

Study on Fertilizer Use Pattern for Balanced Nutrient Application in Andaman and Nicobar Islands, India

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Abstract

A study was conducted to assess the fertilizer use pattern in Andaman and Nicobar islands using basic data on fertilizer use, crop production and household survey by stratified random sampling. The total NPK fertilizers consumption in the island was 950 MT with an average consumption of 19.4 kg ha⁻¹ during 2013-14. The farm household survey revealed that only 70% of the farmers were using chemical fertilizers and among them 70% were using N and P fertilizers whereas only 12.5% used K fertilizer. The NPK fertilizer use intensity was 115, 94 and 12 kg ha⁻¹, respectively with highest application rate in Neil island. The average NPK ratio was 4.2:2.7:1.0 but large variation in total and N, P and K fertilizer use were observed across different islands. Among the organic sources of nutrients Neem cake was used in all the districts whereas poultry manure and FYM were mainly used in South Andaman. Off the total fertilizer consumption vegetable accounted for 65% followed by rice (18%) and plantation (8%). Further the marginal and small farmers accounted for the maximum amount of fertilizer used besides more balanced N, P and K use than medium farmers. In general the study indicated negative N, K and micronutrient balance while P application was sufficient to excess.

(Key words: *Fertilizer use pattern, Balanced nutrients, Island zone, Nutrient ratio*)

Introduction

Supply of required quantity and proportion of plant nutrients is vital for improving crop growth and productivity. Many a times the soil available nutrient reserve is not sufficient to meet the crop nutrient requirements or it gets depleted due to crop uptake necessitating the external addition of nutrients. This is primarily achieved by the addition of chemical fertilizers and its role to supply plant nutrients for increasing agricultural production has been well established (Tomich *et. al.*, 1995; Hopper 1993 and FAO 1998). Therefore, production, supply and use of chemical fertilizers have been one of the core activities of agricultural production strategy in India. It is evident that the total NPK (used as N, P₂O₅ and K₂O) consumption increased nine-fold (from 2 million to 18 million tonnes) between 1969/1970 and 2009-10, consequently per hectare NPK consumption increased from 11 to more than 135 kg in the same period (FAI, 2014). But fertilizer consumption varies widely owing to substantial differences in soil type, fertility status, crop, weather, irrigation facilities, and cost besides its supply. As these conditions are not uniform throughout the country fertilizer use is highly skewed with wide inter-

regional, inter-state and inter-district variations. This can be evidenced from the variations in intensity of fertilizer use which is as low as 48 kg ha⁻¹ in Rajasthan and as high as 237 kg ha⁻¹ in Punjab. But the intensity of fertilizer use in India remains much lower than many other countries in the world.

In the island agro-ecosystem of Andaman and Nicobar, organized fertilizer supply and use of sizeable amount in crop production was started only in the late 80's. This rose to 950 MT of total NPK fertilizer in 2012/13 over an area of 50,000 ha with an average fertilizer consumption of only 19.4 kg ha⁻¹ (DES, 2014). There are two important features of this growth and use in crop production. Firstly, the rate of consumption has increased appreciably only during the last decade due to the intensive cultivation of vegetables and fruits. Secondly, the increased use of subsidized fertilizers particularly nitrogen and phosphorus created imbalanced fertilizer application with wide variations across different islands. In India, per hectare fertilizer consumption is higher in the case of crops with a larger proportion of irrigated area accounting for 68.5 % of total fertilizer consumption. On the other hand agriculture in this island is totally rainfed and alongwith

waterlogging experienced during rice growing season discouraged high rate of fertilizer consumption.

In addition, the non-cost factors influencing the fertilizer use pattern are soil fertility and crop distribution (Jaga and Patel, 2012). The soils of Andaman and Nicobar islands are mostly acidic in hill slopes where plantations are grown and acid-saline soils are widely distributed in the coastal areas where rice is the important crop. Of the 21000 ha of coconut area more than 80% is concentrated in Nicobar Islands where the fertilizer use was negligible and declared as organic islands by the Andaman and Nicobar administration (Velmurugan et al., 2014). Consequently location specific agro-techniques need to be developed to improve the fertilizer use and crop productivity. In addition to NPK fertilizer application, attention should also be paid to the supply, uptake and soil status of micronutrients as continuous cultivation without its replenishment tend to deplete the soil nutrient reserve. Recently boron deficiency has been reported from coconut growing areas of Nicobar Islands (Swarnam et al. 2015). All these facts and agro-ecosystem conditions necessitates the application of fertilizers in required quantity, proportion and methods to significantly enhance crop growth and productivity in these islands. In view of the above a study was undertaken to (i) assess the fertilizer use pattern in Andaman and Nicobar islands (ii) study the intensity of fertilizer use by farmers in different islands and crops (iii) analyze the quantity and ratio of nutrients used in crop production to suggest corrective measures based on soil nutrient status,

Materials and Methods

Study area

The tropical islands of Andaman and Nicobar, India is located about 1,200 km from the Indian mainland in

the Bay of Bengal, between the geographical location of 8° to 14°N and 92° to 94°E. The major land forms are longitudinal hills, hill slopes, mid hill valley and coastal plains. The soils are predominantly sandy clay to sandy clay loam in texture, acidic, medium to high in organic matter content, and poor in available potassium status. Agriculture is confined to mid hill valley and coastal plains. Rice-based cropping system is predominant in Andaman with rice – fallow, rice – pulse and rice – vegetables. Rice is grown during rainy season, and vegetables or pulses are mostly grown during dry season extending from December to April. Plantations of coconut and areca nut are dominant in hill slopes adjoining the valley or coastal plains. Coconut is the main crop in Nicobar Islands where the soils are mostly sandy loam to loam in texture with poor water holding capacity. Due to various reasons agricultural productivity in these islands is lower than the national average.

Data collection and analysis

In the present study the required data was collected from the basic statistics of Andaman and Nicobar Islands and a farmhold survey. Fertilizer use, crop production and area statistics were collected from the basic statistics (DES, 2014). A farmhold survey was conducted to ascertain the status of fertilizer use among different categories of farmers viz., marginal, small, medium and large farmers during 2012-14. Stratified random sampling procedure was followed to select the villages and sample households using a pre tested questionnaires. A total of 425 farmers from all the major inhabited islands were covered (Fig. 1). Information on farmers, farm families, number and type of crops grown with season, amount and kind of fertilizers and manures used for each crop were collected. This information was pooled, analyzed and described using descriptive statistical methods.

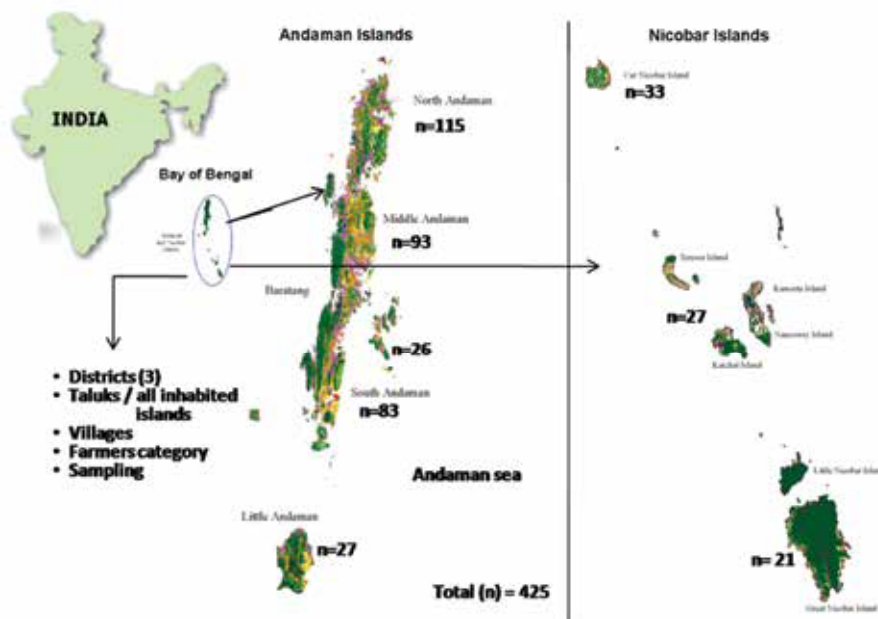


Fig. 1. Location and sampling in the study area

Results and discussion

Fertilizer use pattern

A summary of district wise total chemical fertilizer use (N, P and K) is given in table 1. The data indicated that urea, di-ammonium phosphate (DAP), single super phosphate (SSP) and muriate of potash (MOP) were the only fertilizer materials used to supply N, P and K in crop production. On an average the total NPK fertilizer consumption was doubled in 2012-13 (950 MT) compared to the previous decade (408 MT in 2003-04) and the demand is increasing. This is attributed to the increase in the intensity of fertilizer use in crop

production rather than area expansion. At the same time significant variations in total fertilizer consumption were observed across the islands. Among the three districts, North and Middle Andaman accounted for 53.4% of the total fertilizer consumption followed by South Andaman (44.3%) whereas Nicobar accounted for a meager 2% contributed by the settlers. As a result of declaration of Nicobar islands as organic by the A&N administration there has been no supply of fertilizers. Consequently Andaman Islands accounted for 98% of total fertilizer used in the Union Territory which needs to be considered while assessing the fertilizer use.

Table. 1. District wise fertilizer use and consumption rate in A&N Islands

District	Gross cropped area (ha)	Fertilizer use (MT)				Fertilizer consumption rate (kg/ha)			
		N	P	K	Total	N	P	K	Total
North & Middle Andaman	23250	211.23	198.24	98.29	507.76	9.1	8.5	4.2	21.8
South Andaman	9390	175.46	166.52	79.42	421.4	18.7	17.7	8.5	44.9
Nicobar	16380	8.13	7.12	6.26	21.51	0.5	0.4	0.4	1.3
Total	49020	394.82	371.88	183.97	950.67	8.1	7.6	3.8	19.4

(DES,2013-14)

*2012-13 as base year for calculation; N-Urea, P-Diammonium phosphate, K-Muriate of potash

Similar to the total fertilizer consumption the per-hectare NPK consumption (fertilizer consumption rate) has also recorded significant increase during the same period with inter district variations. In contrast to the total fertilizer consumption, the highest per hectare consumption of 44.9 kg/ha was recorded for South Andaman district followed by North and Middle Andaman district (21.8 kg/ha). This means fertilizer applied to cropped area is higher in South Andaman district though the total consumption is less than North and Middle Andaman district which has largest area under cultivation. Nevertheless this figures are very much lower than the national average of 135 kg/ha (FAI, 2014).

Another striking feature of fertilizer use pattern is the quantity and proportion of N, P and K fertilizers which broadly varied among the three districts. The average N, P and K fertilizer consumption was 8.1, 7.6 and 3.8 kg/ha, respectively. In terms of nutrient consumption ratio (N, P₂O₅ and K₂O) it worked out to be 3.1:1.9:1.0.

Though the ratio is better than the national average, considering the rate of application, it is imbalanced and inadequate to meet the crop demand. Moreover data on total and per hectare consumption alone is insufficient for meaningful description of the entire scenario of fertilizer use pattern and its actual impact on crop production. Such a generalization is misleading therefore, further information on fertilizer users, island wise cropped area and soil nutrient status are required to bring out the hidden facts about fertilizer use and balanced nutrient in the islands.

Percent farmers using chemical fertilizers

The study on fertilizer use by farmers (n=450) from different islands revealed that on an average only 61% of the farmers were using some kind of chemical fertilizers for growing crops (Fig. 2). The data also revealed substantial variations in fertilizer use ranging from 45 to 100% across the islands. In Neil all the farmers were using some kind of fertilizers while in South Andaman only 45% of the respondents were using chemical fertilizers.

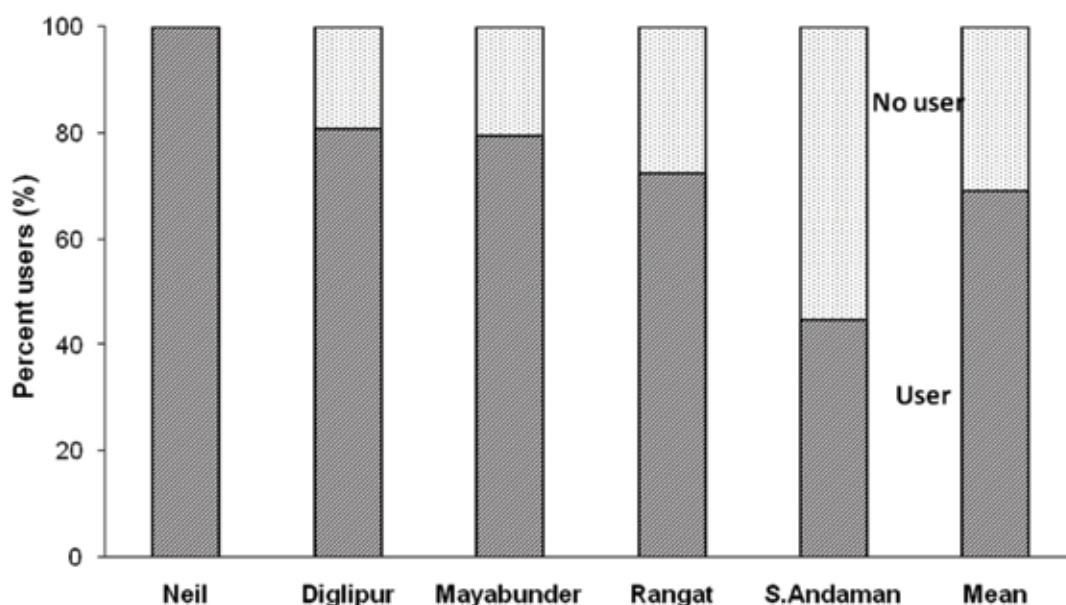


Fig. 2. Status of chemical fertilizers use (N,P and K) in Andaman Island (n=425)

The study also indicated wide regional variations in N, P and K fertilizer use among the users (Table 2). All the farmers in Neil Island used N and P fertilizers followed by Diglipur and Mayabunder constituting 80% of total users. Whereas in South Andaman only 45% and 49% of farmers used N and P fertilizers, respectively. In general, 70% of the farmers were using nitrogen and phosphatic fertilizers. In contrast only 12.5% of the farmers used potassic fertilizer. In other words, 30 % of the farmers were neither applied N nor P fertilizer whereas 89% of the farmers didn't use potassic fertilizer. This could be due to higher cost and scarcity of the K fertilizer besides

lack of awareness on the importance of K and balanced fertilizer application (Motsara, 2004). This generalization didn't hold good for Neil Island which recorded highest K fertilizer users (60%) as in the case of N and P. As that of the national trend in nitrogenous fertilizers use, high amount of N fertilizers are used by the island farmers because of assured response to nitrogen application and the nitrogen responses can be visually appreciated by the farmers in terms of the crop growth and yield. Interestingly in contrast to the national trend of P fertilizer use, on an average the amount of P fertilizer used by the island farmers was equal or more than that of N fertilizer indicating excess use of P.

Table. 2. Percent farmers using different kind of chemical fertilizers in Andaman Island

Location	Percent farmers using different chemical fertilizers		
	Nitrogenous	Phosphatic	Potassic
Diglipur	80.9	80.9	15.6
Rangat	72.5	66.7	5.9
Mayabunder	79.5	79.5	10.3
South Andaman	44.6	49.4	6.0
Neil Island	100	100	60
Mean	70	70	12.5

(n=425)

Use of organics in crop production

While studying the nutrient use pattern it was felt necessary to quantify the organic manure used in crop production along with chemical fertilizer use to understand the nutrient balance and need for chemical fertilizers. The present study indicated that neem cake, farm yard manure (FYM) and poultry manures (PM) were mainly used to supply nutrients required for crop production. Among the organic sources neem cake and FYM are largely used in North and Middle Andaman, while poultry manure is commonly used in South Andaman (Table 3). In Middle

Andaman 70% of the farmers indicated the use of organics followed by North Andaman (58%) and South Andaman (51%) whereas only 5% of the farmers in Nicobar used organics. Neem cake is used in all the places ranging from 25 – 100 kg ha⁻¹ while FYM and PM were used in all places except Nicobar islands. South Andaman farmers used maximum quantity of poultry manure (3.0 t ha⁻¹) in crop production because of its availability. The study indicated the potential demand for organic manures and its scope in crop production which is expected to grow with the promotion of organic farming in these islands.

Table. 3. Use of organic manures by farmers in Andaman and Nicobar Islands

Category of farmers	Neem Cake (kg ha ⁻¹)	FYM (kg ha ⁻¹)	Poultry Manure (kg ha ⁻¹)	Percent farmers using organics
North Andaman	100 (25)	2600 (1100)	1400 (600)	58
Middle Andaman	60.0 (14)	2540 (900)	2150 (1250)	70
South Andaman	50.0 (12)	2306 (1200)	3011 (1800)	51
Nicobar	25.0 (20)	-	-	5

Rate of fertilizer application among the fertilizer users

As discussed earlier data on total fertilizer use and the average fertilizer consumption are not reflecting the actual / intensity of fertilizer used by the farmers. It will be a misrepresentation to assume that all the farmers are using fertilizers whereas only 61% of them used fertilizer. Further, fertilizer use in Nicobar has been totally prohibited after declaring it as organic islands. Therefore, rate of fertilizer application should be calculated only among the fertilizer user from Andaman Islands which are presented

in table 4. It showed that the average rate of fertilizer use (NPK) was 221.8 kg ha⁻¹ which was higher than the national average consumption of 135 kg ha⁻¹ and almost equivalent to fertilizer used in intensive agricultural areas of Punjab (237 kg ha⁻¹). The study also indicated wide differences in rate of fertilizer use across different islands with values ranging from 155 to 458 kg ha⁻¹. The intensity was much higher in Neil island (458 kg ha⁻¹) followed by Diglipur (249.5 kg ha⁻¹) and South Andaman (238.0 kg ha⁻¹) indicating areas of intensive agricultural activities. Neil island is known for intensive vegetable production and known as "vegetable bowl" of Andaman Island.

Table. 4. Rate of fertilizer application and nutrient ratio in different islands

Location	Average fertilizer application (kg ha ⁻¹)			Nutrient use ratio	
	Nitrogenous	Phosphatic	Potassic	Total	(N:P ₂ O ₅ :K ₂ O)
North Andaman	125.5 ±89.7	108.2 ±77.1	15.8 ±41.7	249.5	8:5:1
Rangat	92.1 ±95.9	77.4 ± 89.1	4.9 ±22.9	174.4	19:13:1
Mayabunder	74 ±63.6	69.8 ±61.6	11.5 ±34.8	155.3	7:5:1
South Andaman	133.9 ±190.1	94.9 ± 132.0	10.1 ±40.7	238.0	13:8:1
Neil Island	200.0± 156.0	168.0±181.0	110.0±55.0	458.0	2:1:1
Mean	115.0 ±127.0	93.7 ±97.1	12.7 ±37.8	221.8	4.2:2.7:1

The other important aspect of fertilizer application more relevant to crop production is proportion of different nutrients rather than the proportion of fertilizer materials. This is very important to maintain the soil fertility and enhance the plant growth which is referred as balanced fertilizer application. It means the application of all the deficient plant nutrients in sufficient amounts, appropriate forms and ratios. Application of nutrients in correct quantity and right proportion has been the focus of sustainable nutrient management strategy of India as crop plants require different amount of nutrients for normal growth and development which is reflected in the NPK ratio. At the national level, it has been generally recognized that NPK consumption ratio of 4:2:1 may be ideal under moderate soil fertility conditions.

In view of this, the present study used nutrient ratio to describe the balanced fertilizer application as different fertilizer materials contain different nutrient concentrations. The data showed that on an average nutrient use ratio for the island was 4.2:2.7:1.0 which was narrower than the national average of 8.5:3.1:1.0

for the corresponding period indicating much balanced nutrient use in Andaman. However, these figures are delusion because of large variations in the quantity of N, P and K nutrient used across different islands. In all the islands the nutrient ratio was wider than the average ratio whereas Neil recorded a much narrower ratio of 2:1:1. The wider ratio indicated gross imbalance in nutrient application which is much skewed towards N and P against the balanced nutrient application ratio of 4:2:1. The wider ratio is mostly attributed to the higher cost of P and K fertilizers and subsidy provided to the N fertilizers resulting in more use of N fertilizers. The implication of this excessive or deficit use of different fertilizers (NPK) result in nutrient imbalances in soil and crop uptake with reduction in productivity of crops as in the case of Andaman islands. For these reasons the rate and proportion of nutrient application at different islands need to be considered for suggesting balanced fertilizer application. In Neil, P is applied in excess of required quantity which may get leached to the aquatic system triggering negative consequences.

Nutrient use by different categories of farmers

Several studies in India have indicated that agricultural input use is largely influenced by the size of holding / category of farmers. In Andaman, majority of the farm holdings are small and marginal. The study indicated wide differences in kind and amount of fertilizer used in crop production by different category of farmers. Majority of the small and marginal farmers used N, P and K fertilizers whereas only 33% and 16% of the medium farmers used only N and P fertilizers, respectively. This means majority of the small and marginal farmers applied balanced nutrient than other categories. Similar trend was also noticed for rate of nutrient application across the categories. The rate of application was much higher (> 150 kg ha⁻¹ N and P fertilizers) among the marginal and

small farmers than medium farmers. More interestingly majority of the K users are small and marginal farmers with values ranging from 6-7.2 kg of K₂O per ha while K used by the medium farmers was negligible. This is in contrast to the high rate of fertilizer consumption by the medium and large farmers in mainland India. This propensity of island farmers is unique because in Andaman islands, the marginal and small farmers are mostly following rice-vegetable cropping system whereas the medium farmers are engaged in plantation crops with minimal or no fertilizer application. During the course of the study it was also observed that several marginal farmers in South Andaman are leased farmers / share croppers who used heavy dose of fertilizers and PM to enhance the productivity of vegetables.

Table. 5. Nutrient use pattern across different categories of farmers in Andaman Island

Farmers category	Per cent farmers reporting use(%)			Nutrient application (kg ha ⁻¹)		
	N	P	K	N	P ₂ O ₅	K ₂ O
Marginal (<1 ha)	60	80	10	106.5	55.2	7.2
Small (1-2 ha)	52.9	58.8	5.9	93.5	82.3	6.6
Semi medium(2-4 ha)	54.5	60.6	6.1	47.5	52.0	6.0
Medium (4-10 ha)	33.3	16.7	0.2	37.0	13.8	1.2
Mean	70.0	70.0	12.5	71.1	50.8	5.3

(n=425)

Fertilizer use on important crops

Another important feature of fertilizer use pattern in these islands is proportion of fertilizer used in different crops which in turn linked to the categories of farmers and seasons. There has been a significant difference in the proportion of total fertilizer used for different crops since the beginning of the agriculture in these islands. In recent times about 78% of fertilizer materials used in these islands goes to vegetables and rice alone (table 6). Though plantation occupies more than 55% of cultivated areas it received only 8% of the total fertilizer used evidently because of no fertilizer addition in Nicobar islands which has the largest area under coconut. The study also brought out the fact that pulses and tubers

were the least fertilized crops. The rate of fertilizer application was highest for vegetables (112.3 kg ha⁻¹) because of high market demand for vegetables. Whereas rice received only 19.9 kg ha⁻¹ though it was grown in large area during kharif season fertilizer consumption was only 18% of the total fertilizer used in the Union Territory due to lack of market demand and climatic limitations. Consequently Andaman Islands accounts for the entire fertilizer used in the Union Territory where arable crops like rice, vegetables, and pulses are grown with 80 to 90% of fertilizer application. In general application of K was insufficient for majority of the crops, N was insufficient for plantations, tubers and rice while P was sufficient to excess for vegetables.

Table. 6. Fertilizer use (N,P and K) of important crops in Andaman and Nicobar islands

Sl. No	Crops	Gross cropped Area (ha)	Fertilizer consumption (N, P, K)	Share in fertilizer consumption %	Fertilizer (N,P,K) consumption rate (kg/ha)	Nutrient status
1	Plantations	10416	74333	8	7.1	Insufficient for all
2	Pulses	2607	9292	1	3.6	Sufficient for N, P; Insufficient for K & micronutrients
3	Rice	8387	167249	18	19.9	Sufficient for P; Insufficient for N, K, micronutrients
4	Vegetables	5378	603954	65	112.3	Sufficient for N, P; Insufficient for K and micronutrients
5	Tubers	351	18583	2	52.9	Insufficient for all
6	Fruits	1140	55750	6	48.9	Insufficient for all
	Total	28279	929160	100	32.9	Sufficient for P, Insufficient for N, K, micronutrients

*micronutrients means – Zn, Cu and Bo; Fe, Mn is sufficient to excess

*2012-13 as base year for calculation; N-Urea, P-Diammonium phosphate, K-Muriate of potash

Nutrient balance and fertilizer use

The inherent fertility status of the soil is one of the most important factors determining the type and amount of plant nutrients to be used through fertilizers. The physical, chemical and biological reactions in the soil-plant system affect the fate of applied nutrients in terms of their use by the crops or loss through various phenomena. Even though the organics used in crop production supplied nearly 2-5 kg ha⁻¹ of total micronutrients (Zn, Cu and Bo) besides NPK addition, it is not sufficient to meet the crop nutrient demand and replenish the depleted soil nutrient reserve to maintain the balance (Table 7). In general, the soils of Andaman islands are low to medium in N and K, and medium to high in P content. Of late micronutrient deficiency has also cropped up in certain

pockets of coconut growing areas. On an average, the nutrient balance indicated negative for N, K and micronutrient and sufficient for P. A notable exception to this trend was Neil island where P was used in excess of its requirement, N and K were just sufficient but micronutrients were deficient. The study indicated that excess or deficit use of fertilizers and manures resulted in nutrient imbalance, poor crop performance besides soil fertility degradation. In view of these, fertilizer use in these islands needs to be promoted according to the soil nutrient status, crop requirement and the balance to be applied through fertilizers and most ideally in the integrated form containing chemical sources, biological materials like bio-fertilizers, compost and green manures. In addition, socio-economic conditions and government policies were the major determinants of fertilizer use pattern in these islands.

Table. 7. Soil nutrient balance based on nutrient application and soil nutrient status

Locations	Nutrient application (kg/ha)				Soil nutrient status				Nutrient balance
	N	P	K	Micro-nutrient*	N	P	K	Micronutrient status*	
N. Andaman	77.2 (±41)	52.3 (±37)	9.5 (±25)	3.9 (±2.2)	205 (±61)	16 (±5)	132 (±55)	4.1 (±1.9)	Negative N, K; Just Micro; sufficient P
Rangat	56.3 (±44)	37.5 (±43)	2.9 (±14)	3.6 (±2.1)	180 (±78)	15 (±6)	122 (±68)	3.7 (±1.6)	Negative N, K and Micro, just P
Mayabunder	46.6 (±29)	34.7 (±30)	6.9 (±21)	3.2 (±1.9)	170 (±86)	13 (±6)	115 (±74)	3.5 (±1.1)	Negative N, K and Micro, just P
S. Andaman	78.7 (±77)	46.2 (±63)	6.1 (±24)	3.9 (±2.5)	190 (±76)	15 (±5)	110 (±59)	3.6 (±1.3)	Negative N, K and Micro, Sufficient P
Neil Island	133 (±72)	95.7 (±87)	69.6 (±33)	2.1 (±1.8)	240 (±62)	26 (±9)	150 (±62)	3.4 (±1.8)	Just N, K; Excess P Negative Micro,
Mean	78.3 (±58)	53.6 (±47)	18.9 (±23)	3.3 (±2.0)	197 (±71)	17.2 (±8)	126 (±66)	3.66 (±1.6)	Negative N, K and Micro, Sufficient P

*micronutrients means – Zn, Cu and Bo; Fe, Mn is sufficient to excess

#Values in parentheses are standard deviation; (including no user)

Conclusions

The study showed that over the years the total quantity and rate of fertilizer consumption has increased in the islands but indicated wide variations among the islands. Fertilizer use in Nicobar was negligible though it accounted for major area under coconut. In general, the average fertilizer consumption rate of 19.5 kg ha⁻¹ was much lower than the national average. The survey indicated that only 69% of the farmers were using some kind of chemical fertilizers especially urea and DAP to crops with least per cent farmers using chemicals in South Andaman and highest in Neil Island. Therefore fertilizer use should be estimated only for the users and cropped area in Andaman islands besides its proportionate use in different crops by the farmers should be considered to project a meaningful trend.

The average fertilizer use intensity was 115, 94 and 13 kg ha⁻¹, respectively for urea, DAP and MOP. These fertilizers were mostly used for growing vegetables followed by rice and plantations. The survey also indicated the use of organics such as neem cake, FYM and poultry manure but insufficient to meet the crop nutrient demand particularly in Nicobar islands. Although the average

nutrient ratio was favourable and better than the national average, the imbalance in nutrient use was broadly observed. The rate of NPK application was highest in Neil island and insufficient in Mayabunder whereas Nicobar declared as organic needs more addition of organics. Small and marginal farmers accounted for the maximum fertilizer use particularly in vegetable crops. In general there is a negative N, K and micronutrient balance while P application was sufficient to excess. In view of these, island and crop specific balanced fertilizer application should receive the highest priority in sustainable crop production and nutrient management initiatives.

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