The scoring procedure followed was as follows:

Response	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Positive Items	5	4	3	2	1
Negative Items	1	2	3	4	5

17. Risk orientation

Risk orientation is the capacity of an individual to bear the risk of running a piggery farm. It was measured with a help of a scale developed by Supe (1969) with suitable modification. The scoring procedure followed was as follows

Response	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Positive Items	5	4	3	2	1
Negative Items	1	2	3	4	5

18. Housing type

Type of house means whether it is *Kaccha*, *Pucca* or *Mixed*. *Kaccha* means thatched roof and walls constructed with mud and bricks whereas *Pucca* means house constructed with concrete and cement and *Mixed*, the combination of both, with respect to piggery.

4. Method of data collection

Information regarding list of piggery farmers were collected from local leaders in their respective areas and also by direct survey method. An interview schedule was developed by incorporating all the selected variable in consulting with experts and available literature to collect relevant data. The relevant data pertaining to analysis were collected by personal interview with the help of the pre-tested comprehensive interview schedule. The usefulness of the study was explained to the farmers prior to enquiry to facilitate their co-operation. Information regarding socio-economic background of piggery farmers were collected.

5. Statistical tools used

Socio-economic status were analysed by the conventional analysis in the form of averages and percentages.

RESULT OF SOCIO-ECONOMIC STATUS

1. Age

It could be noticed that nearly less than one-half of the farmers were middle aged (44.44 per cent) followed by old (32.22 per cent) and young (23.22 per cent) age groups

(n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Age	Young	21	23.34
	Middle	40	44.44
	Old	29	32.22

2. Location

It could be inferred from that 87.78 per cent of farmers are from rural area followed by peri-urban 10.00 per cent. The condition from semi-urban is negligible.

(n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Location	Urban	-	-
	Semi-urban	2	2.22
	Peri-urban	9	10.00
	Rural	79	87.78

3. Community

It is found that pig rearing in this district is still a traditional occupation of economically weaker sections of the community and little attention is paid by them towards the pigs. The community engaged in piggery farming activities (50.00 per cent)

is Kattunaickar (or) Joyer who belongs to Schedule tribes. It is followed by Scheduled caste.

(n - 90)

Variable	Classification	Respondents	
		Number	Per cent
Community	Schedule tribes	45	50.00
	Schedule caste	40	44.45
	Most backward caste	3	3.33
	Backward caste	2	2.22
	General	-	-

4. Education

The educational status of majority of piggery farmers (57.78 per cent) was illiterate, where as almost remaining in equal percentage of respondents belonged to primary (12.22 per cent) and Higher secondary (13.33 per cent) level.

(n - 90)

Variable	Classification	Respondents	
		Number	Per cent
Education	Illiterate	52	57.78
	Primary	11	12.22
	Secondary	10	11.11
	Higher secondary	12	13.33
	Collegiate	5	5.56

5. Nature of the family

Majority (59.00 per cent) of the farmers had nuclear family while the remaining 41.00 per cent had joint family. Two-third (60.00 per cent) of the respondents were maintaining medium sized followed by one fifth (24.44 per cent) possessing large sized and more than one tenth (15.56 per cent) had small sized family.

(n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Family size	Small	14	15.56
	Medium	54	60.00
	Large	22	24.44

6. Occupation

It is clear that 57.78 per cent of farmers working as labour or coolies followed by 31.11 per cent of the farmers involved in caste occupation ie., piggery farming.

(n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Occupation	Labour	52	57.78
	Caste occupation	28	31.11
	Business	-	
	Cultivation	10	11.11
	Service	-	-

7. Livestock possession

Among the piggery farmers selected, 60 per cent of the farms are of small herd size followed by larger (24.44 per cent) and medium herd size (15.56 per cent). The reason for majority of the farmers maintaining a small herd might be due to their capacity to invest on animals due to their low level of income.

(n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Livestock possession	Small	54	60.00
	Medium	14	15.56
	Large	22	24.44

8. Land holding

It could be noticed that 64.44 per cent of the farmers were landless labour followed by 18.89 per cent of them are small farmers and 16.67 per cent of them are marginal farmer and none of them belong to big farmer. (n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Land holding	Landless labour	58	64.44
	Marginal farmer	15	16.67
	Small farmer	17	18.89
	Big farmer	-	-

9. Income

It was observed that 80.00 per cent of the farmers belonged to low income group followed by medium (20.00 per cent) in group and no farmers belong to high income level.

(n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Income	Low	72	80.00
	Medium	18	20.00
	High	-	-

10. Farming experience

More than half of the respondents (57.78 per cent) had high level of farming experience followed by medium (33.33 per cent) and low (8.89 per cent) level of experience.

(n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Farming experience	Low	8	8.89
	Medium	30	33.33
	High	52	57.78

11. Material possession

It could be inferred that majority of the farmer (56.67 per cent) having Radio followed by Television (23.33 per cent) etc.,

(n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Material possession	Bullock cart	-	-
	Radio	51	56.67
	Furniture	18	20.00
	Television	21	23.33
	A.H. implements	-	-

12. Extension agent contacts

Most of the farmers 58.89 per cent had low level of contact with extension agency followed by 23.33 per cent of the farmers with medium level of contact.

(n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Extension agent contact	Low	53	58.89
	Medium	21	23.33
	High	16	17.78

13. Economic motivation

Nearly two-third (63.33 per cent) of the respondent had high level of economic motivation whereas less than one-fourth (24.44 per cent) had medium level followed by one tenth (12.22 per cent) had low level of economic motivation.

(n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Economic motivation	Low	11	12.22
	Medium	22	24.44
	High	57	63.34

14. Mass media exposure

The low level of mass media exposure to piggery farmers is attributed to illiteracy, poor socio-economic status and lack of leisure time which deprived them from getting access to various mass media source.

(n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Mass-media exposure	Low	42	46.67
	Medium	26	28.89
	High	22	24.44

15. Social participation

Majority of the respondents (75.56 per cent) belongs to low level of social participation followed by 20.00 per cent belonged to medium level of social participation. As the country pigs are still neglected by many of the higher group people, the piggery farmers are dwelling along with their pigs in a remote corner of the villages for this makes a lack of social immobilization.

(n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Social participation	Low	68	75.56
	Medium	18	20.00
	High	4	4.44

16. Scientific orientation

These farmers are traditional pig growers and their experience is even more than 50 years in this field. The experience in a few communities even traced back to generations. Hence, they follow only traditional methods of rearing. Nearly two-third (68.89 per cent) of the respondent had low level of scientific orientation where as less than one-fourth (20.00 per cent) had medium level followed by 11.11 per cent of them had high level of scientific orientation. The later includes organized private farms.

(n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Scientific orientation	Low	62	68.89
	Medium	18	20.00
	High	10	11.11

17. Risk orientation

Majority (68.89 per cent) of the farmers possessed low level of risk orientation where as 20.00 per cent and 11.11 per cent of the respondent had medium and high risk orientation respectively. This showed that the farmers had little inclination to increase their level of income by facing risk, so as to lead a satisfactory life.

(n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Risk orientation	Low	62	68.89
	Medium	18	20.00
	High	10	11.11

18. Housing type

Almost all of piggery farmers (95.56 per cent) had 'Kaccha' type of house. This predisposes the animals to many disease conditions, especially respiratory problems as the ventilation to the house is minimized by the above type.

(n = 90)

Variable	Classification	Respondents	
		Number	Per cent
Housing type	Kaccha	86	95.56
	Pucca	4	4.44
	Mixed	-	-

As most of the pig farmers are only rural poor, they are experiencing the following major issues in pig rearing.

1. The stock maintained by the farmers are only local country pigs and there is no improved stock of either exotic or crossbred pigs.
2. The economic status of the farmers, does not permit them to offer any alternative feed formulation with agricultural or industrial by-product waste. Hence, pigs are reared only as scavenging animals.

3. As the country pigs are mostly resistant to many of the diseases, special attention is not being given towards health care and management.
4. There is no proper housing and the pigs are existing still in the primitive housing conditions.
5. The local pigs have no defined characters and production potential is found to be lower.
6. Still country pigs are not much relished by most of the people which limits the marketing potential of pig meat and there is no organised marketing facilities.

Information on housing, feeding and health coverage and other management practices were collected. The housing system was very poor. The pig sheds were constructed with mud walls and thatched roofing. There was no ventilation and drainage facilities. The pigs are housed only during night. The pigs were allowed for scavenging. No special feeding practices were followed except feeding of rice bran and oil cakes occasionally in some of the units. No health coverage was given. Mortality of one or two pigs occasionally in the project area was also reported.

Marketing of pigs were effected after six months of age, generally when the pigs weigh more than 35 kgs of body weight which fetches an amount of Rs.500/- per pig.

However, swine production in this area would become a commercial venture if the above constraints are rectified.

Selection of families

For distribution of Large White Yorkshire boars, the farmers are selected in Kancheepuram District based on the following criteria:

1. Those farmers who are willing to crossbreed their local stock
2. Those from whom the data such as weight particulars and reproduction particulars could be collected.

3. Those farmers who are willing to take special care on feeding and to build proper house using locally available materials.

During the year 2000-2001, out of 123 piggery units identified, a total of 50 units have been selected for distribution of boars, as follows:

Sl.No.	Name of the Village	No.of units
1	Salavakkam	05
2	Madhuranthagam	05
3	Uthiramerur	10
4	Kancheepuram	10
5	Thalavedu colony	03
6	Sriperumpudhur	07
7	Surrounding Livestock Research Station, Kattupakkam	10
	Total	50

Pig Sties

The selected farmers are advised to build a separate boar shed with 6.5 square metre covered area. The shed is covered by thatched roof; with proper ventilation and drainage. Extreme care is given to construct the floor by concrete or rough stones to prevent damage to floor by the rooting-up behaviour of the boar. The side walls are one metre in height and strong enough to avoid escape of boar. An optimum height of 7 to 8 ft. has been suggested for proper ventilation to avoid pneumonia problems.

Boars

As the boar constitute half of the herd, the boars supplied are selected based on;

1. Masculine appearance with deep and long body
2. Age - 8 months old, with an average body weight of 65 kg (56 to 70 kg)
3. The boars should have bilaterally well developed testes
4. They must have been born in a litter size of above 12, with birth weight of 1.3 kg
5. The dams of the boars should have good mothering ability
6. The weaning weight of the boar is 13 kg; and
7. They must have well developed teats (6 pairs) and active with no fat deposition on the body.

Adaptability of boars

Adaptability of exotic boars in farmers holdings is also studied using the parameters such as:

1. Feed intake, type of feed preferred :

In the beginning, the farmers have been advised to feed the boars with the concentrate feed with which they are reared in the farm (Livestock Research Station), and gradually replaced by the farmers' usual practice.

2. Body weight (Weight gain / Loss):

The boars are not fed *ad libidum* by the farmers to avoid over weight as it has to suit to the local pigs for crossing.

3. Occurrence of diseases

So far, no disease out break occurred to the boars in the farmers holding.

4. Breeding performance:

As the boars supplied are pre-tested for their breeding performance, the farmers do not come across any such problem.

5. Longevity

6. Mortality rate

Data on basal population

Most of the farrowing occurs in the field during the months of June to October. Obtaining data on basal population is a pre-requisite for any crossbreeding programme in order to know the genetic improvement to be achieved in future. Hence, body weight at different age groups were taken for local desi pigs in village conditions. The mean body weight of indigenous pigs (n = 219) are as follows:

Table 2. Mean \pm S.E. of body weight (in kg) of indigenous pigs from birth to nine months of age

Sl. No.	Age group	Mean body weight (kg) Mean \pm S.E.
1.	At birth	0.69 \pm 0.16 (41)
2.	Fort night	2.14 \pm 0.13 (39)
3.	One month	3.50 \pm 0.21 (25)
4.	Two months (weaning)	6.92 \pm 0.24 (30)
5.	Three months	8.46 \pm 0.44 (29)
6.	Six months	23.27 \pm 1.22 (37)
7.	Nine months	37.50 \pm 1.29 (18)

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COMPARISON OF BODY WEIGHT BETWEEN INDIGENOUS AND CROSSBRED PIGS

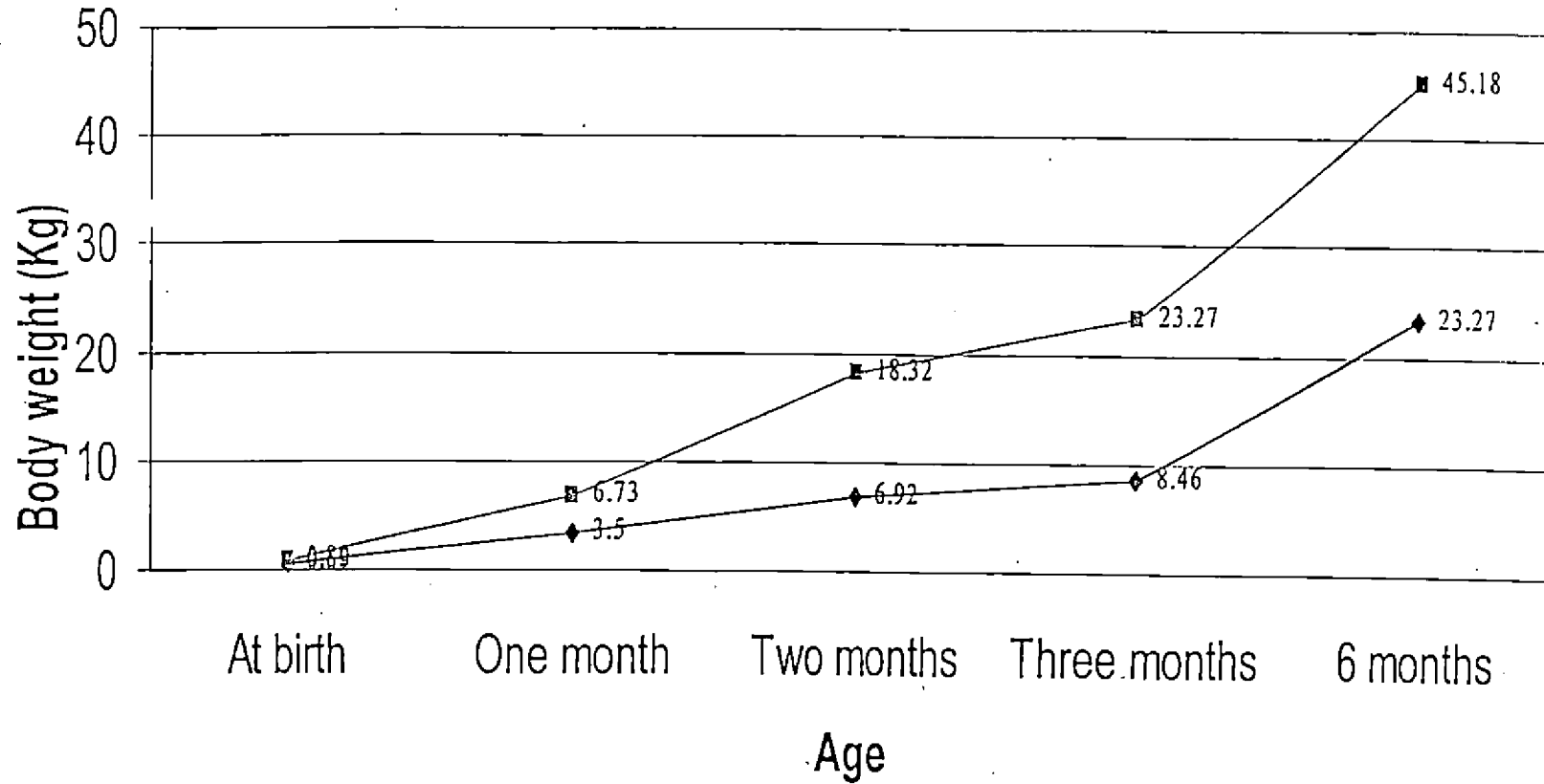


Table 3. Mean \pm S.E. of litter traits of indigenous pigs

Traits	Mean \pm S.E.
Litter size at birth	7.33 \pm 0.98
Litter size born alive	6.01 \pm 0.82
Litter size at weaning	4.22 \pm 1.21
Litter weight at birth	3.71 \pm 0.88 (Kg)
Litter weight at weaning	35.78 \pm 5.99 (Kg)

Table 4. Mean \pm S.E. of litter traits of indigenous pigs crossed with Large White
Yorkshire

Traits	Mean \pm S.E.
Litter size at birth	9.96 \pm 0.58 (23)
Litter size born alive	7.87 \pm 0.35 (23)
Litter size at weaning	6.00 \pm 0.25 (23)
Litter weight at birth (Kg)	6.45 \pm 0.41 (Kg)

Performance of crossbred pigs

The data on the performance of crossbred pigs have been collected and the mean values are tabulated. The birth weight of crossbred piglets was found to be 820g as against the birth weight of indigenous piglets. In general there is a marked increase in the body weight of crossbred pigs over the indigenous pigs noticed.

Table 5. Mean \pm S.E. of body weight (in kg) of crossbred pigs from birth to six months of age

Sl. No.	Age group	Mean body weight (kg) Mean \pm S.E.
1.	At birth	0.82 \pm 0.02 (74)
2.	One month	6.73 \pm 0.88 (67)
3.	Two months (weaning)	18.32 \pm 0.40 (55)
4.	Three months	23.27 \pm 0.49 (46)
5.	Six months	45.18 \pm 0.72 (33)

Nutritional studies

In order to achieve the objective, "to formulate pig ration with locally available resources", locally existing feed ingredients used by the pig farmers are subjected to proximate analysis. The proximate composition of the feed ingredients (10 samples) on dry matter basis are as follows:

Sl.No	Feed stuff	DM %	CP%	CF %	EE %	NFE %	TA %
1	Hotel waste (Swill feed)	23.16	14.31	3.48	16.68	60.38	5.15
2	Pods of <i>Prosopis juliflora</i>	21.58	14.69	17.96	3.88	58.65	4.81
3	Rhizomes of <i>Cyperus rotundus</i>	31.85	4.83	37.07	1.34	51.84	4.92
4	Groundnut cake	89.57	42.31	6.07	5.74	39.17	6.73
5	Rice bran	88.82	12.72	25.35	5.49	38.67	17.77
6	Chocolate waste	95.00	-	-	1.33	49.10*	0.33
7	Cashew apple	10.00	7.07	8.12	2.97	77.31	4.53

* Indicates soluble carbohydrate

Hotel wastes were collected from different sources and dried before analysis. It is found that crude protein content is 14.31 per cent with the dry matter content of 23.16 per cent. *Prosopis juliflora* (Popularly known as "Velikathan" in Tamil) is distributed abundantly in the village lands which is also considered as a potential weed. The pods are collected and are fed to the pigs in many of the villages. The analysis showed that the crude protein content was considerably higher as 14.7 per cent with the fibre content of 17.96 per cent.

During grazing, the local pigs also pick up the rhizomes of *Cyperus rotundus* (Korai Kizhangu, in Tamil) from the harvested field. The protein content is very low (4.83 %). Ground nut cake and rice bran are also given to the animals during summer season, hence they have also been analysed. The values are also in agreement with the normal values.

Very near by the coastal area, pig farmers also use cashew apple as one of the feed stuff during summer season as it is available in plenty during the season. Hence it is also collected for proximate analysis and the result showed that the moisture in the fruit is 90 per cent.

The crude protein content in the fruit is found to be 7.07 per cent and the crude fibre is 8.12 per cent on dry matter basis. Another unconventional feedstuff available in one of the block (Kattankulathur) is Chocolate waste. This waste is available in plenty from a chocolate company. The proximate analysis of this waste was also carried out. It was found that the waste contain only higher carbohydrate content (49.10 per cent) and low fat content (1.33 per cent) . Though it does not have protein content, it is highly relished by the pigs on feeding. Hence, different rations were computed to assess the growth of the pigs. These rations are given in table 6 and trails have been started both in farm and field. In farm, 4 groups have been fed with the ration containing chocolate waste. The animals used are crossbred piglets.

Table 6. Replacement of Maize with chocolate waste :-

CP = 16 % ME = 2500 Kcal.

Ingredients	Ration I (per cent)	Ration II (per cent)	Ration III (per cent)	Ration IV (per cent)
Maize	26.25	17.5	8.75	-
Ground nut cake (GNC)	15	15	20	20
Deioled rice brane (DRB)	26	26	21	21
Wheat bran	16	16	16	16
Dry fish	5	5	5	5
Salt	1	1	1	1
Mineral mixture	2	2	2	2
Chocolate waste	8.75	17.5	26.25	35

The rations formulated using the unconventional feedstuff are presented here. The rations are cost effective and can be affordable by the farmers.

Table 7. Ration with hotel waste & chocolate CP = 12% ; ME = 3094 Kcal.

Ingredients	Parts	Rate (Rs.)
Hotel waste	40	-
Chocolate waste	40	-
Doiled rice bran	10	0.45
Ground nut cake	8	0.96
Mineral mixture & salt	2	-
Total	100	1.41

Table 8. Ration with hotel waste & chocolate CP = 12% ; ME = 3094 Kcal.

Ingredients	Parts	Rate (Rs.)
Hotel waste	30	-
Chocolate waste	30	-
Doiled rice bran	18	0.81
Ground nut cake	20	2.40
Mineral mixture & salt	2	-
Total	100	3.21

Table 9. Ration with hotel waste & Raghi / Sorghum / Bajra
CP = 13.08% ; ME = 3000 Kcal.

Ingredients	Parts	Rate (Rs.)
Ragi / Sorghum / Bajra	44	3.52
Hotel waste	44	-
Doiled rice bran	10	0.45
Mineral mixture & salt	2	-
Total	100	3.97

Table 10. Ration with hotel waste & Raghi / Sorghum / Bajra
CP = 18% ; ME = 2854 Kcal.

Ingredients	Parts	Rate (Rs.)
Ragi / Sorghum / Bajra	36	2.88
Hotel waste	36	-
Doiled rice bran	13	0.58
Ground nut cake	12	1.44
Mineral mixture	2	-
Salt	1	-
Total	100	4.9

Table 11. Ration with hotel waste & Ragi / Sorghum / Bajra

CP = 14.37% ; ME = 2887 Kcal.

Ingredients	Parts	Rate (Rs.)
Ragi / Sorghum / Bajra	40	3.2
Hotel waste	40	-
Doiled rice bran	11	0.5
Ground nut cake	5	0.6
Mineral mixture	2	-
Salt	1	-
Total	100	4.3

These rations are formulated and the farmers are advised to feed their pigs. The mineral mixture is made available to the farmers to complete the requirement of the ration.

Disease surveillance

1. Foot and Mouth Disease Out break

The foot and mouth disease occur every year in some of local piggery units. The samples have also been collected from the lesion and sent to Institute of Veterinary Preventive Medicine, Ranipet, Tamil Nadu to confirm the disease and serotype the virus. It was identified as 'O' type of virus affecting the herd. Hence, the vaccination has also been carried out as follows. The vaccine used was an oil adjuvant BHE inactivated FMD vaccine (Clovax) containing O, A, C, Asia-1, Asia-2 and Sat-3 subtypes of virus

Foot and Mouth Vaccination was carried out as follows

Sl.No.	Name of Unit	No. of Pigs Vaccinated
1	Salavakkam	28
2	Salavakkam	14
3	Salavakkam	24
4	Salavakkam	16
5	Pathisai	17
6	Punkari X road	22
7	Kottamedu	114
8	Sothupakkam	25
9	Madhurandhagam	25
		285

2. Swine fever disease reported

The Swine fever disease was reported in few areas and some organized private farms. Hence, Swine fever vaccination has been carried out in the field units. The details are as follows. The swine fever vaccine used is a live attenuated classical Swine fever supplied by Hoechst.

Swine fever vaccination has been carried out

Sl.No.	Name of Unit	No. of Pigs Vaccinated
1	Sothupakkak	25
2	Madhurandhagam	25
3	Kottadamedu	100
		150

3. Deworming

Deworming of pigs has also been started from the beginning with the medicine Albendazole @ 5 -7.5 mg / Kg body weight, Piperasine @ 200 mg / Kg body weight, and Oxyclosanide @ 15mg/kg. body weight. In order to identify the parasite prevalent in the area, the fecal samples have been collected every month and season wise parasitism is studied. The parasites identified are tabulated.

Sl.No	Season / Month	Parasites identified
1	April to June	<ol style="list-style-type: none"> 1. <i>Ascarid</i> eggs 2. <i>Metastrongylus</i> eggs 3. <i>Balantidium coli</i> cyst 4. <i>Trichuris</i> egg
2	July to September	<ol style="list-style-type: none"> 1. <i>Schistosoma</i> egg 2. <i>Balantidium coli</i> cyst and trophozoite 3. <i>Strongyle</i> egg and larva 4. <i>Acanthocephala</i> egg 5. Fluke eggs
3	October to December	<ol style="list-style-type: none"> 1. <i>Schistosoma incognitum</i> egg 2. <i>Ascarid</i> egg 3. <i>Metastrongylus apri</i> 4. Fluke eggs (<i>Gastrodiscus</i> egg) 5. <i>Balantidium coli</i> 6. <i>Tricuris</i> egg

Among these Nematode and Trematode parasites are highly prevalent in the area which might be the cause for poor production of the local pigs. A rare species of *Acanthocephalid* eggs (Thorny headed worms) have also been recovered. After studying the year round parasitism, the deworming schedule will be altered.

External parasites such as lice and mange mites have also been identified from the local pigs which are

1. Mange mite:-
 - a. *Sarcoptes* sp.
 - b. *Demodex* sp.
2. Lice :-
 - a. *Haematopinus suis*

Table Number of animals dewormed

Sl. No.	Name of the village	Total No. of animals dewormed
1	Salavakkam	78
2	Appayanallur	17
3	Kannikulam	6
4	Kakkalapettai	11
5	Punkeri X road	23
6	Southupakkam	27
7	Acharapakkam	28
8	Oragadam X road	7
9	Araneri	8
10	Chattram	20
		225

During the field visit, the ailing local pigs are treated for respiratory problems with antibiotics and vitamins. The boars supplied to the farmers at Kakkalapettai reported to have maggot wound in the ear and leg and the same was treated with oil of turpentine and antibiotics. Two boars in Salavakkam village were reported to have lesser sexual libido and the same were treated with Climax capsules.

TREATMENT OF PIGS

Sl.No.	Name of Unit	Total no. of Pigs Treated
1	Salavakkam	55
2	Appayanallur	8
3	Kannikulam	9
4	Kakkalapettai	11
5	Punker X road	19
6	Southupakkam	23
7	Acharapakkam	25
8	Oragadam X road	5
9	Araneri	5
10	Chattram	12
	Total	172

The above treatment had been given to overcome the common ailments such as respiratory problems, enteritis, maggot wound, dog bite, supportive treatment for Foot and mouth disease, etc.

3. University of Agricultural Sciences, Bangalore

The Progress of The Research Work :

a) Co-ordination

The ongoing NATP research activities are being carried out through active support and co-operation of the State Department of Animal Husbandry and Veterinary Services, Government of Karnataka - District chapters at Kodagu, Udipi and Dakrishina Kannada, ZRS Konehally and Bramhawar, Extension Education Unit of Fisheries College, Mangalore, ARS Ponnampet and ARS, Kankanadi and Institute of animal Health and Veterinary Biologicals, Bangalore.

b) Field visits :

The Research team visited the operational areas of the project frequently and held fruitful discussions with the farmers in association with the Deputy Directors, Asst. Directors and Veterinary officers of the State Department at District, Taluk and Village level Veterinary Institutions. Visits were also made to most of the farm families covered under this project to get first hand information on the main problems and constraints responsible for under production and low performance of pigs in the above regions. Besides, the team also passed on valuable suggestions and technical guidance for overcoming the shortfalls and problems of low production and/or under production in order to achieve sustainability in production.

c) Creations of awareness :

- a. Continued the group discussion meetings with the farmers involving technical personnel of AH & VS and UAS extension guides. During the visits the research team has identified specific problems and constraints connected with pig production, in particular agro-climatic region/localities.
- b. Updated the salient features of the project activities and scientific approach of pig production, which was earlier brought out in the form of bulletin in local language and distribute to farmers in the project areas.
- c. Conducted farmers seminar and workshop to understand problems of pig production and to share the experience of farmers

HOUSING AND MANAGEMENT OF PIGS UNDER FIELD CONDITIONS - OPERATIONAL AREAS OF NATP ON PIGS



Locally built Pig House under field conditions



A view of locally built Pig Sty under field condition



Local pigs under scavenging system of Management being practised under field conditions



Pig housed in Pig Sty under field conditions



Locally fabricated piglets guard fixed in the farrowing house



Pigs Scavenging near the lake



Mass feeding of grower pigs using hotel waste under field condition



Crossbred pigs maintained by woman farmer in Ponnampet

d) Remedies and suggestions:

In the process of discussion, various remedies and suggestions were given to the farmers along with possible types of project incentives in order to encourage farmers for taking up pig production intensively.

e) Nucleus Pig Breeding Units:

Under auspices of this project, three NATP Nucleus Breeding units were established at Veterinary College, Bangalore, ARS, Ponnampet and ARS, Kankandi for production of superior quality piglets and also as demonstration cum training units in pig husbandry activities. The piglets produced at these nuclear breeding units are being supplied to those farmers identified as beneficiaries in the project operational areas on free of cost as a part of project incentive in order to strengthen breeding activities at their doorsteps and also upgrade their local pigs. These farmers will in turn act as models for furtherance of project activities in the neighboring areas to adopt and practice technologies to enhance pig production activities.

Breeding Stock as on 31-03-2002.

Breeding stock	Boar	Young boar	Sows	Gilt	Male piglets	Female piglets	Total
NBS, Bangalore	3.	--	11	0	16	9	39
NBS, ARS, Ponnampet	--	1	--	7	--	--	8
NBS, ARS, Kankandi	1	--	--	5	--	--	6
						TOTAL	53

f) Supply of piglets to farmers as project incentives:

Project Incentives:

The project has already supplied 142 piglets during the months of June 2001, November 2001 and February 2002 as project incentives for upgrading their local pigs and/or for rearing. This programme will be continued during the next year also. Besides, deworming of the existing stock and provision of chelated mineral mixture as project incentive was provided to farmers covered under this project from time and again. A large number of boar lines have already been created under field conditions in Ponnampet in Kodagu District and Mangalore and Puttur taluks of Dakshina Kannada District.

**DETAILS REGARDING DISTRIBUTION OF PIG TO THE FARMER
BENEFICIARIES COVERED UNDER THE PROJECT**

1) KODAGU DISTRICT:

Virajpet Taluk:

There was a total 32 villages out of which piglets have been distributed to 36 farmers covered under 17 villages identified under the project.

2) DAKSHINA KANNADA DISTRICT:

a) Bantwala Taluk:

In this taluk 16 villages have been identified, in which 4 farmer beneficiaries under 3 villages have received the piglets.

b) Puttur Taluk:

In this taluk, farmers were identified under 35 villages out of which 2 farmers under 7 villages have received the piglets.

c) Mangalore Taluk:

In this taluk farmers were covered under 32 villages out of which 13 farmers covered under 10 villages have received the piglets.

3) UDUPI DISTRICT:

a) Udupi Taluk:

In this taluk, farmers were covered under 18 villages out of which 5 farmers from 2 villages has received the piglets.

b) Karkala Taluk:

In this taluk farmers were covered under 10 villages out of which 1 farmer covered under 1 village have received the piglets.

g) Organization of "Sensitization Workshop cum Scientific Advisory Panel Meeting":

The centre took onerous responsibility of organizing the "Sensitization Workshop cum Scientific Advisory Panel Meeting" of the Coastal Agro Ecosystem, on behalf of UAS, Bangalore from 30-07-2001 to 01.08.2001 in the Veterinary College, Hebbal, Bangalore -560 024. More than 100 scientists, Scientific Advisory Panel Members, planners and administrators had participated in the deliberations. The details are presented in Fig. 6 - Page No. 22.

h) **Evaluation of local and improved pigs in the coastal region of Karnataka:**

Data pertaining to local pigs and their crosses with Large White Yorkshire variety of pigs maintained by the pig farming community of coastal Karnataka region were collected. An effective field survey and observation was conducted about the present pig production systems adopted by the farmers, based on the personal contact and through a well designed questionnaire format. A total of 495 farmers consisting of 222 farmers in Dakshina Kannada district, 48 farmers in Udupi district and 225 farmers in Kodagu district were covered under the investigation. The information regarding the current management practices followed by the farmers was collected and reviewed.

Data pertaining to 170 sows, 119 boars and 1051 piglets reared by the pig farming community of Dakshina Kannada, Udupi and Kodagu districts of coastal Karnataka region was collected during the field survey.

The overall least square mean obtained for litter size at birth was 6.18 ± 0.2 piglets with the co-efficient of variation of 41.26% and that of Litter Size at Weaning was 4.99 ± 0.18 piglets with the co-efficient of variation of 47.70 %. The mean litter weight at birth was 6.58 ± 0.26 kg with the co-efficient of variation of 50.76 % and mean litter weight at weaning was 37.99 ± 1.5 kg with the co-efficient of variation estimated was 52.54 %. The piglets were weighing on an average 1.06 ± 0.009 kg at birth with slightly higher body weight of 1.08 ± 0.01 kg for male piglets in comparison to 1.05 ± 0.01 kg for female piglets. The overall least square mean for Age at First Farrowing was estimated to be 380.94 ± 2 days with the co-efficient of variation of 6.8%. The overall pre-weaning piglet mortality rate was 19.22%. The details are furnished in Table 2, 4 & 6.

The non-genetic factor- sex- was found to affect birth weigh and weaning weight of piglets. But the effect of sex was non-significant on pre-weaning piglet mortality rate. The location was found to be a strong non-genetic factor affecting all the traits considered for the present study. A highly significant effect of location on litter size at birth, litter size at weaning, litter weight at birth, litter weight at weaning, birth weight, weaning weight, age at first farrowing and pre-weaning piglet mortality rate was evident from the present analysis. The details are furnished in Table 1, 3, 5 & 7.

The period of farrowing was found to have a non-significant effect on litter size at birth and litter weight at birth. But period was found to have very significant effect on litter size at weaning, litter weight at weaning, birth weight, weaning weight, age at first farrowing and pre-weaning piglet mortality rate.

The season of farrowing was found to be a weak non-genetic factor. In the current investigation, only birth weight of piglet had a significant effect. Litter size at birth, litter size at weaning, litter weight at birth, litter weight at weaning, weaning

weight, age at first farrowing and pre-weaning piglet mortality rate were not significantly affected by season of farrowing.

positive significant correlation was indicated in the present investigation between litter size at birth, litter size at weaning, litter weight at birth, litter weight at weaning, birth weight and weaning weight of piglets. The details are furnished in Table 8.

(i) Management practices:

In the field most of the pigs kept by the farmers were housed to avoid stamping of piglets and also to facilitate easy suckling. Some of the farmers had farrowing guards in farrowing pens. Separate pens are provided for boars, sows, mother with litters, pregnant sows and young stock with partial sheds with thatched sheets and granite slabs. Majority of them had only one extra pen, wherein mother with litters or with the young stock are housed. Pregnant sows were separated just before the farrowing and kept them away from other stock. Majority of the farmers had farrowing pens with guards. Young ones were allowed to stay with mother for a period of 1½ to 2 months and thereafter they were weaned, and kept with other stock. Male and female piglets were separated at 5 or 6 months of age and housed separately till marketing and breeding.

Most of the farmers washed their pigs once a day and cleaned the shed twice daily. Farmers with large number of pigs practiced ear notching/tattooing to identify the animals.

Majority of the farmers supplemented the piglets with iron dextrose injection or iron syrup in first week of the birth of piglets to overcome the deficiency of iron supplement and to avoid piglet anemia. Some farmers maintained sow record and farrowing register of each individual piglet to indicate family/pedigree of piglets.

(ii) Housing:

The floor of pig shed was mostly constituted of stone slabs with slight elevation. It has a built-in manger divided into water and feed compartments. Some farmers had provided cement floors with water tap and good drainage facility. The wall was mostly constructed with mud but some had brick wall with cement. ventilation was provided in all categories of walls. The roof was usually of asbestos locally available tiles or wooden/plants leaves or polythene sheets and few had concrete roof also.

(iii) Feeding:

Pigs were usually stall fed with kitchen waste vegetable waste, agricultural or horticultural waste, crop residues, poultry waste, seafood waste and damaged food grains. Some farmers fed pigs with 1-2 kg of concentrates in addition to 2 to 4 kg kitchen wastes per day. The feed was given once in morning and once in evening. Drinking water was available through out the day.

(iv) Health Management:

The pigs were vaccinated against FMD and HS as prophylactic measures regularly. Pigs were dewormed periodically with broad-spectrum anthelmintics and for intestinal parasites. Regular health coverage was ensured to all animals from the dispensaries or hospitals of local areas.

(v) Breeding Management:

Male and female piglets were separated at 5-6 months of age. Females (Gilts) were allowed for breeding when they attained 7-8 months of age. Young boars were allowed for breeding after attaining one year of age. Breeding sows were allowed to mate soon after weaning of piglets. Some farmers practiced separation of pregnant sows from other stock and kept them in a separate pen. However, this practice is limited to a few farmers since most of the farmers had just one pen. But almost all farmers gave special care and better management facilities like extra nutrition to the pregnant sows and mother with litters.

HOUSING AND MANAGEMENT OF PIGS UNDER FIELD CONDITIONS IN THE OPERATIONAL AREAS UNDER THE PROJECT IS DEPICTING IN FIG. 7 PAGE 26.

TABLE-1. MEAN SQUARES FROM LEAST SQUARE ANALYSIS FOR LITTER TRAITS

Source of Variation	d.f.	Litter Size	Litter Weight
At Birth			
Location	1	40.75*	382.537**
Period	2	10.98 ^{NS}	23.072 ^{NS}
Season	2	1.18 ^{NS}	8.445 ^{NS}
Residual	164	6.415	8.298
Total	169	59.325	422.352
At Weaning			
Location	1	168.486**	13917.986**
Period	2	55.733**	3129.134**
Season	2	1.459 ^{NS}	117.274 ^{NS}
Residual	164	4.695	322.285
Total	169	230.373	17486.679

NS = Non-significant.

* = (P ≤ 0.05), ** = (P ≤ 0.01).

TABLE-2. LOCATION, PERIOD AND SEASON WISE LEAST SQUARE MEANS FOR LITTER TRAITS.

Trait	P	Overall	Classification							
			Location		Period			Season		
			L1	L2	P1	P2	P3	S1	S2	S3
Litter Size at Birth	N	170	69	101	41	24	105	71	50	49
	μ	6.18	5.77 ^a	6.47 ^b	6.02 ^a	6.33 ^a	6.21 ^a	6.23 ^a	6.22 ^a	6.08 ^a
	SE	0.2	0.28	0.27	0.39	0.53	0.25	0.3	0.34	0.4
	CV	41.3	40.4	41.1	41.9	41.1	41.3	40.0	38.3	46.4
Litter Size at Weaning	N	170	69	101	41	24	105	71	50	49
	μ	4.99	4.17 ^a	5.56 ^b	4.44 ^a	5.54 ^b	5.09 ^c	5.07 ^a	4.94 ^a	4.94 ^a
	SE	0.18	0.23	0.25	0.32	0.46	0.25	0.29	0.32	0.36
	CV	47.7	46.3	45.1	46.2	40.5	49.5	47.5	45.1	51.5
Litter Weight at Birth	N	170	69	101	41	24	105	71	50	49
	μ	6.58	4.58 ^a	7.94 ^b	7.21 ^a	8.18 ^a	5.97 ^a	7.14 ^a	6.24 ^a	6.11 ^a
	SE	0.26	0.24	0.34	0.48	0.71	0.32	0.39	0.42	0.52
	CV	50.8	44.0	42.6	42.5	42.5	54.7	46.1	47.9	60.0
Litter Weight at Weaning	N	170	69	101	41	24	105	71	50	49
	μ	37.99	29.8 ^a	43.6 ^b	35.8 ^a	41.6 ^b	38.0 ^a	38.0 ^a	37.7 ^a	38.3 ^a
	SE	1.5	1.65	2.15	2.56	3.8	2.1	2.26	2.89	3.02
	CV	52.5	46.0	49.5	45.7	44.7	56.6	50.1	54.2	55.3

Note: Least square means bearing same superscript with in a sub-group are not

TABLE-3. MEAN SQUARES FROM LEAST SQUARE ANALYSIS OF BIRTH WEIGHT AND WEANING WEIGHT .

Source of Variation	d.f.	Birth Weight	d.f.	Weaning Weight
Sex	1	0.344*	1	33.041**
Period	2	8.216**	2	45.173**
Season	2	0.968**	2	8.397 ^{NS}
Residual	1045	0.065	843	3.808
Total	1050	9.593	848	90.419

NS = Non-significant.

* = (P ≤ 0.05), ** = (P ≤ 0.01).

TABLE-4. SEX, PERIOD AND SEASON WISE LEAST SQUARE MEANS FOR BIRTH WEIGHT AND WEANING WEIGHT.

Trait	P	Overall	Classification							
			Sex		Period			Season		
			X1	X2	P1	P2	P3	S1	S2	S3
Birth Weight	N	1051	540	511	247	152	652	443	310	298
	μ	1.06	1.05 ^a	1.08 ^b	1.2 ^a	1.3 ^b	0.96 ^c	1.15 ^a	1.00 ^b	1.01 ^b
	SE	0.009	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
	CV	27.36	29.5	25.0	13.4	13.4	31.6	22.7	29.2	30.9
Weaning Weight	N	849	435	414	182	182	535	361	246	242
	μ	7.61	7.41 ^a	7.82 ^b	8.03 ^a	8.01 ^a	7.37 ^b	7.53 ^a	7.55 ^a	7.78 ^a
	SE	0.07	0.09	0.10	0.15	0.15	0.08	0.10	0.13	0.12
	CV	26.15	26.3	25.6	24.8	24.8	24.8	26.1	27.3	24.8

Note: Least square means bearing same superscript with in a sub-group are not significantly different from each other.

TABLE-5. MEAN SQUARES FROM LEAST SQUARE ANALYSIS OF AGE AT FIRST FARROWING (AFF).

Source of Variation	d.f.	Age at First Farrowing
Location	1	17025.831**
Period	2	2467.152*
Season	2	940.185 ^{NS}
Residual	162	563.512
Total	167	20996.68

NS = Non-significant. * = (P ≤ 0.05), ** = (P ≤ 0.01).

TABLE-6. LOCATION, PERIOD AND SEASON WISE LEAST SQUARE MEANS FOR AGE AT FIRST FARROWING (AFF).

Classification	P	AFF	Classification	P	AFF
L1	N	67	P3	N	103
	μ	392.54 ^a		μ	382.83 ^b
	SE	4.02		SE	3.07
	CV	8.37%		CV	8.13%
L2	N	101	S1	N	71
	μ	373.25 ^b		μ	375.65 ^a
	SE	1.62		SE	3.04
	CV	4.35%		CV	6.82%
P1	N	41	S2	N	49
	μ	376.05 ^a		μ	385.86 ^a
	SE	2.04		SE	4.04
	CV	3.48%		CV	7.32%
P2	N	24	S3	N	48
	μ	381.21 ^b		μ	383.75 ^a
	SE	3.2		SE	3.32
	CV	4.11%		CV	5.99%
Classification	P	AFF			
Overall	N	168			
	μ	380.94			
	SE	2.00			
	CV	6.82%			

Note: Least square means bearing same superscript within a sub-group are not significantly

TABLE-7. PIGLET MORTALITY RATE (PMR) UPTO WEANING.

Classification	Number of piglets in each group	Number of piglets died in each group	PMR (%)	χ^2 computed value
Sex				
Male	540	105	19.44%	1.25 ^{NS}
Female	511	97	18.98%	
Location				
L1	398	109	27.39%	26.68**
L2	653	93	14.24%	
Period				
P1	247	65	26.32%	12.29*
P2	152	20	13.16%	
P3	652	117	17.95%	
Season				
S1	443	82	18.51%	0.58 ^{NS}
S2	310	64	20.65%	
S3	298	56	18.79%	
Overall				
	1051	202	19.22%	

NS = Non-significant.

* = (P ≤ 0.05), ** = (P ≤ 0.01).

TABLE-8. CORRELATION COEFFICIENTS BETWEEN DIFFERENT TRAITS

TRAITS	Litter Size at Weaning	Litter Weight at Birth	Litter Weight at Weaning	Weaning Weight
Litter Size at Birth	0.831 ± 0.002	0.853 ± 0.002	0.744 ± 0.005	NC
Litter Size at Weaning	1	0.846 ± 0.002	0.904 ± 0.007	NC
Litter Weight at Birth	0.846 ± 0.002	1	0.779 ± 0.004	NC
Birth Weight	NC	NC	NC	0.266 ± 0.02

NC = Not Computed since the observations were not paired.

RESULTS

- 1) The higher co-efficient of variation observed in litter size and litter weight indicated the possibility of improving them through appropriate selection and breeding methods apart from improving management practices.
- 2) The significant differences estimated for litter size, litter weight, age at first farrowing and piglet mortality rate for different locations indicated that pig farmers in Puttur location are rearing the pigs in more intensive form with excellent management practices including better feed compared to the farmers belonging to Ponnampet location, where the pigs are mostly kept as scavengers.
- 3) Location and period were identified as important non-genetic factors affecting the productive and reproductive traits in pigs. Season was found to be a weak non-genetic factor. The results of this study confirmed the general fact that reproductive traits are controlled or influenced more by environmental factors.
- 4) The significant positive correlation among the litter traits indicated that selection for any one trait would bring about genetic improvement in other traits simultaneously.
- 5) The traditional pig farmers are to be encouraged to raise the animals under intensive rearing. The study also recommends taking upon an organized effort in maintaining and further improving local black pigs through appropriate cross breeding programme with Large White Yorkshire breed of pig.

i) Purchase of Equipments:

The SAP members had approved the purchase of Xerox machine with in the available budget in their meeting held on 2nd August 2001 at Veterinary College, UAS, Bangalore vide Letter No. F.No.AD(A&H)/2000/SAP/G-6 dated 30.09.2001 from the Director, Agro Ecosystem (Coastal). As per the approval our centre has purchased Canon 6835 Xerox Machine during the month on March 2002.

The SAP Committee members have also permitted to engage a Senior Research Fellow by utilizing the available grants under Contractual Services vide letter no. F.No.AD(A&H)/2000/SAP/G-6 dated 30.09.2001 from the Director, Agro Ecosystem (Coastal).

j) World Bank Team head by Dr.P.L.Gautam, Director along with Dr.P.S.Sidhu and Dr.Singh. Member of World Bank Team visited the UAS, Bangalore and also the centre and reviewed the physical and financial status of the ongoing NATP projects on 07.03.2002. The events are shown in Fig. 8 Page 33.

k) Site Committee Report:

NATP Site Committee meeting was held on 13th and 14th March 2002 to review the progress of NATP projects in the Chairman ship of Prof. S.R.Viswanatha, Director of Research and indicated that the programme implementation as well as physical and financial progress achieved are satisfactory. The proceeding of the meeting is shown in page 34.

l) List of literature on pig production and livestock farming (in Kannada) provided to farmers covered under "Strategies for Enhancing the Productivity of Pigs for the farming community under PSR, Coastal Agro-System "

a)

1. Information Bulletin on Strategies for Enhancing the Productivity of Pigs for the farming community under PSR, Coastal Agro-System - Dr.M.G.Govindaiah and Dr.K.S.Prathap Kumar.
2. Information on Modern Animal Husbandry Practices - Dept. of Animal Husbandry and Veterinary Service, Chamarajanagar, Government of Karnataka.
3. Developments in Animal Husbandry and Veterinary Sciences - Dept. of Animal Husbandry and Veterinary Service, Government of Karnataka.
4. Modern pig rearing - Dept. of Animal Husbandry and Veterinary Service, Government of Karnataka.

b) List Of Publications:

1. Govindaiah, M.G., and Jayashankar, M.R., 2001. Rural development through livestock production - the role of women, Common Wealth Veterinary Association News, 17(2):36-39.

4. Central Agricultural Research Institute, Port Blair

Findings of survey conducted :

The larger chunk of Pig population is accumulated in Nicobar group of island and are scattered over north, middle and south Andaman. The pigs reared close to the city are mostly fed with hotel waste, especially leftover boiled rice and vegetables. The pig farmers other than the Nicobarese fed their animals on rice bran, wheat flour, banana, coconut kernels and colocasia.. Colocasia leaves, banana and tubers are preboiled and then fed. Whereas the Nicobarese feed the pigs exclusively on coconut. In villages housing structures are made up of thatched roof. The Nicobarese don't make shed for the pigs, the thick forest cover provide the shelter to the pigs. A sex ratio of 1:5 is practiced in most of the herd. No regular health cover programme is being adhered to. Veterinarians are consulted in case of outbreak of swine diseases.

In March 2001 three growers of improved variety (White York shire) were purchased for evaluation of their performance on the farm. Average daily bodyweight gains at farm level and at the field (scavenging) level were compared and the values were 0.38 kg and 0.24 kg respectively. The feed conversion ratio at farm level was 1:7.82 and the cost/kg BWG was Rs. .97.75 at Institute farm (from 40-80 kg BW). Using kitchen waste, hotel waste or vegetable waste could further bring down the cost of per kg BWG. Most of the farmers did evince interest n increasing their herd size but lack of land and paucity of water prevented them from doing so and financial crunch was identified to be constraint for others.

Salient Finding of survey	
Pig Population	90 % of pig population is concentrated in Nicobar group of islands
Average Holding	3 pigs
Feeding	Coconut Kernel, rice bran, wheat flour, banana, Colocasia leaves/tubers and scavenging
Housing	Made with bamboo thatch
Sex ratio	1:5 (male:female)
Disposal	Slaughtered for festival and disposed of at 8 - 10 months of age. (100 kg)
Health cover	No regular health cover
Income	Rs. 9000 - 12000
Disease	Swine fever

The first sign of sexual behavior was observed in the boar at about 4 month of age and 46 kg of body weight. The sows were mated with the boar available on the farm and farrowing



Indigenous feed trough made by Nicobari tribes



A sow with her piglings



A makeshift pigshed



A Nicobari tribe calling the pig for feeding by beating sticks to attract the attention of the pigs. The pigs response to this sound very promptly.

was recorded in the last week of Oct 2001 (about 10 months from the birth). The two sows produced 7 and 4 piglets and one piglet died during the first week after birth. Piglets were given iron tonic Dexorange to avoid iron deficiency.

Performance of Pigs at Institute farm

Initial body weights (kg)	1.0
WAFSSB (kg)	46
ABW at first farrowing (kg)	110.5
ABW of the piglet (kg)	0.98
Avg.litter size	5.5
ABW at weaning (kg)	11.21

Growth of White Yorkshire Pigs at Experimental Farm

<i>Pigs</i>	<i>Initial BW</i>	<i>BWG in 130 days (kg)</i>	<i>BWG (g/d)</i>
Male	1.01	45.6	350
Female	0.92	34.5	265
Combined	0.98	41.2	316

5. ICAR Research Complex, Goa

Progress of work (2001-2002)

In continuation of earlier years work, a feeding trial was initiated during the year with Brewery grain waste. The experimental feed with 20 % BDG I being fed to a group of cross-bred piglets and the growth performance is compared with the control feed. The trial is continued. Piglet mortality has been recorded and the causative organism has been isolated. Further observations are carried out.

Table I Performance of the piggery unit (from 01.09.99 to 30.11.01)

Year	No. of farrowing	Male	Female	Total	Av. Lt. Size	Pre-wean mortality
1999-2000	07	17	21	38	5.420	21.05
2000-2001	10	32	28	60	6.000	31.66
2001-2002	04	13	11	24	6.000	12.50
Total	21	62	60	122	--	--
No. Sold	--	46	39	85	--	--

Data on piglet mortality due to infectious causes from April 2000 to till date

Sl. No.	Causes of mortality	No. of Animals died	Mortality %
1	Pneumonia	3	18.75
2	Pasteurellosis	2	12.5
3	Gastroenteritis	3	18.75
4	Colibacillosis	3	18.75
5	Septicaemia	4	25.0
6	Urethritis	1	6.25
	Total	16	

In all 18 isolates were recovered from the PM samples.

The isolates were sensitive to cloramphenicol, oxytetracycline, sulphadiazine, vancomycin and resistant to ampicillin and streptomycin.

Inter disciplinary team work :

In almost all the centres scientists from various disciplines like Animal Nutrition, Breeding and Genetics, Livestock Production Management, Veterinary Extension, Agriculture and Fisheries Faculties have contributed a lot for the preparation of questionnaire, system studies and analysis and for developing strategies for enhancing the productivity of the present pig production system.

In CARI Port Blair a multi disciplinary team consisting of Animal Nutrition, Breeding and Veterinary Microbiology, of working to find out solution to various problems identified by the survey work.

Project Impact

Field survey and establishment of field units of pigs with a system approach in various centres have motivated many farmers for adopting integrated pig farming system there by enhancing their system productivity. The technology transfer in feeding, management and health cover has contributed a lot to the farmer's confidence. System approach in research in field condition has resulted in a revolutionary change in the traditional research programmes at farmer's level. A clear picture of the Project Impact will be available on complete implementation of the Project in various centres. Establishment of co-operatives added benefit to the farmers by opening good marketing channels. Disease surveillance and preventive measures adopted added to the health care of animal in the field units.

Administrative Issues :

Technical delay in getting the fund is reported by earlier centres. Provision of incentives to the scientists and staff who are undertaking the NATP work in addition to their normal duties in the host Institute will be a motivating factor for them in the implementation of the project.

Physical and Financial Progress :**a) Physical****1. Lead Centre : Centre for Pig Production and Research, Mannuthy**

Activity	Target	Achievement	Reason for Shortfall
1. Development of technologies and strategies for the solution of problems based on the technical know-how already available in the Centres and also those obtained by concurrent researches undertaken in the centres.	Completion	Completed	
2. Identification of beneficiaries (About five families per Panchayat)	Completion	Completed	
3. Formation of co-operatives at panchayat and District panchayat levels.	Completion	Completed in one panchayat	Technical reason
4. Provision of suitable training to the selected beneficiaries.	Completion	Completed	
5. Providing project report for availing financial assistance from banks if needed and technical help for the construction of cheap low cost pig styes using locally available materials	Completion	Completed	
6. Continuing the phase wise establishment for breeding stock in CPPR and RASS	Completion	Completed	
7. Distribution of piglets generated at farmer's premises	Completion	Completed	
8. Making the system autonomous with respect to availability of piglets	Completion	Completed	
9. Extending the projects to other districts by utilizing piglets produced in the nucleus herd at CPPR	Completion	Completed	
10. Providing adequate support to keep the autonomy of the project	Completion of first stage	Completed	
11. Conduct of a final survey to assess the impact of the Project on various socio-economic aspects in the area.	Completion	Completed	

2. Livestock Research Station, Kattupakkam :

A total of 123 piggery field units were identified to study the prevailing status of piggery farming in Kancheepuram District of Tamil Nadu. The socio-economic status of the pig farmers in Kancheepuram district was studied. It is found that pig rearing in this district is traditional.

Information regarding the nutrition, housing patterns, performance characteristics and management were collected. Pigs are reared only as scavenging animals as the economic status of most of the farmers does not permit them to offer any alternative feed formulations. The housing pattern is still in primitive stage. During the field visits, farmers were given relevant information pertaining to different managerial practices in piggery to be adopted to overcome various problems. Weighment of piglets at different age groups are recorded at regular intervals and health coverage undertaken, socio-economic status of pig farmers, production performance of indigenous and crossbred pigs were assessed. Nutritional studies were conducted for formulating low cost pig feed using locally available resources. Disease surveillance and preventive vaccination were carried out.

3. University of Agricultural Sciences, Bangalore :

Completion of Targeted Activities Chart for the year 2001-2002 :

Activity chart for the year 2001-2002

II / 1	Development of technologies and strategies for the solution of based on the technical know-how already available in the centres as well as those results that are expected to be derived from the concurrent research undertaken in the centres during the course of investigation.	Partially perfected breeding and feeding technologies
II / 2	Provisions of suitable training to the selected beneficiaries at the main centres.	Partially completed and intensive training will be taken up during 2002-2003 for selected farmers at higher levels
	Providing Project Report for availing financial assistance from banks, (commercial banks, Co-operative banks, NABARD and other financial institutions etc.) If needed, the technical help will be given for construction of cheap and low cost pig sties/housed using locally available materials.	Continued
	Continuing the phase wise establishment of breeding stock at ARS, Ponnampet, Pig Breeding Station, ARS, Kankandi.	Continuing the production of genetically superior quality piglets for the beneficiaries covered under this project.
II / 3	Starting phase-wise supply of piglets to farmers who have completed the development of infrastructure and have identified the feed resources for pigs.	Piglets will be distributed phase wise for those identified farmers who have already completed the modification of the existing pig styles as per perfect guidelines and/or construct pig sheds
	Providing help for availing insurance coverage to animals	Will be continued
	Imparting technical know-how with respect to scientific breeding, feeding and management of pigs under field conditions.	Will be continued
II / 4	Identification and fixing of marketing channels for fattener pigs and pork marketing chains, both at the farmers levels and retailers level.	Will be continued
	Continuing the phase-wise establishment of breeding stock at all the centers.	Will be continued
III / 1	Continuing the supply of high quality piglets to other farmers in a phased manner in the project area	Will be supplied in future also
III / 2	Marketing of pigs supplied during fourth semester through pig co-operatives, Agriculture Produce Marketing Centres (APMC)	Will be taken up shortly.

4. Central Agricultural Research Institute, Port Blair

The survey work of Andaman Island is over and the survey of Nicobar Island is well over half way through. The construction of Pig shed is almost complete and is about to be commissioned. As the activity was initially started in a makeshift shed where in two sows and a boar was housed for studies. After first farrowing in each case the present population has gone upto thirteen. The second farrowing in both the cases is expected next month. Studies on the growth and reproductive performance of whit Yorkshire piglets is going on.

5. ICAR Research Complex, Goa

Activity	Target	Achievement
To formulate pig ration incorporating the locally available agro-waste /unconventional feed ingredient and conducting feeding trial for performance study.	Ongoing	Ongoing
Formulating disease control package for obtaining optimum growth rate	Ongoing	Ongoing

Financial Progress :

(in lakh)

Centre	Funds budgeted	Funds received	Funds utilized
CPPR, Mannuthy (Lead Centre)	5.24	6.55	6.46
LRS, Kattupakkam	4.18	--	1.78 (up to Nov.2001)
UAS, Bangalore	5.09	6.237	6.167
CARI, Port Blair	5.07	--	6.24
ICAR, Goa	5.85	--	--

Collaboration and Publication

In all the centres there was collaboration with parent institutes and allied departments. For survey, scientists in the Department of Extension and local bodies have helped a lot. The activities in the next quarter include mainly continuing the supply of piglets to farmers and identification of feed resources, identification and fixing of marketing channels, introduction of management techniques for productivity enhancement in the field system. In future preference will be given for establishment of co-operatives and marketing channels.

List of publications

1. Lead Centre, (CPPR, Mannuthy)

1. Joseph Mathew, Sibi, N.B., Koshy John and Viswanathan T.V. (2002). Study on etiology of swine dermatitis in pig farm. Proceedings of the 14th Kerala Science Congress, 29-31 Jan 2002, Kochi, pp.346-372
2. Venugopal, U.R. and Joseph Mathew (2001). Waste recycling – A tool for cost efficiency food production. Proceedings of the national conference on strategies for safe food production 22nd November, Thrissur, Kerala, pp.162
3. Joseph Mathew, Suraj, P.T., Viswanathan, T.V. and Usha, A.P. (2001). Supplementation of Turmeric (*Curcuma longa*) in pig ration. Proceedings of the national conference on strategies for safe food production 22nd November, Thrissur, Kerala, pp.133-135
4. Viswanathan, T.V., Joseph Mathew, Usha, A.P., Abdul Gafoor, P.A. and Magnus Paul K. (2001). Effect of castration on body weight in male grower pigs. Proceedings of the national conference on strategies for safe food production 22nd November, Thrissur, Kerala, pp.130-133
5. Harikumar, S. Joseph Mathew, Viswanathan, T.V. and George T. Oommen (2001) Carcass characteristics of Large White Yorkshire pigs on organic waste feeding. Proceedings of the national conference on strategies for safe food production 22nd November, Thrissur, Kerala, pp.122-125
6. Viswanathan, T.V. Joseph Mathew, Usha, A.P., Rajendran Thomas, Abdul Gafoor P.A. George Sherin K., Pradeep S.V., Lalu, K. Magnus Paul K. Johnson P.M. Cijo, K. Joseph and Dipu M.T. (2001). Effect of feeding hotel waste, hostel and domestic food waste on grower pigs. Proceedings of the national conference on strategies for safe food production 22nd November, Thrissur, Kerala, pp.85-103
7. Suraj, P.T., Joseph Mathew, T.V. Viswanathan and A.P. Usha (2001). Evaluation of a Pig – Fish- Vegetables integrated farming system. Paper presented in 11th Swadeshi Science Congress, 7-9 November 2001. Abstracts of 11th Swadeshi Science Congress 7-9 November 2001 pp-89.

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8. Joseph Mathew, V.Mridula, K.J. Jobi and T.V.Viswanathan (2001). Utilisation of pig manure for preparation of vermi compost. Paper presented in 11th swadeshi science congress, 7-9- Novembr-2001. Abstracts of 11th Swadeshi science congress 7-9 November 2001. Pp.16

2. UAS, Bangalore

1. Govindaiah, M.G., and Jayashankar, M.R.,2001. Rural development through livestock production - the role of women, Common Wealth Veterinary Association News, 17 (2) : 36-39.

3. CARI, Port Blair

A folder titled " piggery management practices " has been published by the Division of Animal Science and the Authors were Dr. S.P.S. Ahlawat, Dr.B.R. Shome, Dr.S. Senani, Dr. R. Shome, Dr.S.K.Saha, Dr.M.K. Padhi, Dr. R.B. Rai, and Dr.V. Venkatasubramanian.

A paper entitled "Rearing and feeding practices of pig farming in A&N Islands" was presented in National seminar on Resources management for higher sustainable production in Coastal areas. The authors were S. Senani, S.K. Saha, T.V. Viswanathan, S.P.S. Ahlawat, R.N. Chatterjee, A.K. Kundu, S. Jeya Kumar, Jai Sunder, Deepa Bharathi, and A. Aziz.


AED / PIU Actions requested :

1. Arranging provisions for imparting short term training to the scientists and technical staff involved in the project.
2. Provision of incentives for the scientists and staff who are undertaking the project in addition to their normal duties.
3. Setting of separate administrative set up for the project to reduce the work load.
4. Since the construction of furrowing sties and growing styes is almost complete and the space problem has been done away with. The animals will soon be shifted to the newly constructed styes. Hence an additional amount of Rs. 223725/- for the construction of the complete structure may kindly be sanctioned for the smooth functioning of the project.

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