

## NATURE AND SCOPE OF INTRODUCING NON-TRADITIONAL TREE CROPS (*NEEM*) FOR AGRIBUSINESS

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The Indian economy has succeeded in Green, White, Blue and Brown revolutions, but the poverty and social inequality persists. Percolation of benefits from the rich to the poor has often proved wrong. The recent liberalisation and opening of the economy has given a boost to exports and created new vistas for development. Government policies currently indicate that employment opportunities are scarce in public sectors and encourage entrepreneurs to develop business and create more employment opportunities. India, being basically an agricultural country has vast scope to develop agribusiness.

Of late, many corporate giants are venturing into agribusiness and shifting their attention from traditional cash crops to nontraditional tree crops as these tree crops can survive droughts and thrive partially in degraded soil as well as with little attention.

Among all the known under exploited tropical trees with promising economic value, the neem tree offers the greatest potential for commercial exploitation. It can provide a large number of products highly competitive in price and quality both for the domestic and international needs.

### **Neem**

Botanically known as *Azadirachta indica* A. Juss., neem tree is a native of India with its origin in Indo-Malayan region. The commercial value of neem has been known to man since the Vedic times (about 1500 BC). The planting of 50,000 neem trees along the avenue leading to the holy town of Mecca signifies the importance attributed to it. In many parts of India, it is still worshipped with great devotion. Hindu

holy town of Mecca signifies the importance attributed to it. In many parts of India, it is still worshipped with great devotion. Hindu mythology portrays neem as a dream tree (*kalpavriksh*) and the powers of neem to remove all diseases is attributed to the 'amruth' (ambrosia) that dropped from the golden pot while Indra was returning to 'Devaloka' on his abode 'Airavata' after retrieving the *amruth* from *asuras*.

### **Neem Products**

Every part of the tree-leaf, flower, fruit, seed, kernel, bark, wood, twig, root, etc. has been in use, especially in the Ayurvedic and Unani systems of medicine and has been traded for different purposes from vedic times. Today, neem is being used in a large number of products such as pesticides and allied agrochemicals, medicines, toiletries, cosmetics, plant nutrients, animal feed, fuel, raw material for industries like paper, plastic etc.

### **Scope and potential**

On date, it is estimated that there are about 14 million neem trees in India with a potential to yield about 0.45 million tonnes of seeds annually. The seeds with an oil content of 20 per cent can yield about 0.1 million tonnes of oil and 0.15 million tonnes of cake. Uttar Pradesh accounts for the maximum number of trees followed closely by Tamil Nadu, with 2.5 million trees. At present there are about 40-50 companies involved in neem business distributed all over the country. With the world turning towards organic farming, botanical pest control, green manure etc. and export potential for plant products burgeoning day by day, neem scores high.

Promoting neem plantations in the vast area under marginal lands in our country where productivity is abysmally low and inhabited with poor people, offers excellent possibilities for accelerating the rate of economic growth with social justice. Acute shortages in supplies and rising prices of some essential goods such as fuel wood, fodder and industrial raw materials, growing unemployment and a fear that the environmental balance has been disturbed beyond repair suggest serious

consideration of tree crops which often require very little or scanty attention as compared to high input intensive cash crops. The water requirement of these tree crops are also comparatively low when compared with crops like rice or banana (the fact remains that the tree crops having penetrating roots reach the water table to quench their thirst). Neem is one such nontraditional crop that exactly fits the requirement for the need of the present day. Neem has been and is a part of Indian tradition and shall continue to be for the entire globe. This *kalpavriksha* which has been free for all the Persian word *azad-darakh* denotes "Free- Tree", ironically, it is no more a free produce.

Neem seed oil to an extent of about 100,000 tonnes are produced in our country for use in soap industry and other crude pharmaceutical uses inspite of the fact that there is no organised plantations set exclusively for the purpose. Currently, the neem based industries consume hardly about one per cent of the annual produce and that too a bulk of their produce is for export market. With a steady increase in price of neem seeds from Rs. 300/tonne in 1975 to Rs. 3000-4000/tonne during 1990s neem business is going to rule high in the near future.

Coming to business of neem, it can be anything from neem plantation to sophisticated isolation of terpenoids, but the one that is at the reach of a small farmer shall justify equity and the best option is to set up a neem plantation or to set up a processing plant to extract neem seed oil, neem seed kernel extract and neem cake (NSKE).

### **Agribusiness**

Our path of growth and development should be based on economic efficiency, social justice and environmental sustainability in the long run. Encouragement for big corporate sectors and multinationals shall come from within as a consequence of the government policies, but it is often the poor marginal, small farmers and the creamy layer of farmers with a little more land holding and the landless labourers are the deprived sections which need encouragement and support from government, non-government agencies and private sector.

There are various welfare schemes under IRDP and JRY, where neem business can also be incorporated. For example, IRDP and JRY are aimed at providing employment for atleast one person per family and this employment can be on neem processing unit as well if the unit is managed in the village. Otherwise small farmers can obtain the technical knowhow from the forest and agriculture departments regarding the development of neem plantation and financial help from the nationalised banks/cooperatives. Village panchayats can identify waste lands and lease them to unemployed youths to take up neem plantations which apart from giving a green cover to village can also help village youths to benefit from the sale receipts of neem seeds etc.

Agribusiness is not a one step process. It starts with the basic raw material production (from neem plantations) and extends upto processing, packaging and marketing of the final produce. Thus there can be a vertical integration to incorporate the various stages involved before the final product is marketed or a horizontal integration can help in collecting the raw materials or by having processing units at various places so that a large volume of business can be handled.

### **Economics**

Any business venture would be taken only if it can generate an income to sustain oneself, if not, generate tremendous profit. Therefore a benefit cost analysis and other related measures like NPW, IRR and sensitivity analysis etc. are to be worked out to make clear how much could the agribusiness venture generate. This exercise is also useful to gain confidence and appraise the lending institutions for easier lending procedure. A few tables are incorporated from published sources (Tables 1-6, Parmar and Ketkar, 1993) to bring confidence to the readers.

### **Policy Implications**

Institutional lending and support to form small farmers cooperatives and extensive marketing networks are to be set up to pool the produce and fix prices. Subsidies need not be given as these fiscal measures do not reach the needy and instead finance can be arranged

Table 1 : Costs and returns in neem seed processing, 1992 (Expeller)

Details	Rs./tonne
<b>A: Costs</b>	
1. Cost of 1000 kg of seeds	2973.70
2. Brokerage and commission charges	29.81
3. Sales tax	44.60
4. Loading, transport and unloading	162.20
5. Storage	41.96
6. Drying charge	24.53
7. Milling (decortication)+drying kernels	22.49
8. Labour and crushing	10.13
9. Molasses for rotary	12.56
11. Powdering oilcake	6.48
12. Electricity charges	16.48
13. Repair charges for machineries	10.16
14. Variable cost	3365.24
15. Interest on variable cost @ 14% for 6 months	235.57
16. Total variable cost (1 to16)	3600.81
17. Interest (12%) on fixed capital (for 6 months)	17.62
18. Depreciation	7.29
Total Cost (Rs)	3625.72
<b>B. Returns</b>	
1. Sale of 139.5 kg neem oil @ Rs. 20/kg	2790.00
2. Sale of 241.83 kg neem cake @ Rs.3/kg	726.00
3. Sale of 557.78 kg seed outer coat @ Rs.0.70/kg	391.00
Total return (Rs)	3907.00
Net income (Rs)	281.28

Source: B.S.Parmar and C.M. Ketkar, 1993

through primary agricultural cooperative society (PACS) and land development bank (LDB).

In the last hundred years or so, neem components have been studied by many scientists world over, but these efforts have been isolated and sporadic. Nevertheless, enough scientific evidence has been gathered from several hundred references on the subject to warrant the launching of a well coordinated, intensive, multidisciplinary research and development program leading to agricultural, industrial and commercial exploitation of the neem tree.

There is always controversies with neem and its patenting. It should be made clear that the product can not be patented and only the process by which the product is made other than traditional or native methods are patented. This must be made clear through the ministry of Information and Broadcasting to avoid unnecessary panic among potential entrepreneurs in this field.

The feelings of many that the neem produced in India are all exported and at one point of time we would be left with no tree for peoples' use. Hence a quantum of neem products manufactured in our country for exports should also be made available at a nominal rate. Public plantations along the avenues are also to be encouraged as the growing demand for neem may warrant it in the near future.

The business involved with tree crops being seasonal and is under the mercy of the weather and climate. Hence proper hedging has to be provided by way of fixing of minimum price support as it exists for other food crops atleast until the business settles down for another leap.

When compared to other agribusiness activities a birds eye view cannot throw much light on the intangible benefits - such as improvement of climate, provision of shelter to cultivated land in adjacent areas and probable increase in yields, increasing soil fertility and improving soil structure through leaf fall, improvement in wild life habitats, enhanced employment opportunities to local people, etc. These should also to be taken into account for any future assessment.

**Table 2 : Input requirements in different years for raising neem tree on one ha of land, 1992 (Felling cycle =23 years)**

Sl. No.	Description	Unit	Quantity	Relevant years
1.	Thorn fencing with local materials	Mandays	30	1,5,10,15,20
2.	Site preparation and layout	Mandays	10	1
3.	Soil working and digging of pits	Mandays	60	1
4.	Transportation of seedlings	Mandays	10	1
5.	Seedlings	Numbers	400	1
6.	Plantation at site	Mandays	10	1
7.	Watering (two times)	Mandays	40	1,2
8.	Hoeing	Mandays	30	2 to 4
9.	Weeding	Mandays	30	2
10.	Gap filling: Labour	Mandays	4	2
	Gap filling:Seedling (15% casualties)	Mandays	40	2
11.	Fruit Collection and drying	Mandays	40	5 to 10
			50	11 to 15
			60	16 to 23
12.	Tree felling, and wood stacking	Mandays	40	23
13.	Contingencies	Rs.	250	1 to 5
		Rs.	500	16 to 23

**Table 3 : Outputs in different years from raising neem over one ha of land, 1992**

Description	Unit	Quantity	Relevant year
Fruits (15 kg/tree)	Q	60	5 to 10
Fruits (20 kg/tree)	Q	80	11 to 15
Fruits (25 kg/tree)	Q	100	16 to 23
Fuel wood (24 kg/tree)(10% casualty)	Q	86	23
Twigs and top feeds (Rs.100/tree)	Rs.	100	5 to 23

Note : Fruit yield is estimated assuming 400 trees/ha whereas fuel wood is estimated with 10% casualty. Income from twigs and top feeds is a lumpsum net income from each tree

Table 4: Assumed farm-gate prices of inputs for and outputs from neem, 1992

Description	Unit	Price (Rs./Unit)
Labour	Manday	20
Seedlings	100	50
Fuel wood	Q	100
Fruit	Q	150

Table 5: Annual and present value of costs and gross and net returns (Rs.) from raising one ha of neem over a felling cycle of 23 years, 1992.

Year	Annual costs	Annual returns	Present worth of annual cost	Present worth of annual returns	Discount factor at 12%	Cash flow	Present worth of cash flow
1	3650	-	3260	-	0.893	-3650	-3259
2	2350	-	1873	-	0.797	-2350	-1873
3	850	-	605	-	0.712	-850	-605
4	850	-	541	-	0.636	-850	-541
5	1650	9400	936	3629	0.567	7750	4394
6	1050	9400	532	3245	0.507	8350	4233
7	1050	9400	475	2893	0.452	8350	3774
8	1050	9400	424	2586	0.404	8350	3373
9	1050	9400	379	2310	0.361	8350	3014
10	1650	9400	531	2061	0.322	7750	2496
11	1250	12400	359	2559	0.282	11150	3200
12	1250	12400	321	3187	0.257	11150	2866
13	1250	12400	286	2840	0.229	11150	2553
14	1250	12400	256	2542	0.205	11150	2286
15	1850	12400	339	2269	0.183	10550	1930
16	1700	15400	277	2510	0.163	13700	2233
17	1700	15400	248	2248	0.146	13700	2000
18	1700	15400	221	2002	0.130	13700	1781
19	1700	15400	197	1786	0.116	13700	1589
20	2300	15400	239	1602	0.104	13100	1352
21	1700	15400	158	1432	0.093	13700	1274
22	1700	15400	141	1278	0.083	13700	1137
23	2100	24000	155	1776	0.074	21900	1621
Total			12753	45755	7.721		4083

Annuity (Rs./ha) = 5289; BC ratio = 3.59;  
 NPW (Rs./ha) = 40838; IRR (%) = 45.88



Table 6 : Benefit cost ratio under different assumptions of cost return changes

Assumptions	B-C Ratio
Estimated costs and returns	3.59
Costs increase by 10% and return as estimated	3.26
Costs increase by 20% and returns remain as estimated	2.98
Returns reduce by 10% and costs remain as estimated	3.22
Returns reduce by 10% and costs increased by 5%	3.07

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