ECONOMIC VIABILITY OF RAISING ENTIRE-ROOTED TRANSPLANTS (ETPs) OF *POPULUS DELTOIDES* MARSH., IN NURSERY AND EFFECT OF ECONOMIES OF SCALE

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Introduction

The District of Yamunanagar lies in the North-Eastern part of the State of Haryana, adjacent to Nahan District of Himachal Pradesh, Saharanpur District of Uttar Pradesh and Dehra Dun District of Uttaranchal State. It is emerging as a leading centre for manufacture for composite wood, utilizing farm forestry grown logs of *Populus* and *Eucalyptus* species as raw material. It is being called "Chhota Assam" which indicates its importance in trade of composite wood in India. Haryana Forest Department has been growing different clones of *Populus deltoides* Marsh initially with the co-operation of WIMCO and now independently, for meeting the demand of farm forestry sector of the State. Progressive farmers have adapted to raising of *Populus* nurseries for their own use and some have graduated into successful nurserymen. Rural educated unemployed youth who consider routine agricultural work below their dignity, do not mind becoming nurserymen. As such the idea of ETP nursery is rapidly catching on. Also, limited "gold rush" is evidenced into this sector by urban prospectors, who are wanting to make a quick buck. Many enterprising employees of Forest Department and private companies who possess nursery knowhow have joined hands in nursery raising. Different agencies are selling *Populus* ETPs at different rates, commencing from Rs. 5/ ETP by farmers, Rs. 10/ETP by Haryana Forest Department and upto Rs. 16/ETP by WIMCO and Sai Bio-tech Co. This activity caters to an annual demand of between 1.5 to 2.0 million ETPs within and outside the State. The following analysis focuses on the investments, costs and sale realisation with viability studies of raising ETPs.

Material and Methods

One acre (0.4 hectare) of agriculture land was taken on lease for a period of one year, that is two cropping seasons of Rabi and Kharif during January 1999. The rent for the land was Rs. 10,000/-. The said land was taken in village Thaska of Naraingarh Sub-Division of Ambala District which lies on the South-western boundary of Yamuna Nagar District. *Populus* stem cutting of "L"

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series were brought from Haldwani (Chaturvedi, 1982, 1994). Ten thousand plantable cuttings were prepared at a cost of Rs. 2 per cutting i.e. an expenditure of Rs. 20,000. The said cuttings were planted at a spacing of 60 cm x 60 cm by incurring cost of Rs. 2000 by way of actual payment to the labourers. Before planting was done, land was prepared by ploughing twice, harrowing four times and leveling twice at right angles. Square beds with sides measuring 10 m were prepared with water channels as per the slope of the land. Prior to planting of cuttings fully decomposed farm-yard manure, DAP and urea were added. Cost of those inputs was Rs. 6000. During the growing season, the cuttings were irrigated by flood irrigation using diesel pumping set. The cost of the irrigation alongwith fuel charges was Rs. 4,500. Irrigation was continued upto the end of November when growth stops and defoliation commences. One labourer at the rate of Rs. 2000 per month was hired for a period of twelve months for watch and ward of nursery, diesel engine and plants, which cost Rs. 24,000. The nursery area was enclosed with a barbed wire fence whose actual value was Rs. 8,000 per acre considering four years as the life of the barbed wire; for one year proportionate value of Rs. 2000 has been considered as cost per year of fencing.

Apart from the above, 12 man-days of skilled labour was utilized for layout of the planting technique was not known to local villagers and the nursery was being raised for the first time. The cost of skilled labour including boarding, lodging and travel was Rs. 6,000. All the above investment was done under the supervision of a retired forest officer whose services were availed on part time basis to this project and he was paid Rs. 9,000. Thus the total cost of one acre of nursery production amounted to Rs. 86,500 on *ab initio* nursery site. Considering the total investment made during the 12 months, the bulk of which occurred during first few months and giving a discount of one month for the last investment during rest of the year, the interest was calculated at the rate of the 10% which works to Rs. 7,929. Hence the total expenditure and opportunity cost of the investment is Rs. 94,429 or say Rs. 95,000 per acre of Poplar nursery.

The return stream of flow of money i.e. expected after allowing a culling of 20% consists of ETPs numbering 8,000 each valued at Rs. 15. The total expected return is Rs. 8,000 x 15 = Rs. 1,20,000. Thus an investment of Rs. 95,000 in one acre is likely to fetch a profit of Rs. 25,000.

The above information is tabulated in Table 1 and if the nursery activity is enlarged upto one hectare, the effect of economy of scale which becomes operative has been analysed as a possible scenario.

Results and Discussion

The market for sale of ETP is generally fluid and can not be termed as stable from year to year. There are also annual predictable highs and lows of prices depending upon arrival of produce. The prices vary along with the current ruling price of Veneer logs sold fresh in the market. The farmers bring the material after harvesting their agricultural crop as the felling of tree during season when crop is standing damages the agricultural yield. At present the sale price is Rs. 340 to 350 per qtl. Veneer logs that are of the girth 120 to 180 cm over bark with length varying from 130 cm to 250 cm are in demand. The smaller diameter class is preferred because

Table 1

Item of Expenditure	Unit	P/acre Actual	P/ha Assumed	Remarks
(a) Rent, land preparation, fencing and irrigation :				
Rent for 12 calender months beginning from January 1999	Acre/ha	10,000	25,000	Linear increase
Ploughing harrowing levelling preparation of beds water channels	100 m^2	3,000	6,000	Some Economy of scale
Fencing, using barbedwire and iron angles cost Rs.8,000/acre with life of 4 years.	4,000 m^2	2,000	5,000	Linear increase
Cost of irrigation including fuel	Acre	4,500	10,000	Economy increase
Cost of planting material :				
Stem cuttings	Nos.@ of Rs.2/-per stem cutting	20,000	50,000	Linear increase
(b) Cost of labour :				
Planting of cuttings	10000 nos. per acre	20,000 per acre	5,000	Linear increase
Watch and Ward	Year	24,000	24,000	Economy of scale
Cost of Management :				
Skilled labour	Area	6,000	6,000 scale	Economy of
(c) Opportunity Cost :				
Cost of Supervision (Management)	Area	9,000	9,000	Economy of scale
(d) Opportunity cost	Rate of interest 10%	7,929	14,300	Linear
Total Expenditure (a + b + c + d)		86,429	1,49,300	
Gross Income	No. of ETP @ Rs. 15	15x8,000 =1,20,000	15x20,000 =3,00,000	Economy of scale
Actual Expenditure		86,429	1,49,300	
Net return on investment		33,571	1,50,700	
Percentage return per year		38.8%	100.93%	

they yield good quality veneers. There is also increase in demand of *Eucalyptus* veneer logs of the same size as of Poplar logs. The price situation is either stable or marginally on the decline owing to market preference for *Eucalyptus*. Composite wood made out of *Eucalyptus* even without treatment is considered more durable hence the preference.

The sale price of ETPs during previous three years has varied between Rs. 5 to Rs. 18 depending upon quality, clonal purity and also the credibility of the organization selling ETPs. In the above experience of raising of ETPs there is break even if the sale price of ETP is Rs. 11. Higher price more than Rs. 11 gives the profit in nursery of one acre. Whereas with assumed investment scenario on one hectare or more nursery area the break even cost worked out is Rs. 7.50, i.e. where economies of scale begin to operate. Thus when there is steep decline in price, the larger nursery owner can still afford to sell his produce at reduced price, particularly during the second half of the planting season. Thus a larger nursery is found economically more viable than a smaller nursery and gives the owner greater latitude in sale price fixation.

Conclusion

The viability of investment made in rising *Populus deltoides* ETPs increases with increase in size of the nursery. Instead of one-acre nursery, larger nursery of more than two acres is the preferable size as at that size economies of scale become operative. Instead of *ab initio* nursery sites, already tilled agricultural land taken on lease reduces the cost and hence nursery raising should preferably be done on farm land. Novices who intend to take up the work for self-employment are advised to adopt not less than one hectare as the basic size of nursery unit.

SUMMARY

Yamuna Nagar District has emerged as a leading district in the manufacture of wood based panel products utilizing plantation grown *Populus* and *Eucalyptus* wood. ETPs of *Populus* initially produced only by Forest Department are now being raised by enterprising persons also. The expenditure involved in raising *ab initio* nursery in one of the villages, namely, Thaska and the financial returns expected out of the sale of ETPs have been analysed and scenario of larger nursery from 0.4 ha to 1.0 ha which brings economy of scale into operation has been analyzed. It is concluded that nursery activity by resident farmers already practising agriculture on not less than 1.0 ha is economically a better proposition. Novices are advised to raise not less than one ha of nursery.

पौधशाला में *पोपुलस डेल्टायडिस* मार्श० के समुचा-जड़बद्ध प्रतिरोपणों (ईटीपीज़) को उगाने की आर्थिक व्यवहार्यता तथा स्केलस की अर्थव्यवस्था के प्रभाव

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साराशं

हरियाणा राज्य के उत्तर-पूर्वी स्थित यमुनानगर जिला प्लाईवुड जैसे संयुक्त कास्ट तैयार करने के लिए हाल ही में प्रसिद्ध हुआ है तथा इस जिले को छोटा आसाम भी कहा जाता है । संयुक्त कास्ट तैयार करने के लिए पापुलस व सफेदे

का कास्ट पौधारोपण से उपलब्ध हो रहा है । शुरू में पापुलस के जड़तन्तु सहित बड़े पौधों को वन विभाग व विमको ही तैयार करते थे अब प्रगतिशील किसान इन पौधों को अपने लिए तथा बेचने के लिए पौधशालाओं में उगा रहे हैं । ऐसी ही एक पौधशाला हाल ही में थस्का नामक गांव में शुरू की गई । पौधे तैयार करने के लिए पौधशाला पर किया गया एक साल का वास्तविक खर्चा तथा उत्पादित पौधों को बेचने से प्राप्त आय का मूल्यांकन किया गया है । मूल्यांकन से एक एकड़ के मुकाबले 2.5 एकड़ की (एक हैक्टेयर) पौधशाला बनाने से कम कीमत पहले उद्योगों के मुकाबले क्षेत्र में पौधा तैयार होने के बारे में जानकारी प्राप्त हुई है तथा नई पौधशाला कृषकों द्वारा यह कार्य किया जाये तो मुनाफा अधिक प्राप्त हो पायेगा । ग्रामीण बेरोजगार शिक्षित युवा वर्ग यदि पौधशाला शुरू करना ही चाहते हों तो एक हैक्टेयर से छोटी लाभदायक नहीं रहेगी ।

References

Chaturvedi, A.N. (1982). Poplar Farming in U.P., *U.P. For Bull No. 45.*

Chaturvedi, A.N. and B.S. Rawat (1994). Poplar Tree Improvement Programme. *Indian Forester*, **120** (2) : 97-104.