

Analysis of Agricultural Crops Improvement by Wastelands Converted in to Cultivable Lands- Special Reference with Current Fallow lands, Old Fallow lands, Banjar Lands, and Water-Logged Lands

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Abstract

The wastelands, which are with low level of environmental severity, requiring less man power with limited technology to interact for availing wasteland resources for agriculture use are known as very easily reclaimable. In this category other types of wastelands and fallow lands (1 to 2 year) are to be further classified because these two types of wastelands have less severe natural constraints and these types of wastelands were once under agricultural use, but due to deteriorating soil conditions, perhaps they are presently left out of cultivation. There are three different types of wastelands like Old fallow lands, banjar, water - logging and reverine wastelands which are classified as easily reclaimable under the wasteland capability grouping. Such types of wastelands were previously under cultivation but presently are left out of cultivation due to deteriorating soil fertility status, erosion and accumulation of the water. The man made problems as well as natural constraints of such wasteland types may be improved through the management of suitable agricultural practices. Over cropping, large size of land holdings, mismanagement and carelessness of the care-taker mainly caused the problems of such type of wastelands. Such wastelands can be easily reclaimed through proper attention and agricultural technological doses. These types of wastelands are also recommended for agricultural uses and the cost of reclamation and development are worked out here under for all the three types, one by one.

Key words: *wastelands- environment- agriculture- deteriorating- soil- Old fallow lands- banjar- water - logging - reverine wastelands*

Introduction

The concept of wasteland is now-a-days, a common phenomenon. The term wasteland was used to indicate little used common lands, which failed to yield a return to the medieval cultivators. It may be defined as land which is lying uninhabited, uncultivated and left no longer serving any purpose. According to Dudley Stamp, the wastelands are such lands, which are cultivable, but at present they have not been under use and no further use have been found due to some reason or the other. India is confronted with a grave and baffling problem of escalating human and cattle population on the limited and rapidly diminishing land resources, the demand of which for various purposes, viz., food, fodder, fuel, fibre, timber wood, roads, etc., is on the increase and degradation of which is taking place at an alarming rate due to the diversion of lands in a fragile ecosystem for dams and roads, the reckless destruction of forest without adequate concern for the treatment of the catchment, danger of water logging, salinity, desertification, floods, droughts, improper agricultural practices, toxic effects of agricultural chemicals and industrial effluents. The wastelands are ecologically unstable. Over the years of human settlements, these lands have been subjected to different degrees of biotic or ecological interference, as a result, rendering them degraded, infertile and unculturable. These adverse factors have turned more than 39 per cent of the Country's areas into wastelands in some or other forms viz., saline and alkaline lands of 7.16 m.ha., wind eroded area of 12.93 m.ha., and water eroded area of 73.60 m. ha., making a total non- forest degraded area of 93.69 m.ha. The remainder of degraded forest area accounts for 35.89 m.ha. So the total wastelands in India is 129.558 m.ha. The details are given in Table 1.1. This has caused a decline in the percapita availability of cultivable lands.

From a mere 0.48 ha., (1951) to 0.26 ha., (1981) and it is likely to decline further to 0.15 ha., by 2000 AD when the country's population touched the 1020 million with an increased demand for food and other primary produce and direct demand for shelter and roads, etc.

It is clear from that these lands which are subject to degradation are not only posing imminent threat to the environment by causing and ecological insecurity imbalance but to the object of sustainable socio-economic development also. The only way to raise and conserve the land resources to meet the increasing demands of the incessantly growing human and cattle population and to achieve the long cherished goal of sustainable development and maintenance of eco-balance is by reclaiming, developing and judiciously utilizing the degraded unutilized or underutilized wastelands. It is imperative not only to halt any further deterioration of land resources by appropriate measures, but it also necessitates the reclamation, proper development and utilization of already degraded wastelands for sustainable development. This is also in line with the principle of optimal use of each piece of land allowing no land to remain as waste. The success of reclamation of wasteland depends on the suitability of lands based on their capability of productivity. In fact, capability refers to the extent of vulnerability, of such wastelands to be brought under reclamation. This would call for capability grouping of wasteland on the basis of their fertility level so that they will be suitable for further productive activities. This is a method of grouping wastelands on the basis of their capability assessed in relation to their suitability to agricultural uses.

Thus, the methods of wastelands capability grouping are a systematic division of different kinds of wastelands which are distinguished from one another by variation in the type and degree

of use exposed by soil characteristics, morphometric, hydrologic, climatic and pedogenic including other environmental factors. The wasteland capability grouping will help to assess significant factors for conversion. It is an imperative grouping and grading of soils, according to their potentialities and limitations, their capacity of

in the Figure 1. As already stated the regrouping of wastelands on the basis on their capability will help evolve a system-specific preparation of reclamation of such wastelands, which is the very purpose of this chapter. It is necessary at this juncture to know the actual hectare of different types of wastelands so that the capability

Sl. No.	States/UTs	Saline and alkaline lands	Wind eroded area	Water eroded area	Total area	Forest Degraded Lands	Grand Total
1.	Andhra Pradesh	0.240	-	7.242	7.482	3.734	11.416
2.	Assam	-	-	0.935	0.935	0.795	1.730
3.	Bihar	0.004	-	3.892	3.896	1.562	5.458
4.	Gujarat	1.214	0.704	5.235	7.153	0.683	7.836
5.	Haryana	0.526	1.599	0.276	2.401	0.074	2.475
6.	Himachal Pradesh	-	-	1.424	1.424	0.534	1.958
7.	Jammu & Kashmir	-	-	0.531	0.531	1.034	1.565
8.	Karnataka	0.404	-	6.718	7.122	2.043	9.165
9.	Kerala	0.016	-	1.037	1.053	0.226	151.279
10.	Madhya Pradesh	0.242	-	12.705	12.947	7.195	20.142
11.	Maharashtra	0.534	-	11.026	11.560	2.841	14.401
12.	Manipur	-	-	0.014	0.014	1.424	1.438
13.	Meghalaya	-	-	0.015	0.015	0.878	1.384
14.	Nagaland	-	-	0.508	0.508	3.227	6.324
15.	Orissa	0.404	-	2.753	3.157	0.079	1.230
16.	Punjab	0.688	-	0.463	1.151	1.933	19.943
17.	Rajasthan	0.720	10.623	6.659	18.002	0.150	6.281
18.	Sikkim	-	-	0.131	0.131	1.000	4.401
19.	Tamil Nadu	0.004	-	3.388	3.392	0.865	0.973
20.	Tripura	-	-	0.108	0.108	1.426	8.061
21.	Uttar Pradesh	1.296	-	5.340	6.636	0.359	2.536
22.	West Bengal	0.850	-	1.327	2.177	1.103	1.918
23.	Union Territories	0.016	-	0.873	0.889	2.715	3.604
Total		7.158	12.926	73.600	93.691	35.889	129.558

Source:Compiled from Hegde, N.G. 1993. Hand Book of Wastelands Development. Published by BAIF, Development Research Foundation. Pune ,p.13. and Sharma,R.D. 1992. Economics of Fuelwood Production in Wastelands. Concept Publishing Company, New Delhi, p.13.

producing agricultural crops and responsiveness to management practices. This system is to make a sound and complex farm conservation plan and its agricultural uses.

The following five types of capability grouping have been ascribed to various wastelands in India in general as vividly illustrated

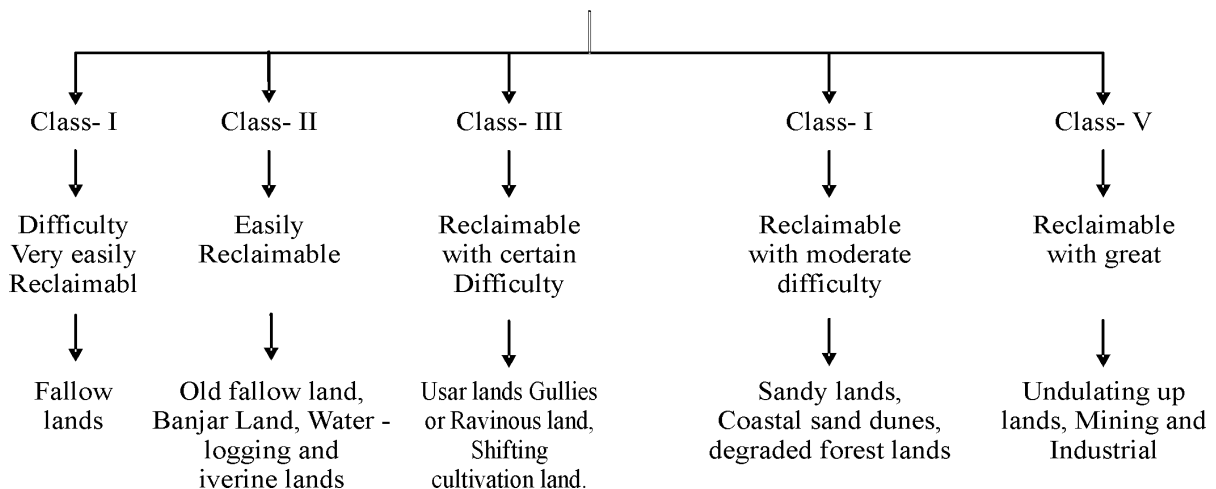
grouping can be projected with the total areas of lands under each group. This would further enable anybody who is interested to know the total cost of reclamation at all India level as well as at the state level in Tamil Nadu. Also this will be able to give required facts relating to classification of lands on the basis of natural characteristics.

TABLE 2
Wastelands Categories in India and Tamil Nadu

Sl. No.	Categories	India*	Tamil Nadu*
A According to Classification on the basis of natural characters			
1	Current Fallow lands	14,360	1.004
2	Old Fallow Lands	9,700	1.008
3	Banjar Lands	6,296	0.014
4	Water-logged Lands	5,300	0.013
5	Usar Lands	12,579	0.015
6	Ravenous Lands	13,669	0.068
7	Shifting Cultivation Lands	5,360	0.043
8	Sandy Lands	5,696	0.022
9	Coastal Lands	8,400	0.023
10	Degraded Forest Lands	35,889	1.009
11	Undulating Uplands	1,903	0.032
12	Mined Lands	6,827	0.040
13	Kankrili Lands	3,579	0.022
Total		129,558	3.313
B According to Capability grouping			
1	Very Easily Reclaimable	14,360	1.004
2	Easily Reclaimable	21,296	1.035
3	Reclaimable with Certain Difficulty	31,608	0.126
4	Reclaimable with Moderate Difficulty	49,985	1.054
5	Reclaimable with Great Difficulty	12,558	0.094
Total		129,558	3.313

Source: * The Hand Book. 2000, Department of Agriculture and Cooperation, Ministry of Agriculture, Chennai, pp.48-49 **Annual Report. 1999 – 2001. Compiled from Season and Crop Report of Tamil Nadu, Directorate of Economics and statistics, Chennai, pp.15-41.

FIGURE 1
Capability Grouping of Wastelands



Source : H.R Yadav. 1987. Wastelands: Diagnosis and Treatment. Concept Publishing Company, New Delhi, p. 95.

Note: Items in boxes belong to the capability group above each of them.

Very Easily Reclaimable

The wastelands, which are with low level of environmental severity, requiring less man power with limited technology to interact for availing wasteland resources for agriculture use are known as very easily reclaimable. In this category other types of wastelands and fallow lands (1 to 2 year) are to be further classified because these two types of wastelands have less severe natural constraints and these types of wastelands were once under agricultural use, but due to deteriorating soil conditions, perhaps they are presently left out of cultivation.

that land as given in the statement that the total expenses is put at Rs. 10,180 per ha. The break up is given hereunder in detail.

The researcher was interested to know the level of income, which could be made out of reclamation of such a land. The income from groundnut cultivation works out to Rs.20, 770 per ha, leaving behind a net income of Rs. 55.5 cr in the first year and Rs.106.32 cr from the second year onwards. By way of projection, the statement includes the national level and the state level investment, employment and net income generation capacity of wastelands reclaimable

STATEMENT 1

Capital Requirement for Reclamation of Current Fallow lands is given as follows. (Cost of Reclamation per hectare)

Sl. No.	Operations	No. of manual Labourers Required	Expenses Rs.
1.	Tractor Ploughing (First time Rs. 1200 + Second time Rs .1200)	2	2,400
2.	Bunding and Levelling @ Rs.80 per head	5	400
3.	Irrigation 15 hours @ Rs.30 per hr.	2	450
4.	Farmyard man ure 12.5 tonnes @ Rs. 100 Per tonne	2	1,250
5.	Miscellaneous Expenses inclusive Labourer	1	550
Total Reclamation Cost			5,050

Reclamation of Current Fallow Lands

The Statement 1 is made to bring out the cost involved in the reclamation of current fallow lands and also the cost involved in the suitable crop viz., groundnut raised in that piece of land. As it could be seen from the statement the reclamation of current fallow land involves the minimum cost of Rs 5,050 per ha., irrespective of states in India. The process of reclamation leads to generation of employment of about 96 m.hrs. per ha., of current fallow lands. Regarding the cost of raising groundnut crop suggested in

under current fallow lands category. While the national level investment on reclamation stands at Rs. 2, 18,702.8 cr, the employment generated will be 73.5 cr. mhrs and net income earned will be Rs.7955.4.cr. The state level figures projected will be, an investment of Rs.1529.9cr, the employment generation to the tune of 65.42 cr. mhrs and net income of Rs.55.5cr in the first year of reclamation and Rs.106.32 cr. from the second year onwards. The abstract of development of current fallow lands is given below. The same method is followed for other groups of waste lands.

A. Investment Cost of Groundnut Crop in Reclaimed Current fallow land is as detailed below:

Sl. No.	Operations	No. of manual Labourers Required	Expenses Rs.
1.	Seeds 60 kg @ Rs. 25 per kg	1	1,500
2.	Seeds showing 25 Labourers @ Rs.40 per head	25	1,000
3.	Irrigation 6 times, each irrigation 8 hours @ Rs.30 per hr (6x8x30).	1	1,440
4.	Fertilizer Requirement (Rs.150+150+240)	3	540
	a) Urea 30 kg @ Rs. 5 per kg.		
	b) Murate of Potash (MOP) 30kg @ Rs.5 per kg.		
	c) Labourers - 3 @ Rs.80 per head		
5.	Maintenance and Protection (per month Rs. 500 for 3 months)	1	1,500
6.	Harvesting 30 women Labourers @ Rs.40 per head 3 men Labourers @ 80 per head	33	1,640
7.	Marketing a) Transporting = Rs. 600 b) Labourers = Rs.160	2	760
8.	Miscellaneous Expenses inclusive labourers a) storage Rs. 300 b) Food Rs. 600 c) Others Rs. 400	3	1,300
	Total Farming Operation Cost		<u>10,180</u>

B. Generation of income from Reclaimed current fallow lands (Per ha)

Crop	Yield (Kg)	Rate per kg (Rs)	Total Value of out put (Rs.)	Total Expenses (Rs.)	Profit (Rs.)
Groundnut	6,000	6	36,000	15,230	20,770

C. Generation of Employment (persons)

	During Reclamation	During farming	Total
i) Direct Labour	9	66	75
ii) Indirect Labour	3	3	6
Total	12	69	81

ABSTRACT FOR CURRENT FALLOW LANDS

National Level

A. Investment**Rs**

- a) Cost of Reclamation = $14.360 \text{ m. ha} \times 5050 = 7251.80 \text{ cr}$
 b) Farming operations = $14.360 \text{ m. ha} \times 10180 = 14618.48 \text{ cr}$
21870.28 cr

B. Employment

- a) During Reclamation (Constant) = $12 \times 8 \times 14.360 \text{ m. ha} = 137.8 \text{ cr.mhrs}$
 b) During Farming operation (Recurring) = $69 \times 8 \times 14.360 \text{ m. ha} = 792.6 \text{ cr.mhrs.}$

Total man hours = $648 \times 14.360 \text{ m. ha} = 930.5 \text{ cr mhrs}$

C. Net income

- Income per ha. = Rs. 20770 x 14.360 m. ha
 a) In the 1st year = Rs. 29825.72 - 21870.28 = 7955.4 cr
 b) From 2nd year onwards = Rs. 29825.72 - 14618.48 = 15207.2cr

State Level (Tamil Nadu)**A. Investment****Rs.**

- a) Cost of Reclamation = $1.004 \text{ m. ha} \times 5050 = 507.02$
 b) Cost of farming operations = $1.004 \text{ m. ha} \times 10180 = 1022.07$
 1529.09 cr

B. Employment

- a) During Reclamation (constant) = $12 \times 8 \times 1.004 \text{ m. ha} = 9.93 \text{ cr mhrs}$
 b) During farming operation (Recurring) = $69 \times 8 \times 1.004 \text{ m. ha} = 55.42 \text{ cr mhrs}$
 Total man hours = $648 \times 1.004 \text{ m. ha} = 65.05 \text{ cr mhrs}$

C. Net income

- Income per ha = Rs. 20,770
 a) In the 1st year = $20,770 \times 1.004 \text{ m. ha}$
 = $2085.30 - 1529.09 = 55.5 \text{ cr}$
 b) From 2nd year onwards = $2085.30 - 1022.07 = 106.32 \text{ cr}$

Easily Reclaimable

There are three different types of wastelands like Old fallow lands, banjar, water - logging and reverine wastelands which are classified as easily reclaimable under the wasteland capability grouping. Such types of wastelands were previously under cultivation but presently are left out of cultivation due to deteriorating soil fertility status, erosion and accumulation of the water. The man made problems as well as natural constraints of such wasteland types may be improved through the management of suitable agricultural practices. Over cropping, large size of land holdings, mismanagement and carelessness of the care-taker mainly caused the problems of such type of wastelands. Such wastelands can be easily reclaimed through proper attention and agricultural technological doses. These types of wastelands are also recommended for agricultural

uses and the cost of reclamation and development are worked out here under for all the three types, one by one.

Reclamation of Old Fallow Lands

The Statement 2 is made to bring out the cost involved in the reclamation of old fallow lands and also the cost involved in the suitable crop, viz., black gram suggested, which could be raised in that land. As it is seen from the statement, the reclamation of old fallow land involves a minimum cost of Rs.6,580 per ha., irrespective of types of soils in India. The process of reclamation leads to generation of employment of about 576 m. hrs per ha., from out of old fallow lands. Regarding the cost of raising black gram crop in that land, it is given in the statement that the total expenses is put at Rs. 5,710 per ha. The break up is given below in detail.

STATEMENT 2

Capital Requirement for Reclamation of Old Fallow lands is given as follows
(Cost of Reclamation for per hectare)

Sl. No.	Operations	No of Manual labourer Required	Expenses Rs.
1.	Removal of bushes @ Rs.80 per head	15	1,200
2.	Tractor Ploughing (First time 1200+ Second time 1200)	2	2,400
3.	Bunding and Levelling @ Rs . 80 per head	6	480
4.	Irrigation (20 hrs. @ Rs. 30 per hr. inclusive labour)	2	600
5.	Farm Yard Manure(13 tonnes per ha. @ Rs. 100 per ha. (inclusive labour)	3	1,300
6.	Miscellaneous expenses (inclusive labour)	1	600
	Total Reclamation Expenses		6,580

A. Cost of Raising Black Gram Crop in Reclaimed Older fallow lands.

Sl. No.	Operations	No of Manual labourer Required	Expenses Rs.
1.	Seeds 25kg@Rs 18 per kg inclusive of labour	1	450
2.	Seeds sowing @ Rs 80per head	2	160
			Rs.
3.	Irrigation (4 times, each irrigation 8 hrs @ Rs 30. per hr. inclusive of labourers)	3	960
4.	Fertilizer		
	a) Urea 50 kg @Rs. 5 per kg = 250		
	b) Labour 2, @ Rs. 80 per head = <u>160</u>	2	410
5.	Maintenance and protection (per month Rs. 400 for 2 months)	1	800
6.	Harvesting (Women) Labour @ Rs. 40 per head and Men laourers @ Rs.50 per head	20 2	800 160
7.	Threshing (Women) labourer @ Rs. 40 per head and Men labourer @ Rs 80 per head	5 2	200 160
8.	Marketing		
	a) Transporting = Rs. 350		
	b) Labourers = Rs. <u>160</u>	2	510
9.	Miscellaneous Expenses inclusive of labourer	3	
	a) Storage = Rs. 300		
	b) Food = Rs. 500		
	c) Others = Rs. <u>300</u>		
	Total Farming Expenses		5,710
	Add: Total Reclamation Cost		<u>6,580</u>
	Total Expenses		<u>12,290</u>

B. Generation of Income from Reclaimed Old fallow lands

Crop	Yield Kg	Rate per kg Rs	Total value of out put Rs	Total Expenses Rs	Profit Rs.
Black Gram	1,850	14.00	25,900	12,290	13,610

C. Generation of Employment (Persons)

	During Reclamation	During Farming	Total
i) Direct Labour	26	40	66
ii) Indirect Labour	3	3	6
Total	29	43	72

The researcher was curious to know the level of income, which could be made out of reclamation of such a lands. The income from black gram cultivation works out to Rs. 13,610 per ha., leaving behind an overall net income of Rs. 13.30cr in the first year and Rs.79.63cr from the second year onwards. By way of projection, the statement includes the National and the State level investments, employment and net income generation capacity of wastelands reclaimable under old fallow category. While the national level

investment on reclamation stands at Rs. 1276.5cr, the employment as 558.7, mhhrs and net income at Rs.1125.2cr in the first year and Rs.7507.8cr from the second year onwards. The state level figures projected are, an investment of Rs 1238.82cr., the employment generated at 58.06cr m. hrs and a net income of Rs. 13.30cr, in the first year and Rs.79.63cr from the second year onwards. The abstract of development of old fallow lands are given below.

ABSTRACT FOR OLD FALLOW LANDS

National Level

A: Investment		Rs.
a) Cost of Reclamation	=	9.700m.ha x 6580 = 6382.6 cr
b) Cost of Farming operation	=	9.700m.ha x 5870 = <u>5693.9 cr</u>
		<u>12076.5 cr</u>
B. Employment		
a) During Reclamation (Constant)	=	29 x 8 x 9.700m.ha = 225.04 cr.mhhrs
b) During Farming operations (Recurring)	=	43x8x 9.700 m.ha = 333.68 cr.mhhrs.
Total man hours	=	576 x 9.700m.ha = 558.72 cr.mhhrs.
C. Net Income		
Income per ha	=	Rs. 13,610 x 9.700m.ha
a) In the 1 st year	=	132017 – 12076.5 = Rs. 1125.2 cr
b) From the 2 nd year onwards	=	132017 - 5699.6 = Rs. 7507.8cr

State Level (Tamil Nadu)

A. Investment		Rs.
a) Cost of Reclamation	=	1.228 m.ha x 6580 = 808.0 cr
b) Cost of Farming operation	=	1.228 m.ha x 5710 = <u>701.1 cr</u>
		<u>1509.1 cr</u>
B. Employment		
a) During Reclamation (Constant)	=	29x8x1.228 m.ha = 28.49 cr.mhhrs
b) During Farming operations (Recurring)	=	43x8x1.228 m.ha = 42.24 cr.mhhrs.
Total man-hours	=	576x1.228m.ha = 70.73 cr. m hrs.
C. Net Income		
Income per ha	=	Rs. 13,610 x 1.228 m.ha
a) In the 1 st year	=	16713.08 - 1509.1 cr = Rs.162.0 cr
b) From the 2 nd year onwards	=	16713.108 – 701.1cr = Rs. 970.20 cr

A. Reclamation of Banjar Lands

The Statement 3.3 has been made to bring out the cost involved in the reclamation of banjar lands and also the cost involved in the suitable crop, viz., eucalyptus suggested and raised in that piece of land. As it could be seen from the statement the reclamation of banjar land involves the minimum cost of Rs. 9,690 per ha., irrespective

of states in India. The process of reclamation leads to generation of employment of about 1,016 mhrs per ha., of banjar lands. Regarding the cost of raising Eucalyptus tree plantation in that land, it is given in the statement that the total expenditure is put at Rs.33,280 per ha. The breakup is given in detail.

STATEMENT 3

Capital Requirement for Reclamation of Banjar Lands is as given under
(Cost of Reclamation per hectare)

Sl.No.	Operations	No. of manual Labourers Required	Expenses Rs.
1.	Tractor ploughing (First 1200+second1200)	2	3,600
2.	Bunding and Levelling @ Rs.80 per head.	8	640
3.	Irrigation @ Rs. 30 per hr. for 30 hrs	1	900
4.	Fencing @ Rs.80 per head + Material cost Rs.1500	10	2,300
5.	Farmyard manure 12.5 tonnes per ha. @ Rs.100 per tone (inclusive Labourers)	3	1,250
6.	Miscellaneous Expenses (inclusive labour)	4	1,000
	Total Reclamation Cost		<u>9,690</u>

Cost of Eucalyptus plantation in Reclaimed Banjar Lands

Number of trees	=	6312
Spacing	=	120cm x 120 cm
Rate of Survival	=	90 percent
Harvest period	=	4 years.

A) Average number of plants per pit] = 12,624
No. of Manual Laborers

B) Cost of establishment

a) Preparation of land @ RS. 50 per head	3	750
b) Lay out @ Rs. 50 per head	10	500
c) Transportation cost of seedlings @ Rs. 50	1	150
d) Cost of seedlings 1000 plant tree Rs 40 (42624 x 40)	1	505
e) Planting cost (Rs. 50 per 1000 pits for 6312 pits)	1	316
f) Manure and Fertilizer	2	500
g) Miscellaneous Expenses (inclusive labour)	2	500
Total		<u>3,221</u>

C) Cost of Maintenance

I First Year	No. of manual Laborers Required	Amount Rs
5 Women Labourers maintenance for 3 days @ Rs. 25 per head	5	375
Plant protection (10 labourers @ Rs. 25 per head)	10	500
Watering (inclusive of labourer cost charges)	2	1,000
II Second year		
Plant protection (20 labourer @ Rs.50 per head)	20	1,000
Watering (inclusive Labourers)	2	1,000
III Third Year		
Plant protection (20 labourers @ Rs. 50 per. head)	20	1,000
Watering (inclusive labourers)	2	1,000
Fertilizer (inclusive 3 labourers)	3	500
Salary for security personnel (500 for 12 month)		6,000
IV Fourth Year		
Fertilizer (inclusive 3 Labourers -3)	3	500
Watering (inclusive 1 labourer)	1	1,000
Plant protection (10 Labourers @ Rs. 25 per head)	20	500
Salary for security personnel (Rs 500 for 12 months)	1	<u>6,000</u>
C's Total		20,375
B's Total		3,221
Total Reclamation cost		<u>9,690</u>
Total Expenses		<u>33,286</u>

D) Total Revenue Received from the Sale of trees**First Year** Nil**Second Year**

a) Re . 0.50 per tree from plantation /nurseries 6,156

Third YearRemoval and sale of one transfer from each pit at a
90 per cent survival rate = 5680 @ Rs.4 per tree 22,720**End of the fourth Year sale of all trees.**

4,000 stalks @ Rs. 22 each 88,000

1,000 stalks @ Rs. 18 each 18,000

680 stalks @ Rs. 14 each 9,520

Gross income	1, 44,396
Less: Total Expenses	<u>33,286</u>
Net income	<u>1, 11,110</u>

E) Generation of Employment (Persons)

	During Reclamation	During Farming	Total
i) Direct Labour	24	99	123
ii) Indirect Labour	4	-	4
Total	28	99	127

The researcher attempted to know the level of income, which could be made out of reclamation of such a land. The income from Eucalyptus cultivation is being worked out to Rs. 1, 11,116 per ha., leaving behind an overall net income of Rs. 58.97cr. in the second and third year and Rs. 128.53 cr from the fourth year onwards. By way of projection the statement gives the National level and the State level investments, employment and net income-generating capacity of wastelands reclamation under banjar category. While the National level investment on reclamation stands at Rs. 20956.8cr., the employment 639.6cr mhrs and net income at Rs. 49001.7 cr in the second and third year and Rs. 551025.9 cr from the fourth year onwards. There was no income in the first year. The state level figures projected are an investment of Rs. 96.59cr., the employment generated at 14.2 cr m.hrs and a net income of Rs. 58.97cr in the second and third year each and Rs. 128.53cr from the fourth year onwards. The abstract of development of banjar lands are given below:

ABSTRACT FOR BANJAR LANDS**National Level****A. Investment**

			Rs.
a) Cost of Reclamation	=	6.296m.ha x 9690	= 61008.20 cr
b) Cost of Farming operations	=	6.296 m.ha x 23596	= <u>148156.04</u> cr
			<u>20956.86</u> cr

B. Employment

a) During Reclamation (Constant)	=	28x8x6.296 mha	=141.03cr. mhrs
b) During Farming operation (Recurring)	=	99x8 x6.296m.ha	=498.64cr.mhrs.

Total man hours = 1016x6.296mha. = 639.67cr. mhrs.

C) Net income

Income per ha.	=	Rs 1, 11,116	
a) In the 1 st year	=	Rs. 24,44 - 732,3	= Rs. 1712 cr.
b) From the fourth year onwards	=	24, 44 - 519.1	= Rs. 19,25cr.

State Level (Tamil Nadu)**A. Investment**

			Rs.
a) Cost of Reclamation	=	0.014 m.ha x 9690	= 13.56 cr
b) Cost of Farming operation	=	0.014 m.ha x 23596	= <u>33.03</u> cr
			<u>96.59</u> cr

B. Employment

a) During Reclamation (Constant)	=	28x8x0.014 m.ha	= 0.31cr.mhrs
b) During Farming operations	=	99x8x0.014 m.ha	= 1.10 cr mhrs.
Total man hours (Recurring)	=	1016 mhrs x 0.014cr	= 1.41 cr mhrs.

C. Net Income

Income per ha	=	Rs. 1, 11,116 x 0.014 mha.
a) In the II nd and Third year	=	155.56 -96.59 = Rs.58.97cr
b) From the fourth year onwards	=	155.56-33.03 = Rs.128.53cr

C. Reclamation of Water-Logged Lands

The Statement 3.4 is made to bring out the cost involved in the reclamation of Coastal Sand Dune Lands and also the cost involved in the suitable crop viz., casuarinas raised in that piece of land. As it could be seen from the statement the reclamation of coastal sand dune land involves the minimum cost of Rs. 11,930 per ha

irrespective of states in India. The process of reclamation leads to generation of employment of about 1,586 m hrs per ha., from out of coastal sand dune land. Regarding the cost of raising casuarina crop in that land, it is given in the statement that the total expenses is put at Rs. 1,07,990 per ha. The breakup is given in detail.

STATEMENT 4

Capital Requirement for Reclamation of Water-Logged Lands is as given under
(Cost of Reclamation per hectare)

Sl. No	Operations	No. of manual Laborers required	Expenses Rs.
1.	Creation of Canal lining @ Rs.80 per head	15	1,200
2.	Provision of drainage @ Rs. 80 per head	20	1,600
3.	Removal the salt by Leaching @ Rs. 80 per head	25	2000
4.	Open ditches @ Rs. 80 per head	15	1,200
5.	Bunding and Levelling @ Rs. 150 per head	12	960
			Rs.
6.	Manual / Animal ploughing @ Rs.150 per head	15	2,250
7.	Farm yard manure 12.5 tonnes per ha @ Rs 100 per tone	3	1,490
8.	Miscellaneous Ex penses inclusive labourers	2	1,200
		Total	<u>11,930</u>

A. Cost of Raising Banana Crop in Reclaimed Water – Logged Lands

Number of plants = per pit one plant
 Spacing = 120cm x 120 cm
 Size of pits = 90 cm x 90 cm.
 Period = 2 years.

First year

1. Seedlings 10,000 @ 0. 50 paisa (labourers included)	2	5,000
2. Plantation of seedlings @ Rs. 80 per head	30	2,400
3. Fertilizer	5	75,400
a) Urea per pit 0.5 kg @ Rs. 5 per kg = R. 2.50		
b) Manure per pit 0.5 Kg @ kg Rs.5 Per kg = Rs. 2.50		
c) Manure per pit 0.5 kg @ Rs.5 per kg = Rs. <u>2.50</u>		
d) @ Rs. 80 per head (7.50x 10,000+ 400) <u>7.50</u>		
4. Irrigation 35 times, each irrigation 15 hrs. @ Rs. 30 per hr. 35 x 15 x 30 included Labourers	2	15,910
5. Maintenance and protection labour @ Rs.80 per head+ Rs.1000	4	1,320
6. Miscellaneous Expenses (inclusive labourer)	2	<u>1,160</u>
Total		<u>1,01,190</u>

Second year

1. Seedlings 10,000 @ 0. 50 paisa (labourers included)	2	5,000
2. Plantation of seedlings @ Rs. 80 per head	30	2,400
3. Fertilizer	5	75,400
a) Urea per pit 0.5 kg @ Rs. 5 per kg = R. 2.50		
b) Manure per pit 0.5 Kg @ kg Rs.5 Per kg = Rs. 2.50		
c) Manure per pit 0.5 kg @ Rs.5 per kg = Rs. <u>2.50</u>		
d) @ Rs. 80 per head (7.50x 10,000+ 400) <u>7.50</u>		
4. Irrigation 35 times, each irrigation 15 hrs. @ Rs. 30 per hr. 35 x 15 x 30 included Labourers	2	15,910
5. Maintenance and protection labour @ Rs.80 per head+ Rs.1000	4	1,320
6. Miscellaneous Expenses (inclusive labourer)	2	<u>1,160</u>
Total		<u>1,01,190</u>

B. Generation of Income from Banana Crop**First year**

Cutting and Sales banana leaves Rs.
 30,000 leaves @ Re. 1 per leave 30,000

Second year

10,000 piece @ Rs.100 per piece 10,00,000
 Gross income 10, 30,000
Less: Total expenses 1, 19,920
 Net income 9, 10,080

The abstract of development of water-logged lands are given below:

ABSTRACT FOR WATER LOGGED LANDS

National Level

A. Investment		Rs.
a) Cost of reclamation	=5.300 m.ha x 11,930	= 6322.9 cr
b) Cost of farming operations	=5.30m.ha x 1,07,990	= 57734.7 cr
		= 63557.6 cr
B. Employment		
a) During Reclamation (constant)	= 107x8x5.300 m.ha	= 453.68cr. mhhrs
b) During farming operations (Recurring)	= 91x8x5.300 m.ha	= 385.94 cr mhhrs
Total man hours	= 1,586x5.300 m.ha	=840.6 cr mhhrs.
C. Net income		
Income per ha	= Rs. 9,10,080 x5.300mha	
a) In the first year	= 482342.4-63557.6	= Rs.418784.8 cr.
b) From the second year onwards	= 482342.4 -57234.7cr	= Rs.425107.7 cr.

State Level (Tamil Nadu)

A. Investment		Rs.
a) Cost of reclamation	= 0.013 m.ha x 11,930	= 15.50
b) Cost of farming operations	= 0.013 m.ha x 1,07,990	= 140.38
		155.88 cr
B. Employment		
a) During Reclamation (Constant)	=107x8x0.013mha	=1.11cr mhhrs
b) During farming operations (Recurring)	=91x8x0.013m.ha	=0.94 cr. mhhrs.
Total man hours	=1586 x 0.013	=2.06.cr.mhhrs.
C. Net income		
Income per ha	=Rs. 9,10,080 x 0.013	
a) In the first year	=1183.10-155.88	= Rs.102.72 cr
b) From the second year onwards	= 1183.10-140.38	=Rs.140.27 cr

The researcher wanted to know the level of income, which could be made out of reclamation of such a land. The income from casuarinas works out Rs.9, 10,080 per ha., leaving behind a net income of Rs. 102.72cr., in the first year and Rs. 104.27cr., from the second year

onwards. By way of projection, the statement includes the National level and the state level investment, employment and net income generation capacity of wastelands reclaimable under coastal sand dunes category. While the National investment on reclamation stands at

Rs. 63557.6 cr., the employment at 840.6.cr.mhrs and net income Rs.418784.8 cr., in the first year and Rs. 4,25107.7 cr. from the second year onwards. The state level figures projected are an investment of Rs. 158.88cr. Employment generated 2.06 cr. mhrs and net income Rs.102.72 cr., in the first year and Rs. 104.27cr. from the second year onwards.

Conclusion

However it could be realized the entire task of reclamation and development of wasteland in India is done on a sustainable basis, by the government and government sponsored agencies and programme So an attempt is made in this article that how far the government programme viz., IWDP is able to create an impact on the rest of the community at village level so as to make the entire exercise of wasteland development a reality.

References

Books

1. Ishwer C. Dhinagar. 1998. The Indian Economic-Environmental Policy. S. Chand and Sons, Daryaganj, New Delhi, p. 325.
2. Kothiah, P. 1995. Linking Self-help Groups with Banks. NABARD, Bombay, pp.32-33.
3. Kumar, L.L.S. et al. 1963. Agriculture in India. Government Agricultural College, Vol. 1 General, Coimbatore p.5.
4. Mamoria, C.B and Tripathi, B.B. 1989. Agricultural Problems of India. K.M. Agencies, New Delhi, p.77.
5. Moore W.G. 1971, A dictionary of Geography, Penguin Books, p.182.
6. Narayan. L.R.A., DP.Rao, and NC. Gautham. 1989. Wasteland Identification in India - Using Satellite Remote Sensing. National Remote Sensing Agency, Balanagar, Hyderabad.
7. Pareek, O.P, Sharma, B.D., Suneel - Sharma and Sharma, S. 1998. Wasteland Horticulture, NRC, for Arid Horticulture, Bikaner, Malhotra Publishing house, New Delhi.
8. Pareek, O.P., Sharma, B.D., Suneel Sharma and Sharma. S. 1998. Wasteland Horticulture–NRC. for Arid Horticulture, Bikaner, Malhotra Publishing house, New Delhi..
9. Powell, M.A. 1997. Land Restoration Through Waste Management. Department of Earth Science Biological and Geological Building, University of Western Ontario, Canada.
10. Pramod Singh. 1985. Problem of Wastelands and Forest Ecology in India, Ashish Publishing House, New Delhi.
11. Pramod Singh. 1985 Problem of Wastelands and Forest Ecology in India. Ashish Publishing House, New Delhi.
12. Pramod Singh. 1986. Problem of Wasteland and Forest Ecology in India. Ashish Publishing House, New Delhi, pp.184 - 186.
13. Prober T.G. 1986. New Life for Wasteland Planning Department. Gwent Country Council, The UK.
14. Ruddar Datt and K.P.M.Sundaram. 2002. Indian Economy. S.Chanth and Company, New Delhi.
15. Ram Prasad. 1988. Technology of Wastelands Development. Associated Publishing Company, New Delhi, p.85.
16. Sharma, R.D. 1992. Economics of Fuelwood Production in Wastelands. Concept Publishing Company, New Delhi.

17. Sharma, H.S. 1980. Ravine Erosion in India. Concept Publishing Company, New Delhi.
18. Sharma, R.D. 1992. Economics of Fuelwood Production in Wastelands, Concept Publishing Company, New Delhi.
19. Sharma, R.D. 1992. Economics of Fuelwood Production in Wastelands. Concept Publishing Company, A/15-16. Commercial Block, Mohan Garden, New Delhi, pp. 60-66.
20. Sharma, S.C. and Chaturvedi, R.B. 1989. Utilization of Wasteland for Sustainable Development in India. Concept Publishing Company, New Delhi, p.49.
21. Singh, A.M. and N.Burra. 1993. Women and Wastelands Development in India, Sage Publications, New Delhi.
22. Singh, A.M. and N.Burra. 1993. Women and Wastelands Development in India. Sage Publications, New Delhi.
23. Singh, M.B and Tewari, D.N., 1996. Agro forestry and Wasteland. Anmol Publication, 4374/4B, New Delhi, p.140.
24. Guidelines for Self-help Group. 1999. Tamil Nadu Corporation for Development of Women Limited Credit, Guindy, Chennai, p.1.
25. Vimal, A.P and Tyagi, P.D. 1986. Fuelwood from Wastelands. Yatan Publishers, New Delhi.
26. Vimal, A.P and Tyagi, P.D. 1986. Fuelwood from Wastelands, Yatan Publishers, New Delhi.
27. Yadav, H.R. 1990. Reclaiming Wastelands, Concept Publishing Company, New Delhi.
29. Bradshaw, A.D. 1989. Wasteland Management and Restoration in Western Europe, Department of Environmental and Evolutionary Biology University, Liver Pool, The U.K.
30. CAPART, November, 2001. Kurukshetra. New Delhi, p. 28.
31. Das, D.C. and R.N. Kaul. 1992. Greening wastelands through waste water, National Wasteland Development Board, New Delhi, 1992.
32. Ilangovan, D. K.Padhmanaban, and C. Anbalagan. 2002. Co-operative Perspective. Development of Wastelands on Co-operative Basis, Vol.37, No.2. Pune, pp. 14-18.
33. Lovraj Kumar. 1985. Significance of Wastelands Development in India Today. Winners and their Essays All India Essay Competition on Wastelands Development, SPWD, Secundrabad, p.15.
34. Narashimhan, B. 1994. Indian Farming. Information on Agriculture, Indian Council of Agricultural Research, Krishi Anisandhan Bhavan, Pusa, , Vol. 44(9) New Delhi, p.12.
35. Neha Parik. 1995. Significance of Wastelands Development. Birla Public School, Bombay, p.15.
36. Rashmi Nair. 1995. Greening of Wastelands. Rama Krishna Vidhyalaya School, Sainik Puri, Secundrabad, p.10.
37. The Chief, NGO Section. 2002. Department of Public Information, United Nations, New York, p.1.
38. The Hindu. July 2001. Major Wasteland Project, Chennai, p.1.
39. Wastelands News. 2000. Society for Promotion of Wasteland Development, New Delhi, p.1.

JOURNALS AND ARTICLES

28. Anbalagan, C. 2000. Kison World. Mound Road, Chennai, pp.13-15.

40. Padmanaban, K. 2001. Rural Energy Crisis in India – An Analytical Study of Demand for, Cost and Supply of Fuelwood in Tamil Nadu (Approved and Unpublished Ph.D. Thesis).
48. Sharma, S.C., et al. 1985. Utilization of Wastelands for Sustainable Development in India. Proceedings 23 of the National Seminar on Utilization of Wastelands for Suitable Development of India, p.115.

REPORTS

41. Annual Report. 1998. Government of India, Ministry of Rural Areas and Employment, Department of Rural Employment and Poverty Alleviation Rural Development, Wastelands Development, New Delhi, pp.127-128.
42. Hegde, N.H. 1998. Low Cost Technology for Afforestation on Wastelands. BAIF, Development Research Foundation, New Delhi.
43. Hegde, N.K. 1998. Low Cost Technology for Afforestation on Wastelands. BAIF, Development Research Foundation, New Delhi.
44. Indian Planning Commission. 1965. Survey and Reclamation of Ravines in India. Natural Resource Committee, Planning Commission, New Delhi.
45. Narayan, LRA., Rao, DP and Gautham, NC. 1989. Wasteland Identification in India - Using Satellite Remote Sensing. National Remote Sensing Agency, Balanagar, Hyderabad.
46. Report of the Working Group for Wastelands Development Sector in the Eight Five Year Plan, National Wastelands Development Board, Ministry of Environment and Forests, Government of India, New Delhi, 1989, pp.48-54.
47. Robert, G 1986. New Life for Wasteland, Planning Department, Gwent Country Council, The UK.