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Research Paper

Impact of north eastern region community resource management project for upland areas (NERCORMP) on overall socio-economic and livelihood status of farming communities in Assam, India

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ABSTRACT : Study was conducted in both the implementing districts *viz.*, Karbi Anglong and Dima Hasao of NERCORMP in Assam during 2014-15 by taking 204 respondents. Study revealed that for almost all the assets, respondents' possession percentage as well as average number asset per household remained higher in case of beneficiary respondents in comparison to non-beneficiary respondents. Because of the project intervention, overall area under crops like Panikheti, plantation crops, banana, orange, areca nut etc. increased significantly, whereas number of households practising 'Jhuming' as a viable livelihood management strategy declined. Among the beneficiary respondents, average income per household per year recorded much higher, as compared non-beneficiary respondents. Similarly, expenditure also remained more among the beneficiary respondents than non-beneficiary respondents. After intervention of NERCORMP, status of creation of assets *viz.*, human asset, physical asset, social asset and food security asset increased significantly that finally led to significant increase of overall asset position for respondent beneficiaries. Most of independent variables considered here maintained non-significant relationship with creation of any of the asset in the study area.

KEY WORDS : NERCORMP, Asset, Income, Expenditure, Impact

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INTRODUCTION :

North eastern region community resource management project for upland areas (NERCORMP), a livelihood and rural development project funded jointly by International Fund for Agricultural Development (IFAD) and North Eastern Council, Ministry of Development of North Eastern Region (DoNER), Government of India has appeared as a big intervention for improvement of livelihood in north eastern region of

India in the last part of 20th century. The project has been operational in six districts of three north eastern states since its' inception in 1999 *viz.*, (Karbi Anglong and Dima Hasao districts (old NC Hill) from Assam; West Khasi Hills and West Garo Hills districts from Meghalaya and Senapati and Ukhrul districts from Manipur) and is implementing by north eastern region community resource management society (NERCORMS) located at Shillong, Meghalaya as Regional Office and district level society in respective districts (Anonymous, 2011). At present, the project is in its third phase and extension of the programme has already been initiated in Arunachal Pradesh including three districts *viz.*, Tirap, Changlang, Longding and Manipur including two more districts *viz.*, Churachandpur and Chandel from 2014. The project adopts a holistic development approach with two broad focus areas - social mobilization and capacity building through various project activities. The overall objective of NERCORMP is to improve the livelihood of vulnerable groups in a sustainable manner through improved management of their resource base that would restore and protect the environment (Anonymous, 2011). Keeping in view all above it was decided to study the impact of NERCORMP on livelihood improvement considering both beneficiary and non-beneficiary respondents. In some cases, the status existed before project starts and the status after the project are compared to see the benefit of the project.

MATERIALS AND METHODS :

This is a Doctoral level research work carried out at Nagaland University, Nagaland. India. Study was conducted in both Karbi Anglong and Dima Hasao districts, the two implementing districts of NERCORMP in Assam. Both the districts have certain peculiarity so far the topography, climatic condition, socio-political structure etc. are concerned in Assam. Total 144 number of respondents as beneficiary of NERCORMP were selected randomly for final data collection from 32 self-help groups (SHGs) and 16 natural resource management groups (NaRMGs) (SHGs and NaRMGs are community based grass-root level organisations sponsored and constituted by the project) from both the districts. At the same time, 60 non-beneficiaries were also selected from both the district preferably from adjoining non-project villages that gave the total sample size 204. Primary data were collected through structured schedule during 2014-15 from all the sample respondents. In addition to simple percentage, frequency analysis, correlation analysis and t-test were used in order to get valid and logical conclusions. Further, indexes were also developed with appropriate scoring technique in order to study the asset/capital creation before and after the project. Asset/capital creation was studied based on six different aspects *viz.*, Human asset, Physical asset, Natural asset, Financial asset, Social asset, Food security asset and finally the overall asset creation (Dolli, 2006).

RESULTS AND DATA ANALYSIS :

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Types of household assets with their values available among the respondent households :

Availability of asset indicates an idea of socio-economic status of the households. Following Table 1 shows in details the various types of assets available with the respondents, number of availability of particular assets per households and percentage of households under different category of assets. It also indicated the value of the assets possessed by the respondents. In the state, after house (100% respondents with 2.21 number/household) most available household asset among the beneficiary respondents was mobile phone (93.8% of respondents with 1.6 number/household), followed by TV/VCD (51.4% respondents with 0.5 number/household), pig (48.6% with 1.9 numbers/household), any other (33.3% with 0.4 number/household), sprayer (33.3% with 0.3 number/household), cow/buffalo (25.0% with 0.9/household) etc. Similarly among the non-beneficiary respondents also, the most available asset was house (100% with average availability of 1.9 numbers per household, followed by mobile phone (90.0% with average number of 1 per household, pig (21.7% with average number of 0.7/household), cows/buffalo (15.0% with average number of 0.4 number per household etc. On an average approximate asset value per household among the beneficiary respondent recorded as Rs. 2.03 lakhs. The asset position in case of non-beneficiary respondents was not at par with beneficiary respondents, and average asset value per household recorded as Rs. 0.45 lakhs only. Jayachandra and Naidu (2006) also reported the increase in value of the asset by 15 per cent

Table 1 : Types of household assets with their values available among the respondent households

Particular/ category of respondents	House	Mobile phone	Radio	Tape	TV/VCD	Refrigerator	Bicycle	Sewing machine	Bike/scooter	Water pump	Four wheel	Power tiller	Tractor	Sprayer	Cow/bullocks	Buffalo	Pig	Any other	Total value	Average value
Beneficiary respondents																				
Units /household	2.21	1.56	0.15	0.03	0.54	0.03	0.16	0.24	0.22	0.02	0.07	0.01	0	0.34	0.88	0.49	1.90	0.39		
% of respondents possessed	100.00	93.80	14.60	3.50	51.4	3.50	15.90	23.60	21.50	2.10	6.90	0.69	0	33.30	25.00	3.50	48.60	33.30		
Values (Rs. in lakhs)	151.84	7.92	0.14	0.17	8.28	0.84	0.58	1.90	13.31	0.25	51.68	1.74	0.0	0.41	14.47	20.00	6.53	12.74	292.81	2.03
Non-beneficiary respondents																				
Units /household	1.87	1.03	0.08	0.05	0.1	0.07	0.05	0	0.05	0	0	0	0	0	0.35	0	0.70	0		
% of respondents	100	90.00	8.30	5.00	10.00	1.67	5.00	0	5.00	0	0	0	0	0	15.00	0	21.70	0		
Values (Rs. in lakhs)	19.68	1.01	0.04	0.06	0.49	0.08	0.08	0.00	1.15	0.00	0.00	0.00	0.00	0.00	3.57	0.00	0.58	0.00	26.73	0.45

in case of small and marginal farmers after working with dairy co-operatives. As among the beneficiary respondents there were some respondents from either Govt. or private sector that led to more improvement of asset position.

For almost all the assets, respondents' possession percentage was higher in case of beneficiary respondent in comparison to non-beneficiary respondents and in some cases percentage was much higher than non-beneficiary respondents. This was in conformity with results made by Sahu *et al.* (2012) in Surguja district of Chhattisgarh State. Similarly, average number of asset per household for all types of asset was found much higher in case of beneficiary respondents than non-beneficiary respondents.

Status of income distribution among the respondent:

Respondents were involved in a variety of income generating activities for their livelihood management. Even a particular respondent's household seemed to involve for a variety of income generating activities. In the state, among the beneficiary respondents all were seen to involve in agricultural activities for income generation (100%), followed by MFP (98.61%), NTFP (92.36%), Piggery (66.67%), business (55.56%), any other (48.83%), wage labour (42.36%) etc. Among the non-beneficiary respondents also, almost similar type of picture was reported *i.e.* 100 per cent respondent involved in agricultural activities for income generation, followed by 76.67 per cent in NTFP, 70 per cent in MFP, 48.33 per cent in wage labour, 38.33 per cent in business, 21.67 per cent in piggery etc. (Table 2).

It also shows the details of income from various sources by the respondent based on 12 months period. In the state among the beneficiary respondent, average income per household recorded as Rs. 1.60 lakhs against Rs.0.34 lakhs for non-beneficiaries. Any other category played the most significant role in increasing the income among the beneficiary respondents as it included some salaried persons either in government or private. Any other category contributed more than 33 per cent of total income in case beneficiary respondents, followed by agriculture (26.8%), business (10.25%), MFP (10.1%), NTFP (7.94%) etc. Again among the non-beneficiary more than 57 per cent income came from agricultural activities, followed by 15.4 per cent from business, 11.65 per cent from wage labourer, 7.85 per cent from form

MFP etc.

It can be concluded that average income per household among the non-beneficiaries recorded much lower than beneficiary respondent. Result was in conformity with the results of Hari and Kumawat (2006) in Rajasthan for Swarnajayanti Gram Swarojgar Yojana. Moreover, for them income from agricultural activities was proportionally much higher than any other sources. Again among the beneficiary respondent, as there were some members from service holder either in government or private sector, any other category outnumbered all other sources. On the other hand it was visible that income in the case of beneficiary respondent was distributed to more number of sources than non-beneficiary respondents.

Table 3 shows in brief the comparison of income by different heads among the beneficiary and non-beneficiary respondents at district level. In Karbi Anglong district, average income per year per household remained higher for all different sources in case of beneficiary respondents than non-beneficiary respondents. Not only that income in case beneficiary respondents remained significantly different (significant t-value at 1% level) than non-beneficiary respondents for all the sources. Similar the case in Dima Hasao district also excepting non-significant income difference between beneficiary and non-beneficiary respondents in case of wage labourer. Devi (1994) in Kerala reported that majority of IRDP beneficiaries experienced an increase in income by 10.15 per cent and a good section of beneficiaries experienced an increase in income by 50 to 100 per cent. Sharda *et*

Table 2 : Distribution of income from different sources among the respondents

Particulars	Agri.	NTFP	MFP	Wage labour	Piggery	Sericulture	Sale of egg	Business	Artisan	Sale of meet	Any other	Total
Beneficiary respondent												
% of respondent	100.00	92.36	98.61	42.36	66.67	9.03	2.78	55.56	4.86	4.17	45.83	
Total income (Rs. in lakh)	61.6	18.24	23.21	12.39	10.74	1.35	0.19	23.56	1.65	0.27	76.61	229.79
% to total income	26.8	7.94	10.1	5.39	4.67	0.59	0.08	10.25	0.72	0.12	33.34	100
Average income/household (Rs. in lakhs)	0.43	0.13	0.16	0.09	0.07	0.01	0.00	0.16	0.01	0.00	0.53	1.60
Non-beneficiary												
% of respondent	100.00	76.67	70.00	48.33	21.67	11.67	0.00	38.33	0.00	6.67	0.00	
Total income (Rs. in lakh)	11.94	0.56	1.63	2.41	0.52	0.25	0	3.19	0	0.2	0	20.69
% to total income	57.7	2.73	7.85	11.65	2.51	1.18	0	15.41	0	0.97	0	100
Average income/household (Rs. in lakhs)	0.20	0.01	0.03	0.04	0.01	0.00	0.00	0.05	0.00	0.00	0.00	0.34

NTFP – Non-timber forest product, MFP – Major forest product

Table 3: A comparison of income by different heads among the beneficiary and non beneficiary respondents at district level

(Rs. per year per household)

Heads	Karbi Anglong			Dima Hasao		
	Beneficiary (n=72)	Non-beneficiary (n=30)	t value	Beneficiary (n=72)	Non-beneficiary (n=30)	t value
Agriculture	32729	22533	3.89**	52611	17266	8.82**
NTFP	7616	1073	6.46**	11758	808	10.4**
Major forest products	7888	3366	4.25**	21994	2050	10.59**
Wage labourer	12833	4700	3.16**	4236	3333	0.63 NS
Piggery	4458	766	6.65**	10465	967	6.54**
Business	17791	5033	4.29**	14791	5600	2.35*
Total of all	122475	38140	8.53**	186801	30841	8.97**

* and ** indicate significance of values at P=0.05 and 0.01, respectively NS=Non-significant

al. (2005) were also in the opinion of increase in average annual income per family by 49 per cent through income generating activities in watershed. Similarly, Mavi *et al*. (2006) reported a significant increase of total income, dairy income, herd size after participating in a self-employment programme on dairy farming. Similar opinion was also made by Puhazhendi and Badatya (2002); Rais *et al.* (2007); Reddy (2001) and Singh *et al.* (2009).

Expenditure pattern among the respondents :

Expenditure is also an important indicator to justify one's socio-economic status. Hence, trial had been made here, to know the status of expenditure pattern in respect to both beneficiary and non-beneficiary respondents. Table 4 shows head wise summary of comparison of average expenditure per year per household among beneficiary and non-beneficiary respondents. In case of Karbi Anglong district expenditure remained higher for all the heads *viz.*, food, milk, education, fuel and electricity, health, cloths, transportation, religion, pan, tobacco etc. in case of beneficiary respondents than non-beneficiary respondents. Further t-statistics indicated significant difference (1% level) of average expenditure between beneficiary and non-beneficiary respondents for all the heads excepting expenditure made on milk (non- significant difference). In case of Dima Hasao, average expenditure made per year per household by beneficiary respondents for all the different heads remained significantly different from non-beneficiary respondents (1% level). Moreover, between the districts, Dima Hasao district comparatively recorded more expenditure in almost all the heads among the beneficiaries excepting fuel and electricity and transportation.

Status of changes of cropping pattern after the NERCORMP intervention :

After popularisation of NERCORMP in the districts and after exposure with various components of its, people in the project area were seen to change their cropping pattern in order to increase their income. The following Table 5 depicts the changes of cropping pattern among the beneficiary respondents after initiation of project activities. Shifting cultivation or 'Jhuming' was one of the major livelihood management activities among the people of both the hills districts of Assam and still it is practising like earlier time. In Karbi Anglong district, after initiation of NERCORMP project number of households practising 'Jhuming' as a livelihood management activity slightly declined to 98.6 per cent from 100 per cent before project starts. Of course area under 'Jhum' declined to 24.6 ha from 34.93 ha recorded just before the project starts activities. Whereas, number of households practising panikheti, plantation crops, banana, orange, areca nut etc. increased significantly after the project intervention. Accordingly area under crops also increased for all these types of crops in the districts. On an average in the district, area under different crops increased to 71.48 ha from 44.97 ha available just before the project starts. This increment of area was 58.94 per cent. Similarly in Dima Hasao district, number of households practising 'Jhuming' as viable livelihood management strategy declined to 94.4 per cent from 100 per cent recorded before project starts. However, area under 'Jhuming' in the district declined to 38.67 ha from 71.2 ha. Similarly, for all other products also percentage of households practising increased after the project. Overall in the district, area under crop increased to 145.6 ha after the project from 87.97 ha recorded before the project

Table 4 : A comparison of expenditure by different heads among the beneficiary and non – beneficiary respondents (Rs. per year per household)

Particulars	Karbi Anglong district		t value	Dima Hasao district		t -value
	Beneficiary (n=72)	Non- beneficiary (n=30)		Beneficiary (n=72)	Non beneficiary (n=30)	
Food	30854	19083	7.64**	37708	15133	11.54**
Milk	1430	1230	0.59 NS	1635	667	2.76**
Education	15909	4100	6.12**	31347	2483	8.00**
Fuel, electricity	2633	1120	9.09**	1934	733	7.53**
Health	7604	3183	7.54**	8792	2717	8.94**
Cloths	7548	2850	8.06**	11660	2817	9.86**
Transportation	3444	937	7.20**	843	403	2.04*
Religion	5479	970	10.0**	9292	1347	12.66**
Pan, tobacco etc.	1942	997	4.55**	5653	1327	7.64**

* and ** indicate significance of values at P=0.05 and 0.01, respectively NS=Non- significant

starts its activity and this increment percentage was 65.52 per cent, higher than the Karbi Anglong district (58.94%). Singh *et al.* (2010) also reported changes on land use pattern and cropping pattern because of intervention of watershed development programme in India.

Impact of NERCORMP on asset/capital creation :

Impact of NERCORMP was studied more specifically by considering 6 different types assets/capital that are acquired by the respondents. The six different types of assets that were considered in the present study are human asset, physical asset, social asset, natural asset, financial asset and food security asset and on the basis of this finally overall asset creation was studied. The following Table 6 depicts the status of asset creation by the respondents before and after project intervention based on the scores developed for that. In case of Karbi Anglong district, human asset before project starts stood at 53.5 per cent that increased to 72.9 per cent after the project intervention with t-value of 50.6 that was significant at 1 per cent level. Similarly, physical asset, natural asset, social asset, food security asset and over all asset also increased after the project. However, financial asset creation was found negative after the project (65.9% before project starts to 59.9% after project intervention). As financial asset includes two different components *viz.*, saving and debt of the respondents together, financial asset creation became negative. In one way saving increased in case of most of the respondents after intervention of project and in the other way debt decreased (positive in nature), that resulted a negative impact on financial asset. In case of Dima Hasao district, creation of human asset, physical asset, social asset, food security asset and overall asset reflects more after intervention of NERCORMP activities as compared to the availability of asset before project starts during 1998, all of these increments were significant at 1 per cent level. So far natural asset is concerned, before project starts it was 52.9 per cent that increased to 53.8 per cent but it was not significant. And in case of financial asset creation, it showed the same trend as that of Karbi Anglong district.

It can be concluded that after intervention of NERCORMP, status of creation of asset *viz.*, human asset, physical asset, social asset and food security asset increased significantly that finally led to significant increase of overall asset position for respondent beneficiaries. In the similar line Biradar *et al.* (2011) also reported the increase in overall capital acquisition index in Bellary and Bijapur districts of Karnataka in Karnataka Watershed Development project beneficiaries that was significant at 1 per cent level. Dolli (2006) in Karnataka reported

Table 5 : Status of change of cropping pattern among the beneficiary respondents at district level

Name of the crop	Karbi Anglong district				Dima Hasao district			
	No. of household practised		Area under crops (ha)		No. of household practised		Area under crops (ha)	
	Before	After	Before	After	Before	After	Before	After
Jhum (Rice)	72 (100.0)	71 (98.6)	34.93	24.6	72 (100.0)	68 (94.4)	71.2	38.67
Pani kheti	15 (20.8)	55 (76.4)	2.27	11.07	17 (23.6)	49 (68.1)	2.4	25.47
Plantation	31 (43.1)	67 (93.1)	3.03	14.47	25 (34.7)	54 (75.0)	2.87	15.8
Banana	0 (0.00)	29 (40.1)	0	1.67	24 (33.3)	41 (56.9)	2.07	7.5
Orange	7 (9.7)	35 (48.6)	0.43	2.68	6 (8.3)	32 (44.4)	0.53	5
Litchi	4 (5.6)	15 (20.8)	0.23	1.1	7 (9.7)	15 (20.8)	0.6	2.53
Vegetable	55 (76.4)	65 (90.3)	2.61	4.83	42 (58.3)	62 (86.1)	3.57	7.8
Arecanut	8 (11.1)	29 (40.3)	0.53	2.1	21 (29.2)	40 (55.6)	2	6.7
Zongta	14 (19.4)	41 (56.9)	0.63	2.63	21 (29.2)	46 (63.9)	1.2	5.77
Mulberry	0 (0.0)	3 (4.2)	0	0.43	2 (2.8)	3 (4.2)	0.27	0.93
Ginger	8 (11.1)	49 (68.1)	0.3	3.17	16 (22.2)	42 (58.3)	1.27	3.4
Gameri	0 (0.0)	24 (33.3)	0	1.8	0 (0.0)	35 (48.6)	0	10.57
Pine	0	5 (6.9)	0	0.93	0 (0.0)	12 (16.7)	0	15.47
Total			44.97	71.48			87.97	145.6
Percentage increase of area after the project				58.94				65.52

Figures in parentheses indicate per cent to total

Table 6 : Impact of NERCORMP on creation of different types of assets

Name of district		Different types of asset (index %)																					
		Human asset			Physical asset			Natural asset			Social asset			Financial asset			Food security asset			Overall asset		
		Before	After	t-value	Before	After	t-value	Before	After	t-value	Before	After	t-value	Before	After	t-value	Before	After	t-value	Before	After	t-value
Karbi	Mean	53.5	72.9	50.6**	51.6	56.8	3.9**	52.6	53.6	0.88^{ns}	53.2	73.3	27.2**	65.9	59.9	-6.9**	52.0	60.1	10.3**	54.9	64.5	26.8**
Anglong	SEM	0.23	0.41		0.33	1.2		0.34	0.92		0.37	0.59		0.98	0.46		0.39	0.65		0.31	0.24	
Dima	Mean	52.8	71.8	33.8**	51.9	56.6	3.4**	52.9	53.8	0.375^{ns}	52.8	72.2	31.4**	64.6	59.5	-6.67**	52.5	58.4	6.89**	54.6	63.9	30.9**
Hasao	SEM	0.23	0.64		0.39	1.36		0.39	0.96		0.29	0.53		0.85	0.48		0.39	0.74		0.33	0.19	

** indicate significance of value at P=0.05 NS= Non-significant

Table 7 : Association of independent variables with asset creation at district level

Independent variables	Co-efficient of correlation (r) with types of asset													
	Human asset		Physical asset		Natural asset		Social asset		Financial asset		Food security asset		Overall asset	
	KA	DHD	KA	DHD	KA	DHD	KA	DHD	KA	DHD	KA	DHD	KA	DHD
Age	0.228^{NS}	0.348**	0.197^{NS}	0.241*	0.050^{NS}	0.287*	0.092^{NS}	0.032^{NS}	0.016^{NS}	0.031^{NS}	0.133^{NS}	0.058^{NS}	0.280*	0.428**
Marital status	0.044^{NS}	0.306**	0.007^{NS}	-0.081^{NS}	-0.105^{NS}	0.030^{NS}	-0.013^{NS}	-0.147^{NS}	0.017^{NS}	0.051^{NS}	-0.056^{NS}	-0.105^{NS}	-0.051^{NS}	-0.007^{NS}
Family type	0.015^{NS}	0.001^{NS}	-0.057^{NS}	-0.219^{NS}	-0.075^{NS}	0.098^{NS}	0.092^{NS}	0.258*	-0.116^{NS}	-0.069^{NS}	0.027^{NS}	0.122^{NS}	-0.058^{NS}	-0.004^{NS}
Occupation	-0.079^{NS}	-0.208^{NS}	0.004^{NS}	0.107^{NS}	-0.139^{NS}	-0.143^{NS}	-0.044^{NS}	-0.266*	-0.003^{NS}	0.049^{NS}	0.181^{NS}	0.142^{NS}	-0.033^{NS}	-0.066^{NS}
Land holding	-0.137^{NS}	0.027^{NS}	0.040^{NS}	-0.137^{NS}	0.003^{NS}	0.148^{NS}	-0.090^{NS}	-0.071^{NS}	0.103^{NS}	0.125^{NS}	0.031^{NS}	0.154^{NS}	0.000^{NS}	0.052^{NS}
Respondent's education	0.094^{NS}	-0.206^{NS}	0.092^{NS}	0.242*	0.150^{NS}	-0.187^{NS}	0.059^{NS}	0.097^{NS}	0.077^{NS}	0.049^{NS}	0.081^{NS}	-0.017^{NS}	0.212^{NS}	0.038^{NS}
House type	0.079^{NS}	0.035^{NS}	0.052^{NS}	0.349**	0.225^{NS}	0.116^{NS}	0.053^{NS}	-0.043^{NS}	0.060^{NS}	-0.031^{NS}	0.059^{NS}	-0.046^{NS}	0.205^{NS}	0.255*
Income	0.112^{NS}	0.167^{NS}	0.159^{NS}	0.246*	0.269*	0.449**	-0.007^{NS}	-0.023^{NS}	0.070^{NS}	0.048^{NS}	0.017^{NS}	0.053^{NS}	0.272*	0.439**
Expenditure	0.042^{NS}	0.054^{NS}	0.101^{NS}	0.152^{NS}	0.153^{NS}	0.253*	-0.016^{NS}	-0.038^{NS}	0.108^{NS}	0.093^{NS}	-0.008^{NS}	0.009^{NS}	0.162^{NS}	0.245*
Training attended	0.173^{NS}	0.118^{NS}	0.148^{NS}	0.085^{NS}	0.070^{NS}	-0.056^{NS}	0.097^{NS}	-0.101^{NS}	0.162^{NS}	-0.016^{NS}	0.205^{NS}	0.038^{NS}	0.304**	0.049^{NS}
Status of respondent	-0.081^{NS}	-0.047^{NS}	-0.111^{NS}	-0.032^{NS}	0.243*	0.375**	0.200^{NS}	0.126^{NS}	0.224^{NS}	0.298*	0.205^{NS}	0.187^{NS}	0.196^{NS}	0.301*

* and ** indicate significance of values at P=0.05 and 0.01, respectively NS=Non-significant; KA- Karbi Anglong district, DHD- Dima Hasao district

that the overall impact of the watershed development project on various aspects of livelihood was positive and highly significant in all the categories of the respondents belonged to both SHG and Non SHG. The overall score values were higher in SHG group than the non SHG members. The data clearly brought out the fact that the natural resource management had positive and significant impact on the various assets status such as human, physical, natural, social, financial and food security leading in to sustainable livelihood of the rural families irrespective of the size of the villages. Swain (2015) was also in the opinion on the same line.

Association of independent variables with asset creation :

A correlation analysis was done to see the association ship between independent variables *viz.*, age, marital status, family type, occupation, land holding, educational qualification of the respondents, house type, income, expenditure, training attended and status of respondent with dependent variable asset creation. Table 7 indicates the correlation co-efficient values (r) to show the relationship of the above independent variables with asset creation in Karbi Anglong and Dima Hasao districts. In Karbi Anglong district, it indicated that most of the independent variables considered here had maintained non-significant relationship with almost all the six types of assets and in some cases it was even negative. This was in similar to the results made by Biradar *et al*. (2011) and Dolli (2006) in Karnataka. Age had positive relationship with creation of all types of assets, which finally led to significant increase of overall asset. Similarly, respondent's income, training attended, status of respondent had also shown some positive as well as significant relationship with creation of some of the assets, that helped in significant increase of overall asset. Otherwise other variables had shown some positive but non-significant as well as negative relationship with creation of assets.

In Dima Hasao district the picture was found comparatively better than Karbi Anglong district. Almost all the independent variables had maintained positive and significant relationship with creation of any one or more types of assets. Age had positive and significant relationship with creation of human, physical and natural asset, which led to significant increase of overall asset position. Similarly, marital status had significant positive relation with human asset creation, family type had significant positive relation with social asset creation, respondent education had significant positive relation with physical asset creation, house type had positive significant relation with physical and overall asset creation, income had positive significant relation with physical, natural and overall asset creation, expenditure had positive and significant relation with natural and overall asset creation and category of respondent had positive and significant relation with natural, financial and overall asset creation.

Conclusion :

For almost all the assets, respondents' possession percentage was higher in case of beneficiary respondent in comparison to non-beneficiary respondents and in some cases percentage was much higher than non-beneficiary respondents. Average income per household among the non beneficiaries recorded much lower than beneficiary respondent. Further t-statistics indicated significant difference of average income and expenditure between beneficiary and non-beneficiary respondents for all the heads excepting few. After intervention of NERCORMP, status of creation of asset *viz.*, human asset, physical asset, social asset and food security asset increased significantly that finally led to significant increase of overall asset position for respondent beneficiaries.

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LITERATURE CITED :

Anonymous (2011). *Sustainable development in the North East India* – A Case of NERCORMP documentation of best practice, December 2011, OneWorld Foundation India.

Biradar, B. N., Manjunath, L. and Yadav, V. S. (2011). Impact of income generating activities on rural livelihoods of KAWAD project beneficiaries.) *Agric. Update*, **6**(3&4): 182 - 184.

Devi, K. R. L. (1994). Employment and income generation in rural women. *Yojana,* **38** (5): 25 – 26.

Dolli, S.S. (2006). Sustainability of natural resource management in watershed development project Ph.D. Thesis, University of Agricultural Sciences, Dharwad, Bangalore, KARNATAKA (INDIA).

Hari, S. and Kumawat, R.C. (2006). Impact of swarnjayanti gram swarojgar yojana (SGSY) in Jhunijhuna (Rajasthan). *Rural India*, **69**(8-9): 164-168.

Jayachandra, K. and Naidu, Gurappa (2006). Impact of dairy cooperatives on income, employment and creation of assets of marginal and small farmers- A case study. *Indian Cooperative Rev.*, **43**(4): 719-724.

Mavi, K.S., Chauhan, J.P.S. and Das, B.C. (2006). Impact of self- employment programme on dairy farming. *Rural India*, **70** (3): 47-49.

Puhazhendi, V. and Badatya, K.C. (2002): SHG-bank linkage programme for rural poor- An impact assessment. Paper presented at the seminar on SHG-Bank Linkage Programme at New Delhi, on 25th – 26th Nov., NABARD.

Rais, Uddin Mian, Jamatul, Fatema and Habibur, Rahman (2007). Impact of dairy farming on livelihood of participating women under Grameen Bank in a selected area of Rangpur district in Bangladesh. *Indian J. Agric. Econ.*, **62**(2): 259-271.

Reddy, V. R. (2001). Watershed development and livelihood security: An assessment of linkage and impact project report centre for economic and social studies, Hyderabad (A.P.) INDIA.

Sahu, B. P., Chaturvedi, M. K. and Yadaw, K. N. (2012). Analysis of socio-economic profile of the ATMA beneficiaries of Chhattisgarh. *J. Plant Develop. Sci.*, **4** (2) : 207-213.

Sharda, V. N., Samara, J. S. and Dogra, Pardeep (2005). Participatory watershed management programmes for sustainable development: Experiences from IWDP. *Indian J. Soil Conserv.*, **33** (2) : 93-103.

Singh, K.M., Meena, M.S. and Jha, A.K. (2009). Impact assessment of agricultural extension reforms in Bihar. *Indian Res. J. Extn. Edu.*, **9** (2) : 110-114.

Singh, P., Behera, H.C. and Singh, A. (2010). Impact and Effectiveness of Watershed Development Programmes in India (Review and Analysis Based on the Studies Conducted by various Government Agencies and Other Organisations), A Report of Centre for Rural Studies, National Institute of Administrative Research, Lal Bahadur Shastri National Academy of Administration, Mussoorie.

Swain, S. K. (2015). Impact of poverty alleviation programmes on socio-economic development of rural poor of Odisha – A Statistical Analysis. *J. Rural Develop.*, **34**(2) :187-213.