



Common Property Resources, Forest Extraction and Livelihood: An Insight to WSHG Entrepreneurs of tribal Odisha

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Abstract

The ownership of common property resources was always in conflict within community and community vs government. Definition about common property resources are advanced on the mainly upon their priority, visibility, accessibility and understanding. Further, its broad classification includes harvesting, extraction and natural production. The nature of dependency among Common Property Resources (CPRs) and Private Property Resources (PPRs) follows higher exploitation with initial compared to the later. The present study is carried out in Tribal dominated district of Odisha, India i.e. *Mayurbhanj* through stratified and multi-stage random sampling to answer how important are CPRs for tribal across *Mayurbhanj* and their dependency upon types of resources with utilisation and limitation. The assessment of LDI (Livelihood Dependency Index) reveals higher dependency of sample respondents of *Mayurbhanj* upon CPRs for livelihood continuation even after having an average membership in Self Help Group programme from last seven years. There exist massive need of making diversified occupation adjustment especially for population residing nearby forestlike engagement in transport of forest items, maintenance, local auction, daily wage based leaf collection and storage for government auction, maintenance and engaging women members in manufacturing of CPR based items.



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Common Property Resources (CPR) – a term closely associated with tribes and their survival but broadly covers access by different community/section of population residing nearby. The ownership of

common property resources was always in conflict within community and community vs government. Several studies given different definition about common property resources based on their priority,

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visibility, accessibility and understanding. Millions of people across the world depend upon common property resources such as forest, pastures, wasteland, grazing land, water resources and idle lands for livelihood and self-consumption. Geographically, the controversy over access, ownership and control of these resources varies and shown serious outcomes. Dasgupta⁴ rightly noted through Gordon article on *'The Economic Theory of Common-Property Resources'* that "an asset that is everyone's property is in fact no one's property". Various common property resources and their access are classified broadly under categories land, water and mineral resources.

The common property resources are renewable and are not produced but extensively harvested. Further, its broad classification includes harvesting, extraction and natural production. A large section of population belonging to marginal and lower income groups are extensively dependent upon common property resources especially land of different varieties. Kumar⁹ through his study on Hiware of Maharashtra also finds increase in income and employment through community driven CPRs. Further, his study also finds increase in dependency upon CPR due to failure of other employment sources like crop failure due to water scarcity and increasing illicit activities. The availability of land and its use varies according to geographical existence, environment and demand. These associated factors significantly affect the availability and extraction of public goods (generally termed as common property resources). Similarly asserted most environmental issues and degradation are associated by virtue of incomplete, inconsistent and insecure property rights ignoring value, efficiency and sustainability¹⁰ Since, the principles of excludability is not applicable as that of public goods resultant in depletion and exploitation. The war for ownership having direct access and control resultant massive degradation of resources with serious ecological repercussions. Failure of responsible institutions (governments) to preserve common property resources and suggested the community participation with reinforcing the existing structures of authority. Several managerial aspects are associated with CPR having behavioural, economic and environmental repercussions³

The distinction about performance and methods of application vary between CPR and PPR

(Private Property Resources) due to the behavioural aspects. Further, major contributory factors are limited access duration and limitation of quantity and quality. Even the nature of relationship between CPR and PPR follows different patterns of development³ There exist massive pressure and serious consequences by population growth on common property resources of developing countries⁸. These exploitations in natural/available resources is found to be higher in case of CPR as compared to PPR. Some Policy makers finds CPR as a crucial element for poor in general and women in particular² Even access to CPRs by locals are diminishing with increase in population and interference of outsiders. The present study is carried out in Tribal dominated district of Odisha i.e. Mayurbhanj. Some of the questions at the beginning of the study which we answer in this article were: how important are CPRs for tribal across Mayurbhanj, dependency upon types of resources with utilisation with limitation and what can be done for this? This paper organised as follows: section I elaborates the CPRs position in India, Section II provides methodology for our Mayurbhanj study and section III findings of the study and section IV conclusion.

CPRs in India

CPR add some US \$5 billion a year to the incomes of poor rural households in India which is 2.5 times higher than world bank lending in 1996. Further, CPR has proven a major means of supporting households of dry regions of India through providing substitute gainful employment, income generation and asset accumulation⁸ CPRs contribution in eastern region which comprises three agricultural dominant states (Bihar, West Bengal and Odisha) and one minerals reservoir (Jharkhand) cannot be denied. The study on five districts of West Bengal (Burdwan, Purulia, Birbhum, Jalpaiguri and 24 parganas) finds greater dependency on CPRs due to less agricultural intensification in selected villages with women participation of 70 – 78 percent. The landless households and small and marginal farmers from villages of Keonjhar district of Odisha are dependent upon CPRs for fuelwood and fodder requirements¹⁵

The CPRs related to forest extraction suffers a lot compared to others in gamut. The dependency of population residing nearby forest for livelihood and self-consumption cannot be overlooked.

Different communities are engaged in varieties of businesses related to forest products in almost all states of North-east, West Bengal, Jharkhand, Odisha, Chhattisgarh, Maharashtra, Andhra Pradesh, Uttarakhand, Himachal Pradesh, Jammu and Kashmir, Karnataka and Kerala. Further, their areas under forest cover are also higher compared to other states of India. Higher concentration of tribal (20 percent and more of total population) exist in all states of North-east (except Assam) and Chhattisgarh, Jharkhand, Odisha and Madhya Pradesh¹⁷

The common problems with CPR in developing countries are over access/extraction, over wastage, mismanagement and inefficient execution/implementation of the related laws. Management of rights to access CPR creates both villain as well as victim and thus suggests allocation of access rights quotas with duration¹ Even active participation of state as external agency to regulate the commons to restrict over exploitation⁶

Literature Review

Common property resources in developing countries are continued being a significant component of the land base of rural communities contributing to the production and consumption needs of rural community⁸ A study on field based Rural common property resources – contribution and crisis in dry and tropical regions of India found 84 to 100 percent dependency on CPR for food, fuel and fodder items. The rapidly declining CPR depends upon the needs and capacity of individual and their adaptive capacities. Further, there exist nexus between CPR and poverty as poor depends heavily upon natural resources for livelihood security. The non-timber forest products in Chhattisgarh through policy interventions like JFM (Joint forest Management) and PPA (network of Peoples Protected Area) have developed collection, processing, storage and marketing operations of tendu leaves⁵ Income from CPR in Odisha (study made in four villages of Keonjhar district during 2012-13) is higher among non-poor households (Rs. 5276) as compared to poor (BPL) households (Rs. 3655)¹⁵ Though the dependency for fodder and fuelwood is higher with BPL as compared to non-BPL households and both factors continued as significant reasons of resource

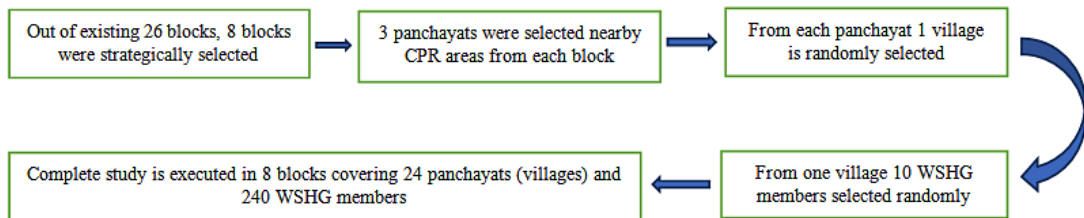
depletion. Further, the other root causes of depletion of CPR in coastal regions of Odisha are privatisation and illegal occupation.¹⁴ The role of community participation in CPR of Hiware bazar village of Maharashtra has increased employment and income. Even the impact of community participation, institutional arrangement and management are essential ingredients for sustainable development.⁹

Methodology and Sample Selection

The selection of samples are done keeping in view the desired concentration of our study i.e. the SHG members and their dependency on CPRs. The households (SHG members) have been selected randomly keeping in view the possibility of availability of CPRs in their nearby region. The economy of Mayurbhanj is mostly dependent upon agriculture along with minerals and biosphere reserves. The Simlipal national forest (Park) covering a vast area of 2750 sq.km. and 303 sq. km. of core area holds tall sal trees in large number. The present paper will analyse the importance of these items along with other CPRs available in the region in promoting livelihood. Specification about the existing infrastructure, methods of preparation, duration and their availability will be analysed. The study had covered the following blocks keeping into consideration the ST concentration, CPRs availability, BPL composition and SHGs functioning.^{12,19}

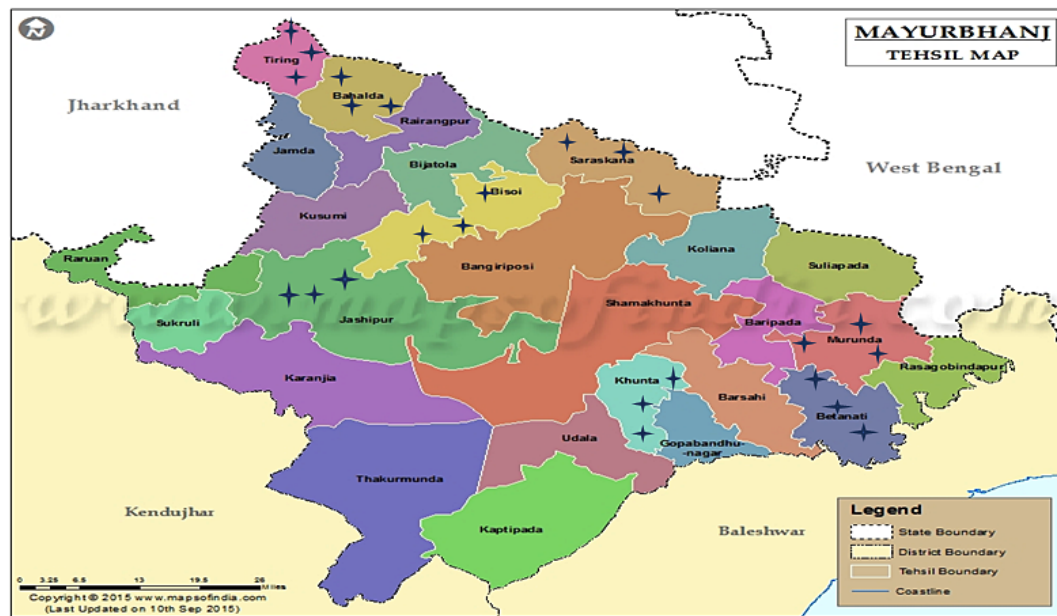
The sample households selected for our study is depicted in fig.1.

The intensive structural study shows less density of ST population in blocks situated near district headquarter (i.e. Baripada) whereas increases with increase in the distance and are more concentrated near forest and minerals hub. Mayurbhanj is endorsed with several natural and mineral resources (stone casting) and is famous for money plant (also known as sabai grass and golden grass) and sal leaf bowl and plates. Many economists observed open access to resources are overused because of the common interest i.e. use. Criticising only one section for exploitation of CPR cannot be justifiable. The institutions also have to also play a leading role in sustainability of CPR through proper management and information dissemination.⁴



Criteria for selection of samples

- *Blocks were selected depending upon the available common property resources in region and their accessibility for individual.
- ** A separate distinction is also made based on geographical distance from district headquarter to analyse the dependency on CPR.
- ***WSHGmember selection represent each household (selection of multiple members from each household is avoided).



Selected Blocks	Type of CPR(Maximum dependency)
Bisoi, Jashipur, Betnoti	Forest resources
Saraskana, GB Nagar, Bangiriposi, Khunta	Pastures, arid land and Common productive land
Tiring	Minerals
+ represents the selected villages (indicative and not to scale)	

Fig. 1: Methodology for selection of sample Households

Our study is confined to the utilisation of forest products, arid land and pastures by the tribal communities in Mayurbhanj district of Odisha.

About Mayurbhanj and Their Tribes

Odisha is the tribal dominated state of India having largest number (62) of tribes. Similarly, Mayurbhanj is one of the tribal dominated district in Odisha (tribal population 56.6 percent) with poor socio-economic status (Rank 23rd out of 30 districts).

Mayurbhanj is a home of 30 inhabiting tribes majorly Santhal (largest tribe in district), Kolha, Munda, Gond, Bathudi, Bhumij, Saunti, Hill Kharia, Mahali, Mankirdia, Lodha, Kol, Holva, Baigha and Kisan. The tribals are inhabiting (concentration) mostly in Udala, Khunta, Bijatola, Baripada and Jamda blocks (tribal population between 70 – 80 percent). According to Tribes of Odisha at Glance (2008), the literacy rate of ST’s of the district was 38 percent against 47 percent of district. Further, they are

majorly engaged as daily labour, agriculture, forest dwellers, fishing, bamboo work and hunting.¹⁹

Period of Study

The visit to study area was carried out during February-May 2013. This season is suitable for CPR related study as other means of employment such as farming etc. are less due to dependency on rain water harvesting throughout the region.

Sample Profile

Out of 240 respondents selected from 37 WSHGs, 50 percent are ST followed by OBC (18 percent), SC (18 Percent) and General (14 percent). The respondents were largely Hindus (97 percent) and rest Christian. The average duration of membership of sample respondents in SHG programme is 7 years (with median 7 years) with standard deviation 2.5.

Survey Findings and Discussion

The findings and discussion section is broadly divided into five categories specifying the socio-economic status, sources of Employment and Income, availability of CPR and its contribution, WSHG programme impact on CPR and finally livelihood analysis.

Section I: Socio-Economic Status of Respondents

The socio-economic position constitute an important element in determining the access, utilisation and status of CPRs of that region. Listed among the 50 most backward districts of India (564 rank and 4th most backward district in state), Mayurbhanj economic status and dependency on CPRs can be visualised.²⁰ The study covers 29 President, 30 Secretary and 181 members and thus comprise all stakeholders of different promoting agencies (88.5 percent WSHGs are promoted by various government agencies and 12.5 percent by NGOs). Out of the selected samples 85 percent are from BPL category while rest 15 percent are non-BPL (cannot be considered as APL category as maximum are poor but does not hold BPL card). Further, 47.5 percent of WSHG respondents never went to schools and are illiterate while 22 percent sample members have studied upto class 5 and 29 percent between class 6 – 10. The age-wise composition shows highest enrolment of lower (46 percent) and middle age group (52 percent) women into programme

and thus are dependent upon local CPRs for livelihood. All dependent member of families of WSHG respondents (exclusively children's of 3 - 15 years) are literate. The average age of selected respondents is 37 years with standard deviation 9.9 (median age 36 years and mode value 30).

The caste-wise distribution shows highest proportion of illiterate samples from ST community (58 percent) followed by SC (46 percent). The designation-wise analysis found higher concentration of illiterate members (56 percent) compared to secretary and president. This may be common for SHGs throughout India as the group members and promoting agencies tries to select only those as leaders (president, secretary/treasurer) who completed higher formal education. Further, the economic-status classification also shows significant differences in literacy of respondents i.e. higher illiteracy among BPL members compared to Non-BPL members ($t_{5,1466} = 3.603 < 0.01$ percent).

Section II: Sources of Employment and Income

The study found engagement of WSHG members in to different activities simultaneously. Depending upon the regularity in employment/income and investments, the activities are broadly classified into three categories i.e. main occupation, subsidiary occupation and group occupation. Since the women members have to carry out family business/activities in active mode (if any) and thus are placed into main occupation followed by subsidiary occupation (having linkage with main occupation) and finally SHG financed occupation i.e. group occupation. Our study is limited to main and Group related occupation as data shows over-lapping of activities.

The study (as shown in table 1) found the sample respondents engagement in farming including marginal and small farmers (61 percent) followed by daily labour and other activities such as Asha workers, ICDS worker and helpers, hotel, petty shop, snack and other items production. The employment duration per month is found to be highest in case of others category along with higher income (compared to other available major activities). The average income from engagement as daily labour is higher compared to return from average man day employment

Table 1: Occupation wise Monthly Average Employment & Income of Respondents

Main Activity			
Activity	Percentage	Emp. Days	Income (INR)
No activity	3	0	0
Daily labour	16	5	448
Farming	61	8	431
Others*	16	13	853
*includes service, shop, hotel, family business, ice-cream making etc.			
Group Activity			
Activity	Percentage	Emp. Days	Income (INR)
CPR related	74	13	848
Non – CPR related	26	14	927
CPR Activities Description			
Animal Husbandry	35	11	778
Sabai Grass	9	16	875
Sal Leaf	40	17	956
Wood/bush	11	12	865
Other forest items	3	4	340
Minerals	2	7	500

Source: Primary data (2013)

The dependency of WSHG members on CPR related activities in the study area is found to be higher (serving more than 74 percent of households under study).

Section III: CPR Activities Status and Access in Mayurbhanj

The CPR access by WSHGs in Mayurbhanj is restricted to following activities.

Forest Dependency and Extraction

The major CPR dependent occupation in Mayurbhanj is Sal leaf business which also includes its several associated businesses (study restricted to collection and processing). Orissa stands as the third largest producer of Sal (kendu) leaf with annual production capacity of more than 5 lakh tonnes (next to Madhya Pradesh and Chhattisgarh). Thissal (kendu) leaf and its associated businesses are extended over 8 tribal dominated districts of Odisha with Mayurbhanj as the largest producer. The collection and processing stages are classified under

i. Stage I: Individual only collecting and selling raw sal leaf,

ii. Stage II: Individual collecting, drying and making casual stitching with small sticks (coconut/bamboo), and

iii. Stage III: Individual collecting/purchasing raw sal leaf, drying and machine stitching.

As the level of effort increases, the income of the respondents are also found to be higher. Further, many respondents reported diversification of business are done keeping in view the local competition/restriction, infrastructure and holding capacity. The engagement of respondents in the third (45 percent) and second category (38 percent) is found to be highest (because of monetary assistance through SHG programme). The caste-wise analysis shows 58 percent of tribals are associated with sal leaf business. Further, it generates on an average an employment around 17 days and income of Rs. 986 (with median employment 17 days and income Rs. 750).

The dependency of the backward and marginalised section of Odisha on sal (kendu) leaf for survival.¹¹ The deregulation of kedu leaves business (2013) provides negative impact Nabarangpur Kendu

Table 2: Sal leaf Collection and Utilisation

Stages	Engagement	Utilisation of Sal leaves in Kg/day	Average Employment Days	Remark
Stage 1	Only collection and selling	2 – 4	12	Engaged self with small family members
Stage 2	Collection, drying and casual stitching	3 – 5	16	Engaged self with old age family members
Stage 3	Collecting/purchasing, drying and machine stitching	7– 12	22	Engaged self with skilled family members + renting machine on hour basis.

Source: Interaction with sal leaves pluckers, panchayat samity and Distributors (2013).

leaf division. Though the pluckers were given an opportunity to sell their collection at open market but the confusion and chaos created both resources and financial damage. In Mayurbhanj rare cases of conflict relating to legal status and rights being reported. The average collection/utilisation of leaves varies with type of engagement as defined in table 2.

Further, the segmentation of market is done keeping in view their position, capacity, future contract and repayment schedule. The intensive analysis found for the stage 1 and stage 2 sellers are confined to local market i.e. local haat, stage 3 processed manufacturers, snacks shop etc. while the stage 3 sellers sell their final products (especially normal flat plates, high quality processed plates, cone and bowl) at regional and national market through distributors. After the process of drying, on an average 7 fine quality leaves are required to make single high quality plate and 2 – 5 leaves (depending upon size) for bowl and cone. These sal leaf cone and bowl are extensively utilised for serving morning and evening snacks and thus possess higher demand throughout Odisha. In Mayurbhanj, the stage 1 producers usually collect 800 – 1200 leaves per day depending upon season, capacity to store and local demand and produce 100 – 120 standard quality flat plates and 40 – 60 medium quality plates.

Sal (Kendua) Leaf Business in Odisha and Mayurbhanj

According to Census 2001, a total of 28,777 villages of Odisha share forestland within village

boundaries (against 30973 in 1991). Kendua/Sal leaf trade is nationalised in Odisha under “The Scheduled Tribe and Other Traditional Forest Dwellers Act 2006” FRA (recognition of Forest Rights) to eliminate private traders and reduce exploitation of pluckers (recognised as Community Forest Resources - CFR). Odisha produces 20 percent of India’s total kendua leaves production and is the only state to have monopoly in production of processed leaves. It is managed by forest department in association with OFDC (Odisha Forest Development Corporation) as commission agent thereby making contribution to 80 percent of forest income. In 2011 – 12, it was estimated 7.8 lakh (registered cardholder) pluckers in the state which will increase to more than 12 lakhs if we include their family members and non-card holders. Mayurbhanj district holds 42.2 percent forest area to total geographical area (DSH, 2011). The sal leaves production in the district is estimated 14 lakh quintal per year with Betnoti and Rupsa (Balasore district) as major collection centre.¹²

The further dependency upon forest resources found 11 percent of sample respondents are engaged in cutting and supply of wood/bush in nearby hotels, dhaba, roadside snack shops, wood shop, schools for MDM and canteen of local government office. Though they carry out this activity illegally but their access and livelihood dependency cannot be overlooked. Even as per discussion, 85 percent sample respondents reported utilisation of forest wood/bush for cooking purpose collected from

nearby forest, roadside trees, wasteland and mediators. These wood/bush suppliers usually carry their products (cut in standard size) in cycle for delivery and travels on an average about 10 – 20 km every day. This business provide gainful employment on an average of 11 man days with income Rs. 865 per month to respondents of the study area.

Wood/bush Supply Business

The wood/bush supply business are done with prior information of forest rangers. These forest dwellers share a significant part of their income with forest area in-charge/rangers/local police. On an average these dwellers supply 40 – 70 kg of wood per week depending upon the size and type of shops and thus enjoying regular source of employment and income. The female members of family are also actively engaged in collection and cutting process and in certain cases (limited) distribution also. The adjustment of male members engagement in wood collection and distribution is done at 60:40 ratio i.e. income share of male 60 percent and female member 40 percent.

The other forest items includes fruits, seeds, traditional rare herbs, mahua and honey. Since the access to these resources requires long day search and varies seasonally, the engagement of respondents are very restricted that too from Jashipur Block (entry gate to core forest area). This task is mostly carried out by tribal respondents and thus providing average employment around 3 days a month with income of Rs. 340. The major reason for their low income is lack of surety about product effectiveness and their demand. The mahua made liquor is extensively used for self-consumption and selling in nearby areas (especially in highway connecting Keonjhar and Chhattisgarh).

Animal Husbandry

The animal husbandry being as major alternative for livelihood promotion occupies (35 percent) important status in CPRs consumption/access. Our study is confined to the livestock such as cow, buffalos, bull, goats and sheep. The engagement in animal husbandry had developed a subsidiary business for few other households of that particular village i.e. a group of individual either from two to three households collect all animals of the village and take them for grazing to nearby forest and pasture

land in morning (08 – 09 Hrs.) and again return them at evening (15.30 – 16.30 Hrs.). This business provides benefits to both the livestock owners in form of monetary (both income and saving) and security benefits while for shepherds with gainful employment and income with zero investment**. The average amount charged per animal (large) ranges from Rs. 35 – 50 per month consisting 30 – 50 cattle per herd (as per discussion with sample respondents).

Animal Husbandry status in Mayurbhanj

According to reports of Department of Water Resources Government of Odisha, the number of households is higher in Badsahi block (35175) while lowest in Tiring (13118). Taking into consideration similar dataset a comparative analysis is done to find the dependency of households on animal husbandry at each blocks of Mayurbhanj. The average number of large animals (including cow, bull and buffalo as covered in our study) in each household is highest in Udala block (6 animals), Baripada (3), Karanjia (2) and Thakurmunda (2) while lowest in Bahalda and Tiring (1 animal for 3 households). In the selected blocks through sampling, the average number of large animals per households is Khunta (6), Udala (5), Jashipur (5), Saraskana (4), Bahalda (4), Bisoi (3), Tiring (3) and Betnoti (2). The average number of cow (including both indigenous and hybrid) is 12117 per block while that of bull is 22513 per block.

Out of the total geographical area of 1042 thousand hectare, 439 thousand hectare constitute forest area (42 percent) while only 389 thousand hectare is available as cultivable land (37 percent). All respondents send/take their animals for grazing to nearby CPRs (either self/family members or through shepherd) and on an average saves Rs. 12 each animal per day (large size). Even certain respondents also access the PPRs whose owner are either not residing in same region or having litigation. The total availability of CPRs (land such as grassland, pastures, temporary farming land, barren land, tree, crops not included in net sown area, forest land including bushes and groves etc.) is 2.16 lakh hectares with an average availability per block 8307 hectares*** (constituting 21 percent of total geographical area). The permanent pasture and other grazing land is found to be higher in Bahalda block (2983 hectares) while lowest in G. B. Nagar (448 hectares). Further, its position in selected area under study is Tiring (1900 hectares),

Jashipur (1218 hectares), Bisoi (2632 hectares), Saraskana (1325 hectares), Khunta (696 hectares), Udala (1411 hectares) and Betnoti (1512 hectares). The animal husbandry business generate on an average employment of 11 man days with income Rs. 778 per month. Block-wise comparative analysis finds active presence of animal husbandry in employment and income generation in all selected blocks (as shown in annexure II). Further, the block-wise animal composition shows higher share of goat/sheep followed by ox/bull and indigenous cow with an average monetary value of (live stocks) Rs. 19697 and median value Rs. 15000.

Sabai (Babai) Grass Activities

The sabai grass business is an integral source of livelihood for Baripada and Kaptipada sub-division. This serves as an all season employment crop and brings regular higher income compared to paddy.¹⁶ The sabai grass as compared to other crops does not require any regular intervention and maintenance. Our study is only confined to the WSHGs who are engaged in production of sabai grass in CPR of the region. In the study area only 9 percent of respondents are engaged in sabai grass production and thus generating employment on an average 16 days and income Rs. 875 per month. Majority of respondents sells around 50-60 percent of produce due lack of storage facility and makes self-utilisation of remaining during off seasons (family members uses sabai grass for producing rope and other fancy items). The intensive analysis shows

higher employment and income from Khunta block while lowest from Saraskana block. Even the Khunta is among eight intensive blocks selected by Orissa Livelihood Mission (OLM) for managerial, financial and technical intervention.

Minerals

The engagements of WSHG members in illegal collection and selling of minerals i.e. coal and iron ore from Tiring block is observed. Though due to several restrictions, the engagement contributes an average employment of 7 days with income Rs. 500 per month only. Further, study find lesser dependency and engagement (3 percent of respondents) upon these resources due to strict checking on mobility of materials (refer annexure I).

Section IV: Contribution of CPR on Livelihood Promotion

An attempt have been made in table 3 to develop CPR based livelihood scale through integrating various broad dimensions such as availability, access, associated opportunities and constraints (SOAS, University of London). Further, CPR significance in the livelihood promotion in the region may also be analysed through comparing their contribution in employment and income generation. Therefore five major components i.e. availability of CPR, access of CPR, opportunity with CPR, employment contribution and income contribution were considered to develop a livelihood dependency index (refer table 3).

Table 3: Components of CPR and Scaling

Sl. No.	Indicators	Category	Scores
1.	Availability of CPR in region	Extremely High	5
		Adequate	4
		Moderate	3
		Low	2
		Very Low	1
2.	Access of CPR	Extremely High	5
		Adequate	4
		Moderate	3
		Low	2
		Very Low	1
3.	Opportunity with CPR	Extremely High	5
		Adequate	4
		Moderate	3

		Low	2
		Very Low	1
4.	Employment Contribution	More than 20 days	5
		15 – 20 days	4
		10 – 15 days	3
		5 – 10 days	2
		Less than 5 days	1
5.	CPR contribution in Total income	More than 75 percent	5
		60 – 75 percent	4
		50 – 60 percent	3
		30 – 50 percent	2
		Less than 30 percent	1

Source: Authors own calculation

The activity-wise accessibility parameter shows overall high level of access (score 3.51) of CPRs by WSHG members in the study area with extremely high access of sabai grass (4.25) and wood (4.0), adequate access of pasture and other available land for animal husbandry (3.5), moderate availability of sal leaf (3.4) and other forest items (3.0) while very low accessibility of minerals (1.0). The overall components analysis shows moderate and high nature as score ranges from 3.07 to 3.71 on five point scale (refer annexure III).

$$LDI = \frac{1}{5} \sum_{i=1}^5 Z_{ij}, 1 \leq SLI \leq 5$$

Table 4: CPR based Livelihood Dependency Index

Criteria Range	Livelihood Nature	Score
$LDI^{WSHG} = 4.00 - 5.00$	Extremely High	41
$3.50 \leq LDI^{WSHG} \leq 3.99$	High	50
$3.0 \leq LDI^{WSHG} \leq 3.49$	Moderate	56
$2.50 \leq LDI^{WSHG} \leq 2.99$	Low	25
$LDI^{WSHG} > 2.49$	Very low	7

Source: Authors own calculation

Further, the assessment of the selective indicators in table 4 shows, 23 percent of respondents in Mayurbhanj are extremely high and 28 percent are highly dependent upon CPR for livelihood promotion. Further, 31 percent of respondents are moderately dependent. The block-wise analysis as shown in

annexure IV found higher accessibility in Khunta block (sabai grass) while lowest in Tiring (minerals) and similarly the CPR based average LDI is found to be higher in Khunta block (3.74) while lowest in Tiring (2.85).

Section V: Conclusion and Recommendation

The study finds higher dependency of sample respondents of Mayurbhanj upon CPRs for livelihood continuation. Even after having membership in SHG programme from last seven years (on an average), they didn't able engage themselves for sustainable other livelihood activities. On the other hand efficiency and effectiveness of SHG program in rural transformation of poor in Balasore district of Odisha (adjacent district to current study area) with major engagement in agriculture and allied activities.¹³ In our study area cent percent members engaged in CPRs based activities have availed loan from linked financial institutions with an average last loan of Rs. 11,676 each member. Some members who are engaged in sal leaf stage II and stage III activities and animal husbandry have invested a significant part of their loan. Further, the respondents of Bahalda, Betnoti, Jashipur, Khunta, Saraskana and Udala are accessing more compared to resource availability in the region. The higher contribution of CPRs in providing employment and income in the area reflects massive dependency and extraction by the respondents and possible chances of further degradation with increase of nearby population. Similar pattern of dependency is observed with study at Maharashtra where the reason was geographical/ climatic whereas in our case its more administrative and skills oriented.⁹

The government of Odisha now should think for diversified occupation adjustment especially for population residing nearby forest like engagement in transport of forest items, maintenance, local auction, daily wage based leaf collection and storage for government auction, maintenance and engaging women members in manufacturing of CPR based items. Possible chances of developing business hub exist in the region due to significant availability of CPRs better communication and both local and national demand for degradable items.

Limitation and Area of Future Research

The study has tried to evaluate the Livelihood dependency index taking into consideration five components mostly related to economic valuation of CPR. There exist studies which also taken other indicators such as cultural, social and co-operative management in impact analysis. Moreover, comparison of CPR with farm and

non-farm engagement may also provide more insights of the story.

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Conflict of Interest

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ANNEXURES

Annexure I: Block-wise Income and Employment through Animal Husbandry

Blocks	Average days of Employment						Average Monthly income (INR.)					
	Animal Hus	Sabai Grass	Sal leaf	Wood/ Bush	Others	Mine-rals	Animal Hus	Sabai Grass	Sal leaf	Wood / Bush	Others	Min-erals
Bahalda	12	-	18	-	-	-	744	-	675	-	-	-
Betnoti	7	16	17	25	-	-	700	822	1318	2000	-	-
Bisoi	12	-	14	18	-	-	780	-	738	800	-	-
Jashipur	9	-	13	9	10	-	777	-	725	733	850	-
Khunta	12	19	22	-	-	-	850	1125	1670	-	-	-
Saraskana	10	11	14	12	-	-	683	600	833	833	-	-
Tiring	11	-	6	-	-	7	863	-	800	-	-	500
Udala	9	20	9	9	-	-	1000	900	783	820	-	-

Source: Compiled from the data collected

**as the owners of cattle are saving the fodder expenditure and utilize both time and money for other economic activities.

***The data excludes urban areas, reserve forest, protected forest area, project area and hill areas.

Annexure II: Block-wise Livestock Asset Composition and Value

Blocks	Number of Animals				Livestock Value (INR)
	Goat/Sheep	Ox/Bull	Cow	Total	
Bahalda	56	11	14	81	3,61,000
Betnoti	30	16	21	67	5,45,300
Bisoi	64	14	7	85	3,76,000
Jashipur	88	23	32	143	7,76,600
Khunta	124	5	34	163	4,16,500
Saraskana	72	4	16	92	2,96,000
Tiring	53	13	10	76	4,16,000
Udala	61	18	53	132	9,18,000

Source: Compiled from the data collected

Annexure III: Activity-wise LDI Mean score

Activities	Access	Availability	Opportunity	Income	Employment
Animal Husbandry	3.50	3.21	3.06	3.67	3.09
Sabai Grass	4.25	3.37	3.25	4.06	4.37
Sal leaf	3.40	3.27	3.25	3.85	4.09
Wood/Bush	4.00	3.70	2.40	3.65	3.30
Other Items	3.00	2.80	4.20	2.20	1.60
Minerals	3.51	3.00	1.50	2.75	2.75
Total	3.51	3.28	3.07	3.71	3.58

Source: Compiled from data collected

Annexure IV: Block-wise LDI Mean Score

Block-wise	Access	Availability	Opportunity	Income	Employment	Avr. Score
Bahalda	3.64	3.32	2.68	3.64	4.28	3.51
Betnoti	3.78	3.34	3.78	3.73	3.65	3.65
Bisoi	3.08	3.25	2.95	3.91	3.54	3.34
Jashipur	3.20	3.04	3.54	3.25	3.41	3.28
Khunta	4.03	3.30	3.19	4.19	4.03	3.74
Saraskana	3.40	3.10	2.75	4.00	3.65	3.38
Tiring	2.85	3.28	2.50	3.00	2.64	2.85
Udala	3.82	3.60	2.95	3.69	2.95	3.40
Avr. score	3.51	3.28	3.07	3.71	3.58	3.43

Source: Compiled from data collected