Watershed Management-A Concept And It's Application

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The protection improvement and rehabilitation of soil and water resources are of critical importance in the achievement of overall development goals. Recognizing this, many developing countries are turning increasingly attention and resources to the filed of watershed management. Now a day all counties wanted to make a good use of their water resources and worked war & footing scale on this subject. They are busy in making plan.

The watershed management approach has been followed in India since early sixties for sectoral projects aiming at control of siltation in reservoirs or mitigation of floods. However, after announcement of the new 20 point programme in the year 1982, this approach was adopted as a national strategy and comprehensive development of rainfed area. Watershed is geo-hydrological unit or a piece of land that drains at a common point. This natural unit is evolved through the inter-action of rain water with land mass and typically comprised of arable lands, non-arable lands and natural drainages lines in rainfed areas. Sustainable production depends on health, vitality and purity of production environment. Therefore, for scientific utilisation of the natural resource vase of land and water, the ideal geographical unit would be the product of interaction of rain with land i.e. the watershed. These are two approaches namely (i) Command area development (ii) Watershed area development. Command area development approach is adopted for comprehensive development of irrigated areas. Availability of water, the most critical factor, is almost assured and intensive production system of specialized nature are practiced for maximising production. The watershed area development approach is perused in rainfed areas where availability of water is dependent on erratic amount, intensity and distribution of rainfall. An element of risk pervades the production system. Hence diversified and mixed farming systems are practiced which include agriculture, forestry, animal husbandry fishery etc. Watershed management is a broad programme, which embraces the philosophy of using each hectare within its capability and treating each hectare according to its need in that use. The conservation of soil and water resources is essential to sound agriculture and continued prosperity of watershed degradation i.e the loss of value over time, including the productive potential of land and water, accompanied by market changes in the hydrological behaviour of a river system resulting in inferior quality, quantity, and timing of water flow.

A simple definition that can be applied to any of the terms as watershed, catchment, drainage basin and river basin, is that they embrace all the land and water area which contributes runoff to a common point. A watershed is a hydrological unit that has been described and used as a physical biological unit and also, in many occasions, as a socioeconomic political unit for planning and management of natural resources. Watershed management is the process of formulating and carrying out a course of action involving the manipulation of resources in a Watershed to provide goods and services without adversely affecting the soil and water base. Thus it is essential scientific management to get the highest dividend in minimum possible time. The four basic steps involved in it are follow:

1. **Survey and investigation**
2. **Planning**
3. **Implementation**
4. **Appraisal of the project watershed**

As Watershed is the most rational unit has been adopted as the fundamental unit in erosion control in the catchment of river valley project, treatment of the catchment areas of flood prone rivers, reclamation of ravines, command area development, drought prone area programme, shifting cultivation, and other SWC (soil and water Conservation) programmes. The keys of successful implementation of any such comprehensive long term approach are accurate and appropriate investigation and planning. The following points must be taken in the account prior to planning stage.

1. **Watershed problems and their management**
2. **Watershed frame work delineation**
3. **Identification of priority watershed**
4. **Basic data requirement**

Preferably a Watershed of 2000-4000 ha should be taken for development and efforts should be made to develop it within as span of 2-4 years. It comprise inter sectoral planning which requires co-ordinated approach of true aspect of agriculture engineering and other fields such as forestry, minor irrigation, animal husbandry etc.

REVIEW AND LITERATURE

Rao, Chittranjan & Chandrappa (1958) suggested that scientific land management has resulted in soil erosion which in turn has resulted in reduce basin retention capacity and siltation of reservoirs, consequently there are drought and floods which need to be prevented. The proven experience of development of a watershed on an integrated basis to bring about the improvement of productivity on sustained basis. Rege (1958) obtained that research conducted at control soil conservation research station at Oatacamund have show that laying down contour furrow at suitable distance with 20-25% slope give about 25% increase in stand of the grass. Ahuja (1964) reported that soil and water conservation measures as contour bund have been laid out in Jadan area having rolling topography with shallow depth. In 1960 yield of forage was 683 Kg/ha without bunding Immediately after bunding it was 1237 Kg/ha in 1961-62. In spite of less rain during 1962 the yield of forage increased and total yield was 1969Kg/ha which shows increase by 94.4 and 129.3 during 1961 and 1962 respectively. Raghunath & Das (1967) suggested that the adopting contour farming reduction in runoff was 40% and 21 % in 25% slopes for main and second potato crop respectively. Murthy (1968) reported that bunding has been found to increase cotton and jowar yield by 20% to 40% respectively at the government farm Madras when all other good farming practices were followed along with the contour bunding the yield at Sholapur and Vijaypur improved by 50 to 100%. England C.B.(1973) suggested that as an aid to understanding and predicting water movement within agricultural watershed. Watershed models offered a powerful yet relatively unused tool for determining the movement of dissolved or suspended pollutants. If models are constructed in such a way the land management effects are predictable, they also become a useful tool in pollution control planning. Placement of agriculture wasters or applied chemicals should be accomplished judiciously, with full consideration of water flow paths and land are should be adjusted to achieve the desired results. Foster and wisohmen (1974) observed that the soil loss from the concave slope averaged 89.6 and from the convex slope 134% of that of the uniform slope. Thus the irregular slopes can only be evaluated by using the shape index along with

the average values for the slope stepness and slope length. Mayer et al (1995) found that about 15% of the soil particles transports in rill flow from a tilled soin (16% slope) were larger than I mm and almost 3% of all sediments were large than 5 mm. They concluded that the rill flow can transport very large particles. Tejwani (1975), concluded on behalf of experiments at Deharadun that the seasonal runoff value of 54% from untreated catchment was reduced to less than 40% of the rainfall, the corresponding reduction on soil was from about 30 tones to less than 30 tones/ha during the rainy season. Sastry (1980) reported that the farm pond which was constructed at central soil and water conservation training Institute, Dehradun in 1958 with designed capacity of 1.65 ha 18 ha. The capacity of pond was reduced to 1.31 ha. over a span of 10 year. The soil of the area was reported to be Sandy loam. Babel and Agal (1981) studied runoff and sediment deposition in trenches at C.T.A.E. Watershed, Udaipur and reported that total runoff volume and sediments from untreated areas were 44.3% and 14.65% higher than that of treated areas respectively. Dhruvanarayana and Ram Babu (1983) analysed soil erosion rate in India. It was
estimated that about 16.35 tones per ha of soil is detached annually and of this about 20% carried away by the rivers into the sea. Nearly 10% of it is being deposited in our surface reservoirs resulting in the loss of 1-2% of storage capacity. Kate, et.al., (1992) found that effect of various cropping system and land treatments in reducing runoff. Soil losses as studied at Sholapur. The contour bunding and strip cropping system was found most efficient in reducing runoff by 87.7% and soil loss by 57.7% over broad bed furrow and inter cropping system. However (CB+SC) system reduced runoff soil lose by 51.5% and 71.1% over contour bunding and inter cropping system respectively. Further (**CB+SC)** and (BFF+IC) system are equal rewarding in term of crop production and monitory return as compared to (CB+IC) system. Oswal, M.C. (1994), studied proper conservation, harvesting and appropriate use of limited rainfall and concluded that it is possible to greatly improve and stabilize the yield of short duration and low water required improve dry land crops. He also stated
that the water harvesting structures like farm ponds, khadins and broad base bunds greatly induce ground water recharge, thus these should be practiced in dry land farming form beneficiary point of view.

OBJECTIVES

Objectives of the study are as follows:

1. Utilizing the lad according to its capability
2. Minimizing runoff and conservation rainfall where it falls.
3. Safe drainage of excess water towards storage reservoirs.
4. Checking formation and expansion of ravines gullies and other forms of soil erosion.
5. Recharging of ground water.
6. Maximizing the productivity per unit area per unit tones of water
7. Increasing cropping intensity.
8. Improving agriculture system
9. Improving the socio-economic condition of rural areas.

HYPOTHESIS

There is n significant impact of watershed management on-

1. Checking expansion of ravines due to soil erosion and steep slope.
2. Expending the area under agriculture and forest.
3. Increasing agriculture production.
4. Enhancing productivity and improved quality of life in the area.

METHODOLOGY

The watershed area where will be located, will be studied using the topographical sheets of the study area.
The physiographic, slope and size, hydrology, drainage, vegetation, land use and socioeconomic
conditions will also be studied. The study will be carried out techniques. Various maps, graphs, and other illustrations will be prepared at different level and scales to elucidate various relevant to the study are collected concerning development as revenues, forest, irrigation, transport etc.

INTRODUCTION OF STUDY AREA

Dhaulpur district is situated at 26°'22', to 26°57', north latitude and 77°14' to 78°16' east
longitude, having area 3034 square kilometre.

DHAULPUR DISTRICT LOACTIONAL MAP

Dhaulpur as a separate District came into existence in 15th April, 1982 Comprising Dhaulpur, Rajasthan. Bari and Baseri Tehsils earlier included in Bharatpur district it is situated as a distance of about 109 km from Bharatpur and 55km from Agra and is no the main National Highway No. 3 from Agra to Bombay. Bhaulpur is also a Railway Junction of the Central Railway.

DHAULPUR DISTRICT TRANSPORT NETWORK

The present name of Dhaulpur is said to have been derived from the site Dholdera or Dhawalpuri built by Raja Dholan (or Dhawal) Deo, a little to the south of the present town. Dhaulpur town was taken y Sikandar lodi is 1501 and hi army plundered in all directions rooting up all the gardens which shaded Dhaulpur upto 7 kos. Baber mentions the places and states that it surrendered to him in 1526. Humayum moved the site of the town further to the North to avoid encroachment by the river chambal. The reference Dhaulpur also comes in ancient history. It has been mentioned that at Mathura, ruler's of a naga family came to power and the naga houses of padmavati and Mathura, ruled over Dhaulpur and adjoining territory. The ruling family of Dhaulpur state were hats of Bamraolia clan, the letter name being derived from Bamraolia is said to have lands in about 1195 A.D. They jointed the Rajputs against the musalmans and received a grant of the territory Gohad about 1505 A.D. when they assumed of the title of Rana. Till 1761, when the Marathas had been
defeated at Panipat, Rana Bhim Singh seized the Fort of Gwalior but it was taken by Sindhia in 1777. The first Rana or more correctly called Majaraja Rana of Dhaulpur was Kirat Singh who was succeeded by his son Bhagat Singh in 1936. The area concerned Dhaulpur district rises from the alluvial plain near the town of Dhaulpur which is 183 meter above the mean sea level. This area is an irregular wedge shaped territory. Another features of this area is large number of ravines owing to the
triable nature of the alluvial portion of the site, the depth of the river beds between the nature surface of the ground and the quick drainage caused by the heavy slope of the drainage area. These ravines have development on the banks of the Chambal and except where prevented from cutting further in by range of hills extend from some kilometres in length and provide a shelter to dacoits.

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