

ECONOMICS OF SOIL CONSERVATION IN MACHHAKUND-SILERU CATCHMENT AREA OF ODISHA

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Abstract: Koraput and Malkangiri are the southern most districts of Odisha. Both the districts are located in south Eastern most Ghat mountain range. Some parts of the area occur at 150-1000 meters above the Mean Sea Level (MSL). The region is characterized by scatted, isolated, sharp and some series hills with forest cover. The evidences of soil erosion and degradation in this region shows a cause of multipurpose reservoirs in Machhakund-Sileru catchment area.. Gullies and ravines are steadily encroaching into productive table land of many major command areas Excessive deforestation, overgrazing, faulty agricultural practice and the industrialization is the causes of erosion. Factors like climate (temperature, rainfall and wind), vegetation, topography (degree and lengrh of slope) and soil type (infiltration, permeability, soil depth, particle size) ultimately refers to its erosivity.

The paper includes the analytical framework of soil economics with four objectives, which based on firstlt, to appreciate hydro-electric projects and its Potential located in Machhakund-Sileru catchment area.

Secondly, to know the entire soil profile of Koraput and Malkangiri districts which come under Machhakund-Sileru catchment area of Odisha. Thirdly, to focus various watershed and sub-watershed projects established in the Machhakund-Sileru catchment area and fourthly, to find ecological balance with tribal gain due to the implementation soil conservation programmes by the department.

Soil conservation activities are undertaken various agro-economical and socio-economic measures. The central government has launched many policies, Programmes to protect the soil erosion and to increase the productivity in the region. Various approaches like watershed management, promoting farm crops (cashew, mango, sisal, etc.) have been an effective tool for rural transformation and natural resource management. Watershed project is a useful technique for soil conservation process. The benefits of watershed are based on afforestation, gully control, conserve fertile top soil and percolating and run off recycling with ground water recharge.

Keywords: Mean Sea Level (MSL). Soil Conservation, Soil Erosion, Hydro Electric Projects, Ecological Balance, Soil Conservation Programmes, Watershed Programme, Tribal people

1. Introduction

Soil and water are the two principal natural endowments responsible to regulate the entire living world. It is the contribution of nature that gifted for the sustainability of the whole biological kingdom. It is impossible to produce a handful of soil through the application of science. Nature with its own system and cyclical process created these properties. Soil has total biotic components of this earth. It is realized that these endowment is self renewing at limited rate only. It may depend upon the extent of nature of human intervention into the stock dynamics. Soil is the principal medium of the plant growth which has both features of a renewable as well as an exhaustible resource. Its nutrients and organic matters can be replenished. But when the top soil depth is reduced by erosion the soil eventually be lost irreversibly. Soil resources are an essential input of production and no output could be thought up without the use of soil.

Erosion may be defined as the detachment and transportation of soil. Running water, wind waves of the sea, moving ice etc. lifts the surface soil with their movement which is called as erosion. Natural erosion may not always be harmful. Human induced erosion is cleared for different types of agriculture's and large scale industrialization and mining severe erosion. The erosion may be gully, torrent, reel, sheet and patch sliding, whatever is the type and cause, soil erosion destroys the physiology of earth, damaging the entire ecosystem and the living world.

The evidences of soil loss and degradation show that the multipurpose reservoirs are getting silted up at alarming rates. Gullies and ravines are steadily encroaching into productive table land of many major command areas and considerable number of flora and fauna are being endangered. Soil conservation is the only known way to protect the productive land. The aim is to keep the surface soil intact and minimize the impact of the factors of erosion. By applying different methods, the surface soil is protected and conserved. The process of conservation practices include biological measures, mechanical measures, technical measurer, contour farming, contour bonding, graded bonding, beach terracing on steep slopes, runoff harvesting, storage and recycling

2. The research Problem

In Machhakund-Sileru catchment area contains some hilly terrains. The entire land is undulating. A number of tribal ethnic groups practice shifting cultivation. The region also has some major multipurpose river valley projects. Because of natural undulating terrain and development activities, soil erosion has been severe here. For large scale mining, particularly bauxite, forest areas have been cleared. Alongside the establishment of hydro-electricity projects and other development activities the necessary soil conservation measures have been implemented in the region. Since mid 1950, intensive soil conservation practices have been undertaken to protect this catchment area. . In this study an attempt is being made to analyse the soil conservation practices and economic impact of soil conservation measures in the hilly region of Machhakund-Sileru catchment area in Odisha.

3.Objectives

The present study intends to pursue the following objectives:

- 1.To appreciate hydro- electric projects and its Potential located in Machhakund-Sileru river basin.
- 2.To know the entire soil profile of Koraput and Malkangiri districts which come under Machhakund-Sileru catchment area of Odisha.
- 3.To focus various watershed and sub-watershed projects established in the Machhakund-Sileru catchment area.
4. To find ecological balance with tribal gain due to the implementation soil conservation programmes.

4.Methodology

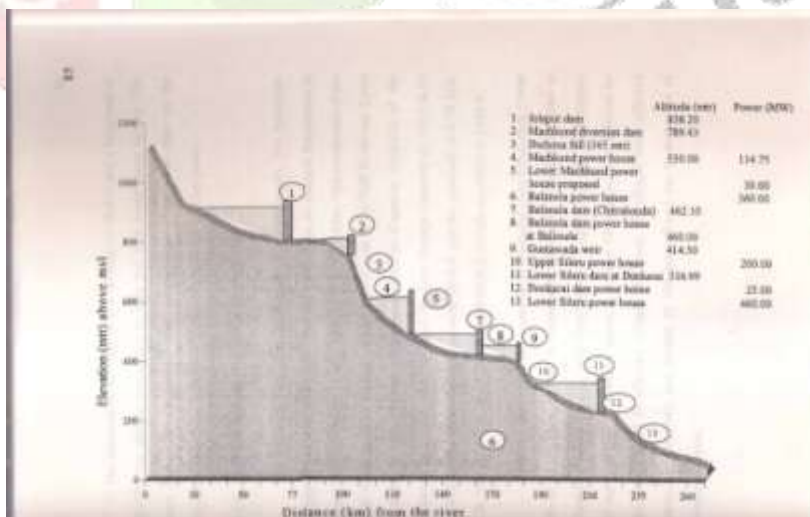
The study is analytical and descriptive and used both primary and secondary. Secondary data are collected from the government and non-government organizations and different reputed journals and books. Two tribal villages located in Macchhakund-Sileru catchment area are undertaken for primary informations. The collected data are put through process of tabulation.

5.Different hydro electric projects and its Potential in Machhakund-Sileru catchment area

The Machhakund River rises in the Modgol hill of Vishakhapatnam district on the 3000 feet plateau near Wandergedes becomes the boundary between Andhra Pradesh and Odisha. River Machhakund exploit with many small tributaries among which Gurupumeru Deoldei (Near Khairiput) are important. Moving through a narrow valley named Kondakmberu becomes the boundary of the state with a new name as Sileru and joins at mugl point at Motu. Swarnakukhi is a small river of Andhra Pradesh and Koraput of Odisha covering small parts where river Pangam, Saptadhara, Kiyang are also the natural water sources. Sileru river is a tributary of Sabari River. It is originated from Andhra Pradesh but flows through Odisha before merging with Sabari. Sileru flows at the border of Andhra Pradesh, Odisha and merge with Godavari River. The water released from Balimela power house is used for irrigation purpose by Potteru Irrigation Project (PIP) in Sabari basin. The perennial water supply of Sileru River comes to mid land of East Godavari district and get diverted to Donkari reservoir (330 MSL).

The water of Machhakund,Duduma and Gurupriya have been harnessed for hydro-electric electricity in Machhakund-Sileru catchment area. The hydro electric and water projects constituted in Machhakund Sileru catchment area where as many as 13 small and large projects seen excluding Polavaram Project. (Fig-1)

Fig: 1 Hydro-electric and irrigation projects with their altitudes



Source: Mishra,P.K.(2002)

6.Potential of Hydro-Electric Power Projects

The river of Machhankund and Sileru harnessed for power generations in its path for many years. The proposed Polavaram Dam Project will be the highest hydro power generating station in the Godavari catchment area which depend on the water contribution of Machhakund,Sabari and Sileru rivers A list of Channels of Hydroelectric power Stations of Machhakund-Sileru Catchment area has indicated (Table-1).

Table-1: List of Hydropower projects in Machhakund-Sileru basin

SI. No.	Name of The Project	State	Power generation (in MW)
1	2	3	4
1	Upper Indravati	Odisha	600
2	Machhakund	AP	360
3	Balimela	Odisha	360
4	Upper Sileru	AP	240
5	Lower Sileru	AP	540
6	Upper kolab	Odisha	240
7	Pench		160
8	Ghat Ghar pumped Storage		250
9	Polavaram (under construction)	AP	960

Source: <https://Wikipedia.org>

7. Soil conservation in Five Year Plans

Large scale soil conservation measures began in 1951. During first five plan period (1951-56), Central Soil Conservation Board was established and chain of nine Research Demonstrations, seven Training Centres with multidisciplinary expertise were established under Ministry of Agriculture.

During second plan (1956-61), All India Soil and Land Use Survey (AISLUS) organisation with its four regional centers were established to meet the soil survey requirement in the catchment of river valley projects under central sponsored schemes. About 43 dry farming demonstrations were launched in 11 States, Union Territory (UT) of Delhi and Damodar Valley. In 1959 a Model Soil Conservation Bill was circulated to the States for enacting suitable legislation for effective implementation of the soil and water conservation programmes.

In the third plane (1961-66) a working group reviewed the problems and facilities. A national scheme for treating the catchment of selected Multipurpose River Projects was launched in 13 catchments (Map-1). Another programme for survey and categorization of waste lands was taken up in 17 states in order to ascertain areas which could be reclaimed a third scheme landless agricultural labourers were resettled. Similarly, a centrally sponsored scheme was launched for identification and categorization of ravenous areas in four states. The programme content both for agricultural and non-agricultural lands. State Soil Conservation Boards were also established in a number of states.

Assessment of soil erosion and analysis of soil loss based on sub-watershed within a watershed. The Machhakund-Sileru area comes under Koraput and Malkangiri region with a latitude of 170 461 to 180 411 North and longitude of 820 051 2711 to 820 581 4011 East. The total area of Machakund is 189944 he and Sileru is 277575 he with a total area of 467519 he (Table-2).

Table -2: General Information about Machhakund- Sileru Chatchment Area

SI. No.	Category	Machhkund	Sileru	Total
1	2	3	4	5
1	Watersheds	21	31	52
2	Sub-Watershed	129	195	324

Source : Soil Conservation Office at Koraput

Map –4.1 : Machhakund- Sileru catchment area showing in no-6 in the map.



Watershed Programme got wide momentum in 5th Five year plan (1974-79) . In this period three Central Plans were launched.

1. Pilot project of Amendment of Alkali and Acid soil in compact areas.
2. Creation and strengthening of state soil and land use survey organisation.
3. Control of shifting cultivation.

In 6th Five Year Plan (1980-85) National Land Resources Conservation and Development Commission on National and State Land Use Board were set up. Integrated watershed management in the catchment of flood prone river launched. Soil conservation in the catchment of river valley projects were started.

Seventh Plan (1985-90) aims at intensifying the water and soil conservation programme for checking the land degradation and enhancing the productivity available land. To ensure people participation for effective maintenance of soil conservation utilization of assets created.

Works like ground water development and utilization on construction of water harvesting structure, were undertaken in 8th 9th, 10th, 11th(1992-97, 1997-2002, 2002-2007 & 2007-2012) five year plans.National Watershed Development Programme in rainfed areas also launched and Revised river valley projects were enacted.

Soil profile of Koraput and Malkangiri districts

In Odisha, Koraput and Malkangiri districts is famous for highest hilly peaks. The region is located between Machhakund-Sileru catchment area. The entire land area is undulating. A number of tribal ethnic groups practice shifting cultivation. Because of natural undulating terrain and development activities, soil erosion has been severe here. Alongside the establishment of hydro-electricity projects and other development activities, soil conservation measures have been implemented by the government in the region. Since mid 1950s intensive soil conservation practices have been undertaken to protect the catchments area of Macchakund-Sileru Hydro electric projects.

Koraput and Malkangiri are the southern most districts of Odisha. They are located in south Eastern most Ghat, mountain ranges of Odisha. Physiographically, the region is contiguous to the main land of the mountain ranges. Some parts of the area occur at 150-1000 meters above the Mean Sea Level (MSL). The highest mountain peak of the state Deomali is located in Potangi Block of Koraput District where a high altitude research station is located. The region is characterized by scatted, isolated, sharp and some series hills with forest cover.

Koraput district consists of 14 C.D. Blocks , 220 G.P.s, 2028 villages, 2 sub divisions, 1 Municipalities and 3 NACs and Malkangiri District has 7 CD Blocks, 108 GPs 1049 villages and 2 NACs with a great variation in topography and soil type. The soil are mostly red, mixed red, yellow, alluvial red and black. The texture is sandy loam and sandy clay looms. They are highly eroded, rich in iron and aluminum and are usually deficient in boron and zinc. Soil acidity and iron toxicity are problems of most of the blocks.

Koraput district has 8807.0 Kms i.e. 7.809 lakhs hectares geographical area. The area under forest is 1879.53 Sq. Kms. which includes reserve forest, demarcated, undemarcated and unclassified forest. Total urban area is 176.4 Sq. Kms and rural area comes 6,54838 Sq. Kms. Malkangiri district has 5791 Sq. Kms geographical area and 3, 35000 ha. Of forest area. In comparison to the state the districts occupy 6 % (Koraput) and 2.60 % (Malkangiri) of geographical area.

Agriculture is the mainstay of the people in the region. The SC/ST population is 64%, Literacy rate is only 35.72 % in Koraput and 30.53 % in Malkangiri. Most of the farmer's take-up agriculture as subsistence enterprise. Out of the 1,180,635 of total population, rural population Koraput district is 982188 i.e. 83% and Urban population is 198449 i.e. 17%. In Malkangiri district total population is 505000 in which urban population is 35000 i.e. 7% and rural population is 420000 i.e. 93%. Mountain hills, undulating terrains and forest with variable landscape do not offer an environment for better farming practices. The primitive tribal economy of the region has not been able to overcome the limitation of their traditional skill and practices. Traditional artisan like, weavers, potters, smiths, bamboo craftsman etc, maintain their livelihood with traditional occupations.

The region is occupied with diversified landscape, climate, temperature and land use, cropping pattern is different in different parts of the region. The land is 150 to 300 slopes with 3 to 8 inch depth. Shifting and Jhola type of cultivation prevails, where oil seeds, ragi, cereals. Pulses and some dry land crops are cultivated. But gradually the cropping pattern has changed with cashew, sisal and coffee plantation.

On the foot hill of Laximpur, Nandapur, Bandhugaon, Pottangi, Khairiput Mathili, dry land horticulture crops, cereals are cultivated in the valleys of Eastern Ghat Mountain ranges Paddy, Sugarcane and vegetables are the dominant crops and loss of land of Kotpad and Boipariguda Blocks are the worst affected with this situation.

Koraput and Malkangiri districts also suffer from acute soil erosion of various forms. Due to deforestation and shifting cultivation, steady degradation of natural flora and fauna, land sliding, siltation of reservoirs have become a serious issue. The mountain range suffers from E2 (moderate) grade of erosion. Gullies and reel types of erosion damage natural vegetation land structures and ecosystem. Nandapur, Pottangi, Narayanpatna Bandhugaon and Dasmantpur Blocks are the worst affected with affected with this situation.

In foot hills like Korapur, Lamtoput (Macchhakund) blocks suffers with sheet erosion, E2 type of erosion (moderate type) disrupts the soil depth, agrostructure, siltation of reservoirs and tanks, sediment ridged and unridged lands of Boipariguda and Borigumma Block also suffers with moderate erosion due to unlevelled landscape and improper water management system. Valleys and low land of Kundra, Kotpad and Jeyporeblock suffers with sheet and reel erosion. River bank erosion also occurs in undivided Koraput district. It creates land sliding, torrent and detachment of river bank, Kolab, Machhakund and Indrabati are the major rivers of the region which cause this part of erosion.

8. Ethics of Soil Conservation

The fundamental ethics of soil conservation is to protect land and water, the two important natural endowments, which are crucial life supporting elements. Since one inch of top soil is formed in 350 to 400 years the entire living world is dependent upon the soil conservation process. So the basic aim of the Soil Conservation (SC) Department includes retention of fertile top soil, through proper scientific care and retention of ground water recharge. Ecological balance is another important aim of Soil Conservation Department for maintaining natural vegetation. The methods and approaches of the Department are different according to the land and soil type, slope of land, erosion status, water run-off speed etc. As per the soil depth and erosion type, the following step wise measures are taken:

8.1 Biological approach- is the first step improvement of vegetation/plantation in changing pattern is carried out.

8.2 Cultural approach- When biological approach fails or does not suit then cultural methods are adopted. Considering the slope and erosion agro-economic practices are used.

8.3 Demonstrative approach- Cropping pattern and crops are changed time to time, season to season to demonstrate the checking of soil erosion status.

8.4 Mechanical or Technical treatment- It is the last resort for erosion checking. Variety of methods as per the requirement to maintain the landscape intact and undisturbed is adopted.

9. Administrative Structure and various programmes in soil conservation

So far as the administrative structure of Soil Conservation Department is concerned a Soil Conservation Officer (SCO) is in the charge of a Division assisted by Assistant Soil Conservation Officer (A.S.C.O) at Sub-divisional levels, who are served by Junior Soil Conservation Officers (J.S.C.O.) and Soil Conservation Technical Assistants (S.C.T.A.) under whom Soil Conservation Sector Officers (S.C.S.O.) and Junior Soil Conservation Assistants (J.S.C.A.) operate. The latter is assisted by Field Demonstrators (F.M.D.), Bhumirakhyak (BR), Amin and Kamadar at grass root level.

The treatment adopted differently for different type of land by the department according to soil depth. In Sandy clay coarse the treatment adopted by the department through gullies control, loose boulder, planting or drainage line loose boulder check dam etc. (Table-3).

Table-3: Treatment adopted in different type of land by the department with soil depth and erosion pattern

Sl. No.	Type of land	Soil depth	Nature of slope	Erosion pattern	Treatment adopted by department
1	Hill sandy loam (GSL) gravel sandy clay coarse (GSCL)	Moderate depth D1, D2, D3. 0-8 inch	15 to 25 % slope	E3 severe	Gullies control measures, loose boulder structure (LBS), planting or drainage line loose boulder check dam (PTDL)
2	Foot hills, GSL & GSCL	D3, D4 18 to 36 inch	8 to 15 % slope	E2 moderate	Dry land horticulture Check dam
3	Pediment up land bonded or ridged sandy clay loam	D4 & D5 soil depth	5 to 8 % slope	E1 & E2 slight	Agro forestry
4	Vallies, sand clay	D4 & D5	0 to 3 % slope	E1	Water harvesting and Watershed management

Source: soil conservation office, 2015

10. Various soil conservation programmes

The visible and invisible impacts of soil conservation are indicated in the Machhakund-Sileru catchment area. Different activities on soil conservation particularly special programmes like Watershed development, Afforestation, MGNREGA Programme and basically R.L.E.G.P Rural Labour employment Generation Programme – Plantation), E.R.R.P. (Economic

Rehabilitation of Rural Poor), .I.G.S.(Income Generating Scheme – Plantation), E.A.S.(Employment Assurance Scheme – Watershed), Sisal Plantation, A.C.A. Additional Central Assistance – Watershed), N.W.D.P.R.A. (National Watershed Development Programme in rainfed areas are taking into account. Benefits of the people through this programme and other governmental programmes have a clear visibility. The soil and water conservation department has been taking soil erosion programmes which are visualized.

11. Surveyed Village Adjoining to Machhakund River

Village Gutalpada is a small ST dominated village, 7 Kms. away from G.P. Headquarter and 35 Kms. from Block. It is a foothill village adjoining to Malkangiri and Andhra Pradesh Border. There is a Primary School and Anganwadi Centre. The cultivable lands are undulating, dry and unsafe. River Machkund passes through this village, but the irrigation facility is not possible by the cultivators because of their poverty. The entire area is erosion prone. Gully and rill type of erosion occurs particularly during rain. Seasonal vegetable are cultivable alongwith paddy. Small patches are land are cultivated and fragmented holdings. The socio-economic condition is in subsistence level due to a lot of conspicuous reason

12. Surveyed Village Nearer to Sileru River

The Grampanchayat of Motu is located at the tail race of Malkangiri district.Motu is a revenue village situated 112 kms away from district headquarters, 98 Kms from Block headquraters and itself as a Tahasl The village is surrounded by forest with mixed lands which is under cultivation. People collected different jungle product like Mahu seed, Mahua flower and Kendu leaves.The occupation of the people is agriculture. Paddy, Maize and many vegetable products are produced by the cultivators. Particularly by the Koya people which are the original inhabitant of the village.The village is bounded by four neighbor villages like Binayakpur , Alma, Kamalapuram and Baribanchha.. The name of the forest is Motu forest. It is located in the bank of Sabari and Sileru river. The village occupied two categories of road. A pucca road, mud road are available in the village. Electricity and water supply is available in the village. Some tube wells for drinking water to the people are also provided.There is BSNL mobile tower and a dispensaries in the village. There is a community hall and an Anganabadi centre located in the village. A temple and a gudi (village Goddess) house is seen in the village. A Church and Masque located in the village. A UP School, ME School and a high school is there for better education.

Two villages of Koraput and Malkangiri district (one each) with 20 families of Gutalpada and 30 families of Motu have been surveyed. Here, the Table-4 shows their permanent settlement and migration in the village.

Table-4: Surveyed families in the Machhakund-Sileru catchment area

SI.No.	Name of the village	Name of the district	Block	Lacation of River	No. of Surveyed family	No. of permanet settlement families	No.of Migrated families	Years of Migratrion
1	2	3	4	5	6	7	8	9
1	Gutulapada	Koraput	Lamtaput	Machhakund	20	19	1	50
2	Motu	Malkangiri	Podia	Sileru and sabari	30	20	10	80

Source : Compiled From Primary Study

The Table-5shows the gain of the lower section people working in different soil conservation activities. The Big Push Theory is correctly applicable here. It is shows that people earns an average of Rs 98 in Koraput region and Rs.145 in Malkangiri region.

Table-5. Average benefit of the people and the region from soil conservation.(Annually)

SI. NO.	district	Programmes	Govt. Expenditure	People's benefit
1	2	3	4	5
1	Koraput	MGNREGA,NWDPR A Cashew plantation, coffee plantation etc.	8.419 lakhs	Rs 98.00
2	Malkangiri	IWDP,NRM MGNREGA etc.	2.652	145.00

Source: Compiled From Primary Study

13. Maintaining of ecological balance

Ecological balance is another important aim of soil conservation department, maintaining natural vegetation, green house effect, air pollution, water pollution are the important.

The methods and approaches are different according to the land and soil type, slope of land, erosion status, water run-off speed etc.The region suffers with Gully, Reel, Sheet, Torrent, and Patch sliding type of erosion. Gully control measures lime Loose Boulder Structure (LBS), Plating of Trees along with Drainage Line (PTDL), Loose Boulders Check Dam (LBCD) are taken. -12 no. of watersheds under NWDPR A scheme is under progress in 9th and 10th plan period in different blocks of the area.

-784 he. Of cashew in 5 blocks and 2288 he. of coffee plantation has been carried out in 10th plan period. Under NFFWP programme 64 projects have been executed.

-To maintain natural vegetation in small patches of 5 to 30 acres of cultivable land, check dams with division weirs are constructed and feeding channels are provided to the arable land.

-All most all the blocks of Koraput and Malkangiri region, having Water Harvesting Structure (WHS) to hike the ground water table. Village tank were set up and maintain to provide water for cultivation and to maintain percolation potential of rain and drain water.

14. Suggestions

The following suggestions seem pertinent in the context of the study:

I. Awareness should be created among the local people through various social organizations to check podu cultivation in the upper reach of the high hill slopes.

II. Afforestation should be encouraged through social forestry. The forest department has a significant role to check the deforestation.

III. Soil conservation programmes should be diversified and should reach nearer to all section of the people.

IV. Significant soil conservation activities should be taken in Machhakund-Sileru catchment area. Initiative measures should be provided by the authorities of Dam projects and Hydro-electrical projects.

V. One cannot over-emphasise the need for promotion of tribal education. Without this no soil conservation programme will be successful in the region

15. Conclusion

There is a coherent and internal relationship between soil and all living organism on the earth. On the contrary, degradation of land and erosion create problems in non- agricultural Common Property Resources (CPR) where huge property is endangered. Problem can be viewed in two aspects i.e. production point of view and environment point of view. Soil erosion in the river valley basins and high hill mountains in the country are baffling to the planners, policy makers, scientists and administrators.

From government side soil conservation activities are undertaken various agro-economical and socio-economic measures. The central government has launched many policies and Programmes to protect the soil erosion to increase productivity. Various approaches like watershed management, promoting farm crops (cashew, mango, sisal, etc.) have been an effective tool for rural transformation and natural resource management. For socio economic reforms, watershed serves as the platform towards the upliftment of the poor and vulnerable section of the household residing in the micro watershed. Natural resource management through watershed programme is one of the most viable and holistic approaches towards food security and disaster management. Soil and moisture conservation and ground water recharge through water bodies, like, field bonding, check dams, diversion weir etc. are some of the major activities undergone in the watershed.

The Machhakund-Sileru catchment area is the focusing point in the paper where various watershed and sub-watershed project also find place.. Maintaining ecological balance in Koraput and Malkangiri district, erosion control through Watershed Treatment, Plantation, Division Weir, Water Harvesting Structure (WHS) are analysed. It is confined that a negative externality is a hindrance in the development process in Koraput and Malkangiri region. Deforestation-linked with soil erosion in the region. By the empirical observation it is seen that the huge and lump-sum amount expenditure on the Koraput and Malkangiri region never be a solution in soil erosion control. The region is located basically in the Machhakund –Sileru catchment area where Jolaput and Balimela reservoir is located which is a permanent source of soil erosion which never be controlled by such decision making process.. Most of the labour groups in all the villages are involved in soil conservation work but the land owner farmers of the locality are usually working in their field. It is too difficult to evaluate the real value of soil erosion and soil quality. There is no specific method to calculate the value of soil erosion rather can assess the benefit of the people through the application of soil conservation measures.

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