

Studies on Tribal Farming in Nicobar Islands, India

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Abstract: *The Nicobarese were the largest tribal group inhabiting 12 islands with major concentration in Car Nicobar. As there is no reliable information on the biophysical set up, socioeconomic and farming system characteristics of these Islands, the study aims to derive baseline information on the above aspects, which is essential for any planning process. The agricultural production in Nicobar Islands is mainly dictated by rainfall. The soils are inherently acidic except in Car Nicobar and Katchal where neutral to calcareous soils are found. The tribes are living in a social system called tuhet and have no individual land rights. Majority (73.4%) of the household heads comes under active workforce with worker consumer ratio of about 60%. The coconut is the predominant crop occupying 84% of the agricultural area. On an average 235 coconut trees were owned by an individual household with values ranging from 10 to 1000. The major livestock were pig (82%) and goat (18%) reared in an extensive open semi feral system. The average annual income from farm enterprises is INR.103345 (\$1694) majority comes from coconut. The average family expenditure is INR.76692 (\$1257) with major expenses on food (54%), religious ceremonies, and children's marriage besides household and personal maintenance including health cost. Remoteness and isolation, monopoly in copra marketing, tuhet system insisting sharing some part of income, lack of knowledge on scientific management of crops like vegetables, lack of enough native breeds of livestock were the major constraints for improving farm production in these Islands.*

Keywords: *Farming systems, Tuhet, Constraints, Nicobari tribes, Nicobari fowl, Nicobari pig.*

I. Introduction

The Nicobar group of Islands is home to two tribes of Indo-Mongloid origins. Out of these two the Nicobarese are the largest tribal group inhabiting 12 Islands with major concentration in Car Nicobar. They were the last indigenous people to arrive on these Islands and have racial mixture with the natives of South East Asia [1]. Unlike other tribal groups, they have much greater contact with the outside world and socially and economically more developed than any other tribal groups in Andaman and Nicobar Islands [2]. To overcome the problem of over population of tribes in Car Nicobar, 165 families were shifted to Harminder Bay in Little Andaman in 1973. Therefore at present these tribal groups were found in Nicobar group of Islands as well as in Harminder Bay in Little Andaman.

The information about the communities, institutions, major economic and demographic trends affecting a community or an area is critical in planning and implementation of any effort whether at the global or regional level [3]. Similarly biophysical and economic information is helpful in assessing the resource availability, their consumption pattern, sources of income and employment opportunities besides the general level of economic prosperity of the region or the targeted population. Land use and development trends indicate the place and phase of development, and suggest factors which may influence those development trends. All this information is helpful in planning a successful development programs in the targeted areas.

However, farmers land management practices are actually influenced by many factors such as availability of natural, human, technological and capital resources, biophysical and socioeconomic constraints besides policy environment including land rights, land tenure, subsidies, taxes, commodity prices, and transportation and marketing opportunities [4]. Devising strategies for promotion of land use practices necessitates knowledge on factors comprising biophysical settings, socioeconomic characteristics and institutional characteristics of farmers. As there is no such information on the tribal farmers of Nicobar Island the present study focuses (i) to examine the existing biophysical characteristics of Nicobar group of Islands, (ii) to analyse socio-economic characteristics of existing farming systems; and (iii) to identify the constraints for adoption of new technologies to help in planning any agricultural development programs in the study area.

II. Materials And Methods

2.1 Study area

The study was conducted in Nicobar group of Islands which are situated in the South-east of the Bay of Bengal between 6° - 10° N latitude and between 92° - 94° E longitude (Fig. 1). The total geographical area of the Islands is 1840 km² with a population of 36842, of which tribal population accounts 63.1% [5].

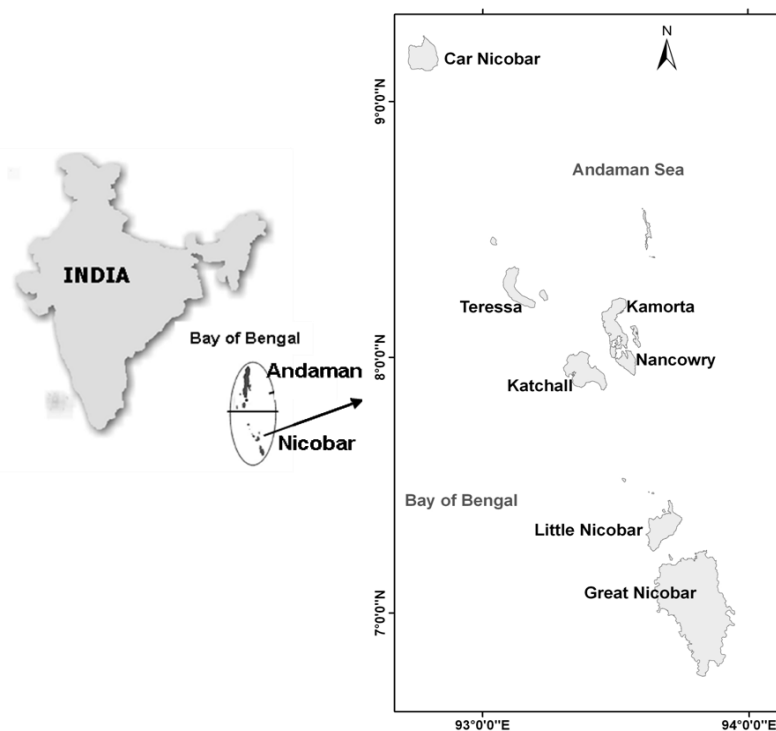


Figure 1 Location map of study area.

The Islands experience humid tropical climate with total annual rainfall of 300 cm and average mean maximum and minimum temperature is of 30.2° C and 23.0° C, respectively. Major share of rainfall is received during May to December after that dry period extends for 3 to 4 months from January to April. Only rainfed agriculture is practiced and horticultural crops are the major source of livelihood with coconut occupying an area of 80% of agricultural area. The other crops grown are banana, papaya, tapioca, sweet potato, pine apple etc. mainly grown in home gardens. The farmers are practicing subsistence farming or natural farming as there is no application of external inputs such as chemical fertilizers, pesticides etc. for increasing the production. In the study area, it was observed that the livestock production, in general, limited to rearing of pig and goat in open range–semi feral–system, and family poultry especially of indigenous birds.

2.2 Methodology

Stratified random sampling procedure was followed to select the villages and sample households. A household survey was carried out during June to October 2012 with pre tested questionnaire with a total number of 327 selected farmers. The stratification was done by selecting Islands having more than 70.0% tribal population viz. among the 12 inhabited Islands of Nicobar district, four islands viz., Car Nicobar, Kamorta, Katchal, Nancowry were selected for the study. Besides, Hut Bay in Little Andaman which has the dominant tribal population was also included in the study area. Information on farmers, farm families, role of different agricultural activities, and income contribution from each farm enterprises were collected. The information on farm household includes, age, level of education and household size and expenditure pattern during last five years.

Long term weather parameters like rainfall, evapotranspiration (ET) and no. of rainy days were collected from Indian Meteorological Station at Car Nicobar for analysis of weather related parameters like occurrence of drought, wet spells, the scope for water harvesting and management opportunities in these Islands. Secondary data were used where ever necessary in assessing the biophysical characteristics.

For soil resource assessment soil samples were collected from 0-15 and 15-30 cm depth from different land uses viz., natural forests, coconut plantations, homestead gardens and fallow lands. The soils were analyzed

for pH, EC, organic carbon (O.C), available nitrogen (N), phosphorus (P) and potassium (K) by following standard procedure.

2.3 Data analysis

The socioeconomic and production characteristics of the farmers were descriptively analyzed and described using measures of dispersion of frequency, mean, cumulative frequencies and percentages, etc. One way ANOVA and turkey's test were done to determine any significant differences between the islands and also between different sizes of holdings differentiated based on number of coconut trees owned by each household.

III. Results

3.1 Biophysical characteristics

The Nicobar group of Islands is located in tropical region experiencing heavy intensive rainfall during monsoon period with precipitation exceeding evapotranspiration (ET) resulting water surplus from April to December months (Fig. 2). However, dry condition with water deficit occurs for three months (January to March) resulting in water scarcity even though total annual rainfall exceeds 300 cm. The number of rainy days remains more than 15 in almost all the months during monsoon season with mean monthly rainfall of 200 mm. During dry period extending from January to March, minimum of 40mm rainfall was received in about 2 to 4 rainy days which provides scope for small scale in situ water harvesting structures to tide over the water scarcity in cultivation of annual crops in these Islands.

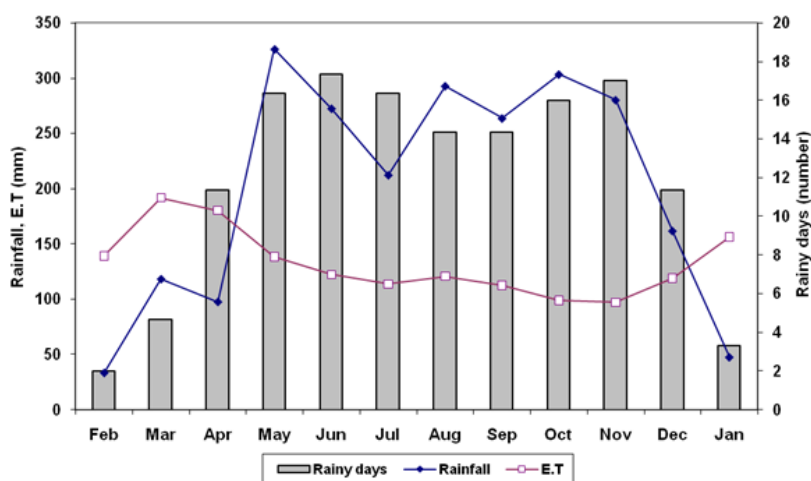


Figure 2 Rainfall pattern over Nicobar Islands.

The nature and quality of soils determine production potential of different crops in these Islands. The analysis of different soil parameters indicated spatial variability in soil fertility status across the Islands (Table 1). The soil nutrient status especially nitrogen (N), phosphorus (P) and potassium (K) play an important role in crop production. The soils of Car Nicobar and Katchal were neutral, non saline with mean organic carbon content of 2.03%. The nitrogen (N), phosphorus (P) and potassium (K) were present in higher quantities in these Islands as compared to others. However, in Nancowry and Kamorta Islands acid soils (pH 5.3) were found with low phosphorus (0.005 g kg⁻¹ soil) content. The soils of Hut bay were alkaline (pH =8.0), low in organic carbon, poor to medium in N, P and K concentration. Though the soils are non saline, the mean EC value (0.2 dS m⁻¹) was higher in soils of Hut Bay as compared to other Islands.

Table 1: Mean surface soil properties of different Islands.

Island	pH	EC (dS m ⁻¹)	O.C (%)	Available macronutrients (g kg ⁻¹)		
				N	P	K
Car Nicobar	7.1	0.06	2.03	0.164	0.010	0.105
Nancowry	5.3	0.07	2.09	0.159	0.005	0.105
Katchal	7.3	0.11	1.79	0.140	0.010	0.109
Kamorta	5.2	0.12	1.72	0.130	0.005	0.113
Hut Bay	8.1	0.21	1.13	0.107	0.006	0.108

3.2 Household characteristics

The average characteristics of the households surveyed are presented in Table 2. The data indicated that majority of the households (88.1 %) were headed by men and remaining 11.9 % by women. The age of

household head ranged from 20 to 86 with an average of 47.8 years and majority (73.4 %) of them were in active workforce (less than 55 years). The family size varied from 2 to 16 with an average of 5.9 persons, whereas two-thirds of the households had a family size less than the average.

The standard of education moulds the farmer’s response to improved technology and market performance. Therefore examining the educational status of the farmers is very important. The educational status of the household head was given as a categorical variable (e.g., primary, secondary, etc.). The overall literates in the study area were about 79.8 %, of which, 11.9 % of the respondents completed post secondary level of education followed by secondary (49.5 %), primary education (18.4 %) and remaining 20.2 % of them had no formal education. The occupation structure of the sample households was studied according to main and subsidiary occupation. Though all of household heads are practicing farmers, in 29.4% of households at least one person other than the household head is employed in government agencies. As no significant differences were found between the Islands for the above parameters, they were not given separately.

Table 2: Household characteristics of the tribal farmers in Andaman and Nicobar Islands

Household head	Frequency	Percent (%)	Cumulative frequency	Mean
Gender of the household head				
Male	288	88.1	288	-
Female	39	11.9	327	
Age of household head				
< 26	15	4.6	15	
27-35	51	46.8	66	
36-45	84	77.1	150	47.8
46-55	90	82.6	240	
56-65	60	55.1	300	
>65	27	24.8	327	
Household size				
1 to 3	33	10.1	33	
4 to 6	171	52.3	204	
7 to 9	108	33.0	312	5.9
10 to 12	12	3.7	324	
> 12	03	0.9	327	
Education of household head				
No education	66	20.2	66	
Primary	60	18.4	126	
Secondary	162	49.5	288	6.4
Post secondary	39	11.9	327	

3.3 Agricultural production system

In the study area natural forests, waste lands/fallow lands, plantations, home gardens were the major land uses found besides land for settlements, and are common in all the islands. The natural forest accounts for 98% of the total available area, while other land uses confined to 2% only. The plantation crops especially coconut (*Cocos nucifera*) occupies 84% of the area under agriculture followed by areca nut (*Areca catechu*) (Fig.3). In addition, fruit crops such as banana (*Musa sp*), papaya (*Carica papaya*) and pine apple (*Ananas comosus*) covers an area of about 4%. Though the tuber crops such as greater yam (*Dioscorea alata*), colocasia (*Colocasia esculenta*), cassava (*Manihot esculenta*) and sweet potato (*Ipomoea batatas*) occupies significant place in the tribal society and covers only 1 % of the agricultural area.

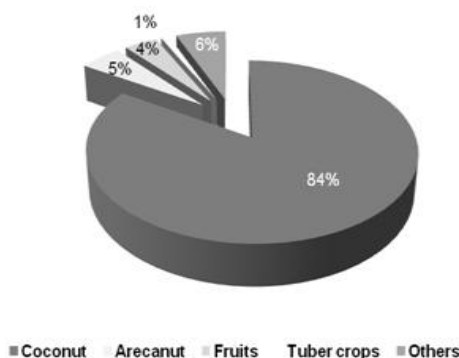


Figure 3 Percent area under different crops

Home gardens are ubiquitous in any tribal society and are maintained as a part of survival over generations. Like many tribal groups, home gardens are present in every household and tuber crops, fruits trees (pandanus, pine apple, papaya), medicinal plants and seasonal vegetables (brinjal, tomato, cucurbits, chilli etc)

were grown in home gardens which are mainly used to meet the family requirement. The dominance of coconut is unique to these islands and different from other parts of the country where food crops dominate the cropping pattern. The average coconut trees owned by the individual family were 235 which were ranged from 10 to 1000 trees. Like many tribal groups land ownership belongs to the tuhet or clan and only usufructuary rights are with the individuals for agriculture and other purposes [2, 6]. Though there is no individual land right and land records are not available, number of coconut trees owned by each household will give reliable information on size of land holding. Hence, size of land holding was inferred from number of coconut trees owned by individual households and the categorization was done accordingly (Table 3).

Table 3: Size of land holding based on number of coconut trees owned by individual household

No. of trees	Category	Frequency	Percent	Mean holding
< 100	Marginal	105	32.1	68
101- 250	Small	102	31.2	188
251-500	Medium	102	31.2	371
>501	Large	18	05.5	685

The average number of coconut trees owned by a large farmer is 10 times higher than the marginal holders indicating a relatively high inequality in distribution of land in terms of ownership of coconut trees. However, 5.5% of the households have more than 500 coconut trees and no significant difference in average holding size was found across the Islands (Table 4). However, in Katchal mean holding of coconut trees (342) exceeded the overall mean due to loss of lives during tsunami 2004. Apart from coconut, areca nut was also grown by tribal households except in Hut Bay and no significant differences were found across the Islands.

Table 4: Average holding of coconut trees across the Islands

Name of Island	Average no. of trees owned by individual household	
Coconut	Areca nut	
Katchal	342	104
Kamorta	149	75
Nancowry	203	53
Hut Bay	233	0 [#]
Car Nicobar	236	126
Mean (p< 0.05)	235 ^{NS}	103 ^{NS}

[#] not included for mean comparison

3.4 Livestock and poultry production system

The Nicobari tribal's were the last indigenous communities to arrive on these Islands, who brought livestock such as pig and poultry with them and thrived, but depended on the natural ecosystem for feed and fodder [7]. Accordingly, the major livestock comprised of pig (82%) and goat (18%) which are reared in extensive open semi feral system by the tribal community. Rearing pig is considered as a traditional household activity and 76 % of the households were involved in it. The average herd size of 4.3 pigs were maintained by the majority of households (59.6%) and very less households (5.5%) have herd size of more than 10 (Table 5).

Table 5: Status of livestock possession in tribal households

Herd Size (No)	Frequency	Percent (%)	Cumulative frequency	Mean
Pig				
Nil	78	23.9	78	
1 to 5	195	59.6	273	
6 to 10	36	11.0	309	4.3
11 to 20	15	4.6	324	
> 20	03	0.9	327	
Goat				
Nil	204	62.4	204	
1 to 2	39	11.9	243	
3 to 5	54	16.5	297	4.6
6 to 10	24	07.3	321	
11 to 15	06	01.8	327	
Poultry				
Nil	84	25.7	84	
< 10	168	51.4	252	
11 to 25	57	17.4	309	12.2
26 to 50	15	04.6	324	
> 50	03	0.9	327	

Goat forms the second largest livestock component and 37.6% of the households were rearing goat with average herd size of 4.6 under open grazing on waste lands and tree fodder from nearby forests. Poultry is another important farm activity found in the tribal areas with majority of the households having a flock size of less than 10. The indigenous Nicobari fowl was mainly grown by the farmers. Although pig, goat and poultry are the important livestock enterprises found in the study area, differences were observed between the Islands in terms of number of households having these activities and herd size as indicated in Table 6.

Table 6: Percent households having various livestock and poultry activities in different Islands

Island	Pig (%)	Herd size	Goat (%)	Herd size	Poultry (%)	Flock Size
Katchal	100.0	5.5	70.0	4.5	90.0	7.6 ^b
Kamorta	11.1	3.0 [#]	11.1	6.0 [#]	88.9	32.8 ^a
Nancowry	70.0	2.3	0.0	0.0 [#]	70.0	7.2 ^b
Hut Bay	80.0	4.8	25.0	3.0	20.0	0.65 ^c
Car Nicobar	83.3	4.2	45.0	4.6	91.7	8.9 ^b
Mean	76.6	4.3 ^{NS}	37.6	4.6 ^{NS}	75.2	12.03

[#] not included for mean comparison

In general, majority of the households (76.6%) were rearing pig with mean herd size of 4.3. No significant differences were found in herd size between the Islands. The percent households rearing goat varied from 0 to 70. The highest percent of households reared both pig and goat with larger herd size in Katchal Island. In contrast, only 11.1% of the households reared both pig and goat and 88.9% have poultry with larger flock size (32.8%) in Kamorta Island. While in Car Nicobar islands, pig and poultry were reared by 83.3 and 91.7% of households respectively. The important feed sources for pig are the coconut, kitchen waste and tuber crops and it was found that 21 % of total copra production was utilized as pig feed in the Nicobar Islands.

Though not many differences were found across the Islands in livestock possession but inequality in crop and livestock production system in the tribal society exists as clearly indicated in Table 7.

Table 7: Structure of crop and livestock production in tribal household (n=327)

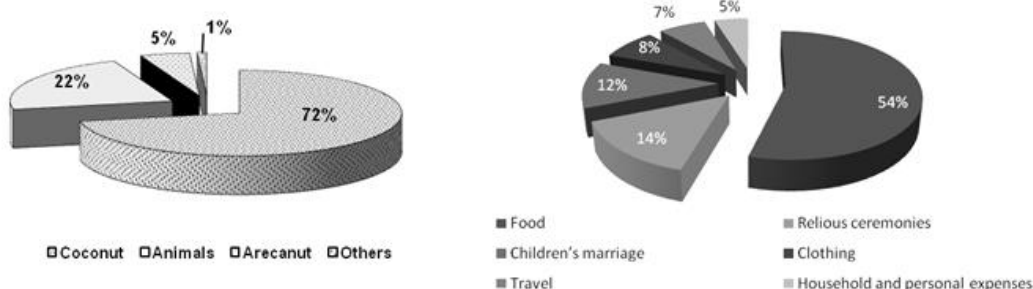
Variable	Minimum	maximum	Mean	S.D	% household
Household size	2	16	5.9	2.3	-
Coconut (No's)	10	1000	235	179	100
Areca nut (No's)	0	1000	38	110	36
Pig (heads)	0	30	3.3	4.2	76
Goat (heads)	0	15	1.7	3.0	38
Poultry (heads)	0	150	9	16	41

* SD- Standard deviation

The coconut trees grown by the households in the study area were ranged from 10 to 1000 with an average of 235 trees. Further it was observed that the coconut tree has been cultivated by all households, however areca nut and livestock production varies between 36 to 76% of households. The skewness of the distribution as indicated from standard deviation showed existence of inequalities in tribal society and highest inequality was found in coconut, while lowest in goat ownership.

3.5 Farm income and expenditure pattern

The average annual income from different farm enterprises (Fig. 4a) is INR.103345 (US \$ 1694), where coconut alone accounted for 79 % of the total farm income followed by livestock (22 %) and areca nut (5 %). Poultry is practiced as backyard poultry, used for own consumption therefore, this component did not accrue to farm income. Based on the income contribution from different farm enterprises, coconut based farming was identified as the most predominant farming system in these Islands.



4a. Income contribution

4b. Expenditure pattern

Figure 4. Income and expenditure pattern of tribal household in Nicobar Islands

The average annual family expenditure for the last 5 years was INR.76692 (US \$1257 at 2013prices) and the expenses on food, religious ceremonies and children’s marriage were the major expenses incurred besides household and personal maintenance including health cost (Fig. 4b). There was no expenditure for construction or renovation of dwelling and education during last 5 years as they were provided with free dwellings constructed by the government after Tsunami in 2004 as a part of rehabilitation program and free education is imparted for children up to secondary level. As the food crops like rice, wheat or pulses are not grown in these Islands expenditure on food items was substantial (54%) which is slightly higher than the national average expenditure (52.9 %) on food items in 2011-12 in rural households of India [8].

3.6 Constraints faced by the farmers

Farmers were asked to outline the issues that they considered important in improving farm production or adoption of new enterprises and technologies (Fig.5). The issues were mostly common across the Islands. The isolation and remoteness of the Islands was expressed as a major constraint by majority (74.1%) of the respondents. The other major issue was monopoly in copra marketing (75.5%), tuhet system (63.9%) which imposes sharing at least some part of the individual income with all members of the tuhet. Water scarcity (58.7%), lack of knowledge on scientific management practices of annual crops especially vegetables (51.4%) and lack of improved native breeds of pig, goat and poultry (30.6%) were also identified as some of the constraints for improving farm production in the tribal areas of the Islands.

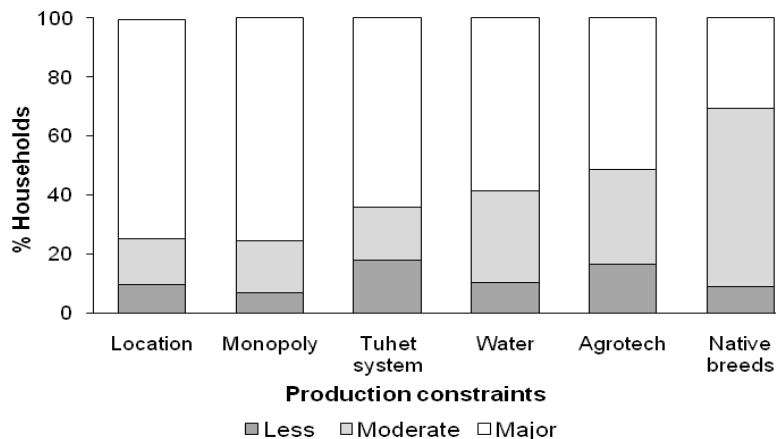


Figure 5. Major constraints experienced by tribal farmers of Nicobar in farm production.

IV. Discussion

4.1 Biophysical characteristics

The agricultural production in Nicobar Islands is mainly dictated by rainfall, and also limited by soil resources. The land use policy of the government such as notifying the entire Nicobar Islands as Tribal reserve and Biosphere reserve and location of two national parks in these Islands affects the free movement of outsiders affecting large scale economic activity in these areas. Moreover, less than 2% of the total geographical area is under cultivation and area expansion is not possible because of the existing laws. Besides, rainfall for more than 6 months permits cultivation of plantation crops like coconut and areca nut with limited extent of tuber crops. Water scarcity during dry season is also a major constraint for growing annual crops like vegetables. Under such a condition, small scale insitu water harvesting structures will play a major role in providing life saving irrigation to crops, livestock as well as for domestic use.

The soils are inherently acidic in some of the Islands because of parent material except in Car Nicobar and Katchal where neutral to calcareous soils are found. The soils are rich in organic carbon and available nutrients except P in acid soils. As the chemical use is not allowed in these Islands, organic recycling and organic input use forms an essential component for sustaining agricultural production in these Islands.

4.2 Socio economic characteristics

Understanding the human capital available in a society is imperative for planning any economic activity. In the same way it is very much essential for agricultural operations as the human resources available in the household determine the level of subsistence within the limitations of natural forces. In the study area, as majority (73.4%) of the household heads were within the active workforce and majority of the farming population were young who will be more receptive for any interventions than the older population. Such a large workforce is normally expected in any developing nation which is mainly decided by the demographic factors.

In an agrarian society, the household size could be an asset or limitation depending on resource availability especially land. Limited resources and larger workforce may result in under utilization of available human resources. In the study area the average household size was 5.9 and average workforce was 4.8 with values ranging from 2 to 16 and 2 to 9 respectively, indicating worker consumer ratio of about 60%. The mean dependency ratio was only 57 which were similar to that of national dependency ratio 53 for 2012 [9] indicating more active working population in these Islands.

The education is a social capital which plays a vital role in taking well informed production decisions and also provides opportunity to involve in nonfarm sector thus reducing pressure on limited land resources. In general, 79.8% of the household heads have formal education which is in consonance with the district level literacy of 72.34% [5]. This was reflected in the occupational status of the household members, where at least one person from 29.4% of the households were working in government sector, though all the household heads were doing farming as major occupation. During survey it was also found that the younger generation is moving to Port Blair, capital city of Andaman and Nicobar Islands, where employment opportunities are more compared to Nicobar Islands.

4.3 Farm production characteristics

In Nicobar Islands, agriculture is rainfed and plantation crops viz., coconut and areca nut were produced under zero management resulting in lower productivity (3317 nuts /ha) than the national average of 6869 nuts/ha [10]. Off the total production of copra, 16 to 21% is used for feeding pigs and less than 10% is used for home consumption. The remaining was dried by traditional, crude way resulting in poor quality and low market price. Other crops like banana, pine apple, greater yam, and sweet potato were grown in home gardens in a limited area without any external input application which were not entering the market chain but used for home consumption or shared within the tuhet. In some instances they were exchanged for other products in barter system. The tuber crops were also used as a feed for pigs.

Among the livestock, pig plays an important role in the tribal society which was not grown commercially but an urgent financial need they were sold in the market. Otherwise they were mainly offered during tribal festivals or ceremonies like marriages etc. The possession of pigs indicate the social status of the households and the number of pigs increases with increasing number of coconut trees owned by individual household. In Kamorta, only 11.1% of the surveyed households were rearing pig which could be attributed to the influence from non tribal's accounting 46% of total population in this island. In recent times, goat rearing is preferred than pig by the tribal population as indicated by the tribal captains. However, the main constraints were lack of native breeds adapted to harsh conditions of the Island and suitable for low input production system as they were recently introduced unlike pig. And lack of proper housing, feed and fodder besides knowledge on improved management practices were also affecting the production of farm animals.

The poultry production in these Islands was only backyard poultry where only few birds of local Nicobari fowl were grown by women in an open ranch system. It was found that almost 70 to 90 % of the households were having poultry except in Hut bay. But it was not practiced as an economic activity and mainly used for home consumption. The intensive rainfall received during monsoon season causes heavy mortality of other introduced birds like Vanaraja an improved breed suitable for back yard condition which was successful in other parts of the country.

4.4 Constraints for farm production

Remoteness and isolation is the major constraint in these islands because of which the economic activity is very low and the production of perishable products like vegetables, fruits, poultry cannot be taken up on a larger scale. Moreover, there is no scope for area expansion under agriculture because of existing laws. Only at Car Nicobar, there is a limited market availability for these items because of government servants who has to depend on imports from Port Blair for their food supply including vegetables, fruits and other essential

items. In other Islands, the demand for these products was nonexistent. The purchase of copra is controlled by tribal co-operative society and no free market for this product because of which the tribes were not getting remunerative price for their produce. Besides, a crude method of copra drying affects its quality due to excessive moisture, sudden incessant rains and high humidity.

Even though, the tuhet system provides social security for all its members, it is considered as one of the major deterrent for taking up any new initiatives especially by the younger generation. Similarly water scarcity during dry season, lack of improved native breeds of livestock, feed and fodder and lack of knowledge on scientific management or improved techniques were some of the constraints identified during the study.

V. Conclusion

The present study in tribal Islands of Nicobar clearly indicated that the agricultural production in these Islands is limited by biophysical factors such as rainfall, soil and water resources besides government policy on land use. The socio economic characterization indicated that majority of the households were headed by men and majority of them are in active workforce where the average age was only 47.8 years. The literacy level of the tribal areas of Nicobar was far better than other tribes of the country. There was no individual land right as in other parts of the country and only usufructary rights were given to the individual households which was acting as a major constraint for taking up any initiatives in agriculture or in any activity.

The coconut cultivation played an important role in agricultural production of these islands and contributed 80 % of farm income. Besides production of copra it was also used as animal feed especially for pigs to the extent of 21%. Pig and poultry were the two traditional farm activities and were indigenous to the tribes. Though pig is considered as a family asset and indicates the social status of households in the tribal society, only 76.6% households were rearing pig with mean herd size of 4.3 in open ranch system without scientific care and business intention. Similarly poultry was not developed as an economic activity and it was only a family poultry with small number of indigenous birds reared by women in backyards. In recent times goat rearing was gaining momentum and preferred by tribes as indicated by many of the tribal captains.

The sale of copra was the major source of income for majority of the households though 29.4% of households have income from nonfarm activities like government service. Other than food, religious ceremonies and children's marriage accounted for 26% of total household expenditure. The expenditure on education was nil as free education is imparted to children up to secondary level by government and no private players were allowed in educational sector in these islands unlike in other parts of the country.

Remoteness and restrictions on land use were considered as a major impediment for adoption of new technologies by all the respondents. The other major constraints identified were tuhet system insisting sharing some part of income, lack of enough native breeds of animals and lack of knowledge on scientific management of farm enterprises. Besides nil or limited market for agricultural products was also identified as a major constraint for improving farm production in these Islands.

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