

STUDY OF WATERSHED MANAGEMENT

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ABSTARCT

Water is very important component of life so its management is necessary. Since thousands of years the problem of water is arising .Watershed can be defined as the drainage basin of a catchment area of a particular stream or river including glaciers. Watershed development refers to the conservation, regeneration and judicious utilization of the entire resources - land, water and vegetative, animal and human within a particular watershed. The watershed development relates with percolate and stores the flowing rain water, increase in economy of village and overall development of village. Village will be on the safe side even if there is drought condition, increase agriculture standard and to bring the barren land under cultivation. Proper use of available water improved agricultural processes crop pattern different steps to save water yield of crops can be increased. This system checks chemical and physical properties of water to determine progress. This includes survey about progress and model preparation of case study place. We oriented that the study of watershed development project increase economy of villagers and natural resources like availability of water, plantation in watershed, availability of fodder, increase in price and productivity of land. Increase in physical and chemical properties of water and soil. Women development as well as education increases, changing crop pattern leads in crop yield.

Keywords: *Catchment Area, Cultivation, Management, Watershed*

I.INTRODUCTION

Since thousands of years the problem of water is arising ,the man started thinking on the problem of water and its proper use from the time he started fanning and henceforth this problem is going to arise in so many way and it is the challenge before the people to solve the problem of inadequate water arising in their decade nobody can say that whether this problem will be solved or not in ten years or hundred years "Many a Little Manes a Meckler "each and every single drop of water is very necessary but, its management is not proper. At some places installation of drip irrigation and sprinkler is done but. That water cannot be used for wider areas due to variation of rainfall in different regions. The crops are destroying is commonly heart it is taking a step forward to save each drop and to use it in extreme conditions.

Environmental regeneration is possible only when the concerned people see a reason for it and are fully in control of all aspects of resource mobilization, management and conservation just as human being and their activities are the primary causes of environmental destruction, and they are the reassures for restarting the health of the environment that they are rained. Hence there can be no sustainable natural resources management

without the active participation of all inhabitants of the concerned environment. So considering above factors we should take a step forward for proper management and better use of available water

1.1 Components of watershed development:

- 1) Human resource development.
- 2) Soil and land management.
- 3) Water management.
- 4) Crop management.
- 5) A forestation.
- 6) Livestock management.

1.2 Necessity of watershed management:

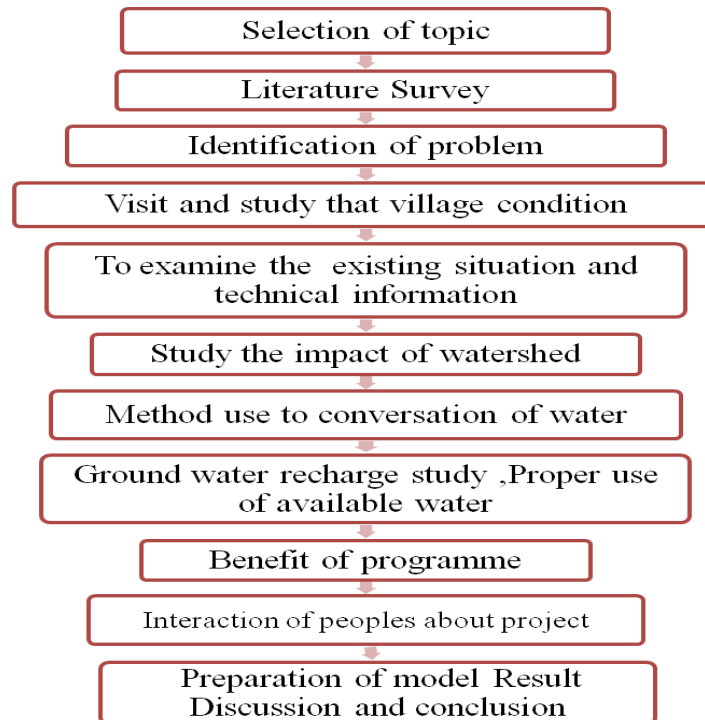
Taking into consideration all the irrigation plans of Maharashtra, only 26% of total cultural commanded area can be brought under stored water (Today only 13% of land is benefited by irrigation) . Even if we think of supplying water to right month's crops, then only 30% of land can be brought under water. But still today 87% of agriculture is totally depending on rainfall.

1.3 OBJECTIVE OF STUDY

People can get employment depended on agriculture due to watershed.

1. To increase the economy of the village.
2. Overall development of village will be there.
3. Village will be on the safe side even if there is drought condition.
4. To raise the standard of living of people.
5. To bring the barren land under cultivation.
6. To percolate and store the flowing rain water.
7. Fodder for cattle for fuel trees should be planted plantation also leads to construction purpose fruits etc.
Dried leaves can be used for compact manure.
8. To maintain the health and hygiene of villagers.

II. METHODOLOGY



2.1 Planning of watershed development:

For any project to be started, its sanction is must, then & then only it can be implemented after technical sanctioning and attachment of funds, work can be started then acquisition of land is done during survey, the villagers must give their lands under project while implementation the views, the person incurring loss or profit does not means. A lot there are also some schemes undertaken by which the economically backward people are also benefited. The views of people such as everything must be done by government or it is not our responsibility slows down the development porous. Due to this people don't have their full participation if there must be progressives working all above matters must be avoided.

2.2 Data to be required for watershed management.

2.2.1 Site Selection of Catchment Area:

The following point must be considered while deciding the catchment area.

- 1) A village is selected where area is divided into small-small catchment area.
- 2) Political economic and social status of a village must be considered.
- 3) The catchment area should not be too small or too big.

2.3 Element of watershed development:

Land suitable for agriculture, open piece of land, all the plants from grass to forest, pet or wild animal and human being are the elements of watershed management. Even with this climate, rainfalls are also the main elements.

a) **Land**

b) **Rainfall**

c) **Climate**

2.4 Watershed management:

For the development of the village some pre information is necessary. Then and then only, further step can be taken successfully otherwise, it will not fulfill the needs information such as the source of water

2.4.1. Social and Economical information:

For development of village economical support is required; help can be taken from different organizations and programs.

i) Population of village:

Present and future estimation of benefited people is of men, women & children's

ii) Land holding:

Total area of land, agricultural land is necessary division of the land is done as per the type of land

iii) Number of animal, Types their need of fodder and water, their use and related information must be collected.

iv) Health: Medical facilities must be looked for.

vii) Other information: Availability of electricity, no. of organization, weakly market telephone line, markets, business, etc.

2.4.2 Technical Information: .

Information required is as follows:

i) Village map and Topo sheet:

ii) Contour map:

iii) Amount of rainfall:

iv) Survey of Soil:

v) Land and types of land:

2.5 Involvement of volunteers in rural development:

If there is equal involvement of each and every village then only the work will be accomplished successfully. So bring the feeling of working together is a great challenge and for this volunteers must visit different villages and undertake related programs.

a) **Rural leadership**

b) **Tendency of villagers**

c) **Participation of villagers in implementation:**

i) **Mental support**

ii) **Physical support**

iii) **Financial support**

There are more objective of watershed management .But we focus in this case study on to increase water storage capacity and how it is impacted and beneficial to village.

III. RESULT AND DISCUSSION

Salient Features of Check Dam		
1	Type of structure	Check Dam
2	Location of the structure	22/1
3	Name of Village	Mhaswandi
4	Total catchment area (in ha)	80.00
5	Total Command area (in ha)	20
6	No of Beneficiaries	8
7	Total Cost (in Rs)	396,730
8	Local Contribution	7,752
9	Funds required	388,978
	Annexure attached	
Design details		
	Hydraulic design	
	Structural design	
	Stability analysis	
Cost Estimation		
	Quantity sheet	
	Estimate and cost	
Drawings		
	Sketch- Cross section	
	Sketch-Elevation	
	Cross section & L section of Nala	

Design details of check dam		
Name of village	Mhaswandi	
Location:	22/1	
A)	HYDRAULIC DESIGN	
	a] Runoff coefficient calculation	
1.	Type of Structure	Check Dam
2.	Catchment area	
	a. Area under cultivation	A1 = 15.00ha.
	b. Area under pasture	A2 = 10.00ha.
	c. Area under forest	A3 = 55.00ha.
	Total Catchment area	A(A1+A2+A3) = 80.00ha.
3.	Runoff coefficient	

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	a. Cultivated area		$C1 = 0.60$
	b. Pasture land		$C2 = 0.36$
	c. Forest area		$C3 = 0.50$
	Weighted Runoff coefficient		$C = 0.50$
	b] Time of concentration calculation		
4.	Length of Catchment		$L = 850.00 \text{ M}$
5.	Elevation	Highest Elevation	$RL = 760.00 \text{ M}$
		Lowest Elevation	$RL = 680.00 \text{ m}$
		Difference	$H = 80.00 \text{ m}$
6.	Time of concentration		$tc = 0.01947 \times K^{0.77}$
			$K = (L^3 / H)^{0.5}$
			$K = 2770.66$
			$tc = 8.71 \text{ Min}$
			$tc = 0.15 \text{ hrs}$
c]	Calculation for maximum rainfall intensity		
			$K = 6.0810$
	$I_{max} = K * T^a / (tc + b)^n$		$T = 10.0000$
	$I_{max} =$	13.73 cm / hrs.	$a = 0.1459$
	$I_{max} =$	137.32 mm / hrs.	$b = 0.5000$
			$n = 1.0923$
d]	Calculation For Peak Runoff Rate by Rational Formula		
	$Q_1 =$	CIA/360 cumec	
	$Q_1 =$	15.30 cumec	

B] Structural Design details :

Mhaswandi		22/1
1	Discharge [Q]	15.30 cum.
2	Depth of Nala [D1]	3.50 meter
3	Width of Nala [W1]	22.00 meter
4	Spillway Width [W]	16.00 meter
5	Flood Depth [d]	$Q^{0.67}$
		$1.704 \times W$
		0.68 meter
		0.70 meter
6	Free Board [f]	0.50 meter
7	Gross Free Board [F] f + d	1.20 meter
8	Height of water storage [h]	1.50 meter
9	Foundation depth [k]	2.34 meter
	Foundation depth as per the site conditions[k]	1.20 meter

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		Say	1.20 meter
10	Total height of dam [H] $h + F + k$		3.90 meter
11	Key wall length [l] $0.3 + 0.3 = .60m.$		3.00 meter
12	Top width of dam [b] $0.55 [h + d]^{0.5}$		0.82 meter
		say	0.80 meter
13	Bottom width of dam [B] $[h + d] / 1.5$ 2.25 m.		1.47 meter
			1.50 meter
14	Depth of water cushion [dw] $0.82 \times (d^{0.33}) \times (h^{0.5})$		0.89 meter
			0.89 meter
15	Width of Water cushion [bw] $1.33 \times [(dw + h)^{0.5} \times d]$		1.44 meter
			1.40 meter
16	Length of Wing wall D/S. $(B-b) + bw+0.6$		2.70 meter
17	Length of Wing wall U/S.		4.00 meter
18	Width of Wing Wall's		0.60 meter
19	Crip Length		13.30 > 6h Hence
20	Length of Apron $2 \times [d + h]$		4.40 meter
		say	4.40 meter
21	Thickness of Apron $= \{ 2 \times [d + h] \times H \} / 30$		0.57 meter
		say	0.60 meter
22	Width of Apron		16.00 meter
23	Top width of Header Wall		0.60 meter
24	Backwater spreading length		120.00 meter
25	Storage Capacity (on an average basis)		990.00 cumt
	Storage Capacity (with multiple fillings)		2970.00 cumt
			2.97 TCM

IV. CONCLUSION

1. Watershed management plays an important role in protecting drinking water supplies and at the same time ensures that a broad range of other environmental, human health and social (*i.e.*, culture, recreation.) concerns are being addressed.

2. The watershed represents a physical unit within which water moves and is influenced by natural processes and the impacts of human activities. Watersheds therefore provide a good basis for management.

3. The activities undertaken in this project include soil and water conservation measures like construction of Check dam, Bandhara etc. By construction of Bandhara the stored water is use for agriculture purpose and to increase infiltration and to prevent soil erosion.

4. This watershed development relates with increase in economy of village and overall development of village.

5. Village will be on the safe side even if there is drought condition, proper use of available water improves agricultural yield.

VI. ACKNOWLEDGEMENT

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