Evaluation of People's Well-being at an Integrated Watershed Management Area in Maharashtra State of India

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Abstract

Different parts of India experience extreme water scarcity and drought particularly during the peak summer season. Integrated watershed management is seen as a pragmatic solution to combat this situation. International organizations, national government and the state governments are working in tandem to revise this situation. Many NGOs are also part of this initiative. Randullabad village located in the Indian state of Maharashtra is one such example. The zone along Randullabad is one of the drought prone zones. An integrated watershed management program functions in this village along with some neighboring villages. The government is claiming a visible outcome in improvement of the villager's life due to this program. However, the research team initiated an idea to investigate the on ground reality in identifying augmentation of the villager's overall well-being. The research utilizes Nobel Laureate Professor Amartya Sen's Capability Approach to establish a research methodology to evaluate Randullabad village's overall well-being. The research collected primary data in four functioning sets. These are sustainable livelihood opportunity, education, housing and health. The research identifies that although the watershed management has provided some benefits to the villagers, it has not yet able to provide substantial freedom to the villagers in choosing different functioning sets capable to uplift their overall well-being.

Keywords: Watershed management, Well-being, Capability approach, Livelihood, Health, Education.

1. Introduction

Watershed is the natural geo-hydrological area that drains to a common outlet. It is the basic tool for land and water planning. But the purpose and approach has not remained the same from beginning. Prior to 1970s and 80s, first generation of watershed management projects in developing countries applied soil and water planning approaches that emphasized engineering works (Darghouth, et al. 2008). But an overall failure of 'engineering only' approach led to significant restructuring of watershed development strategy. Gradually, 'engineering approach' became a 'management approach' combining engineering, community partcipation, economic benefit, and environmental improvement. Today, the most successful applied research and knowledge sharing in watershed management programs worldwide have been based on a participatory and partnership approach (Darghouth, et al. 2008). Watershed management is not only about protecting waterbody and improve its condition, but to enhance opportunities and minimising negative environmental externalities downstream. If managed

efficiently, watershed improves soil and water conservation, irrigation facility, and land use pattern leading to increased agricultural productivity in drought prone and desert prone areas. Watershed connects people of different livelihoods and any improvement needs to validate with multidisciplinary perspective to establish its consequences in improving economic benefit, social equity and environmental protection of the people. Gradually, watershed development programs have become integrated watershed management encompassing institutional strengthening, income-generating activities through alternative sources, and markets to improve livelihoods (Mondal, et al. 2016). But studies on integraterd watershed management mostly focuses on either techno-economic aspects of the program or institutional arrangements (Kurian, 2004, Saravanan , 2002). Very few studies explore in identifying relation between watershed development and human development. This paper aims at identifying relation between human development and integrated watershed management.

The research focuses on Randullabad village in the Indian state of Maharashtra as the case study to investigate the main objective of this paper. This region and the village locality is located among the most severe drought prone zone of India. This zone is suffering from erratic rainfall in the range of 500 to 750 mm. Farmers unable to plan cropping types and harvesting duration in extreme weather condition and variable rainfall. Limited livelihood options resulted into rapid deforestation and natural resource degradation, which might attributed in further decline in rainfall and uncertain precipitation (Figure 1).

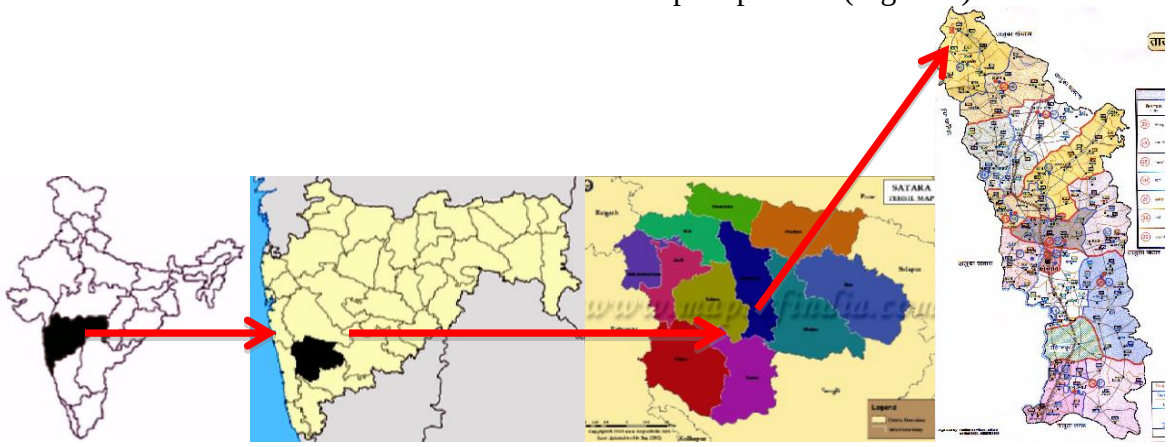

Figure 1: Location of Randullabad village

In 2008, a microwatershed project was initiated in this region with the help and financial support of Indo-German watershed development program. Randullabad village is a part of this project that spread across 732.00 ha. Randullabad village which has 374 households with a polulation of 1929 experienced visible changes in its overall situation (Table 1).

Table 1: General Statistics of the Village

	Male	Female
Population	982	947
Literacy	94.87%	92.50%
Landless households	3.74%	
Small and marginal farmers	84.76%	
Medium farmers	11.23%	
Big farmers	0.27%	
Average cultivable landholding per households	1.37 Ha	

The microwatershed development project primarilily focused at livelihood development measures and women empowerment among others. The project provided skill based training like motor winding, computer training, house wiring, tailoring, and beauty parlor etc for augmenting livelihood opportunities. Under the women empowerment strategy, the project envisaged twnty four numbers of 'Self Help Groups'[1] (SHGs) for experience sharing and imparting confidence among village women. Women also undergone training programs related to saving and credit, preventive healthcare etc. 'Sanyukta Mahila Samitee' (SMS), an apex body of SHG was created to plan, implement and monitor the activity related to drudgery reduction, women empowerment, and coordination between various institutions. The watershed management project has some impact in improving physical conditions of the villages. Yearly fodder production inceased 116%, whereas average daily milk production increaded by 133%, and arrangeents were made for livelihood generation for additional forty two peoples. Cropping pattern were changed and changing pattern resulted into significant improvement in annualised agricultural yield. Integrated watershed management also taken additional steps like banning bore wells, drinking water supply scheme, solar pump for drinking water supply, and integrated bio- energy model for improved energy security.
Existing literatures and reserchers mostly focuses on this physical transformation evident from watershed management. These literatures focuses on utility based analysis that is concerned only with changes in utility provision. Very few literatures put attention on human well-being[2] or people's pespective to identify the development or its consequence on people. Well-being is a multidisciplinary dimension and requires innovative approaches to measure it. This paper focuses on human well-being to identify the consequence of watershed management on human well-being.

2. Research methodology

This paper opts for human capability to achieve policy well-being as the measurement scale instead of utility based measurement and monetization of policy implementation. This paper has developed an analysis tool, which in turn have evolved from the premises of equality and justice. The simple reason to adapt this analysis method is the significant moral and ethical connotation represented by the deep rooted values of human perspective of policy well-being. But the traditional ways of analysing well-being is by underlying its benefit in terms of economic, social or physical outcome. But the superior ethical dimensions of well-being theme require much more insight than this standard mechanism. Our interpretation of well-being is that it is a combination of "equality", "justice" and "happiness". The initial condition of deprived citizens has to be considered. But the question is how we can analyse well-being? In order to response to this question, we have further introduced economist Amartya Sen's "capability approach" as the theoretical framework tool in the paper. We have sustained Sen's vision of capability as 'substantive freedom' to achieve 'alternative functioning' combinations. Concept of functioning reflects the various things a person (or group) may value doing or being. We have extended Sen's theory from a personal choice to combined choice and institutional choice. In simple terms capability approach would reveal the capability of people (or group) to actually have the ability to be benefited from interventions

[1] A self help group is defined as a "self governed, peer controlled information group of people with similar socio-economic background and having a desire to collectively perform common purpose." Tamil Nadu Corporation for Development of Women Ltd. (TNCDW) defines self help group as a small economically homogenous affinity group of rural poor, voluntarily formed to save and contribute to a common fund to be lent to its members as per group decision and for working together for social and economic uplift of their family and community (Shodhganga).

[2] Well-being can be defined as an individual's/ group's perception of their position in life or the assessment of a person's quality of life according to his own chosen criteriain in the context of the value systems in which they live (Dodge, Daly, Huyton, & Sanders, 2012).

in the areas of watershed manageent project. Sen's capability approach can provide the fundemental framework require to measure multidisciplinary dimensions of well-being.

Capability approach provides a conceptual framework for analyzing well-being and is generally seen as a strong critique of existing traditions in welfare economics. Wealth or physical transformations in terms of income per capita does not automatically imply better life. Sen cites the example of Gabon or South Africa or Namibia or Brazil, which are much richer in per capita GNP than Sri Lanka, China or the state of Kerala in India, but have very low life expectance at birth compare to the later. Similarly, achieving enhanced physical condition of villages do not automatically corroborate into improved well-being. It is important to take note of utility but happiness or desire fulfillment is also a part of human existence. There are many other things of intrinsic values of human life, like rights and freedom – which are totally neglected in welfare and utility based approach. It is difficult to conclude that human well-being only depends on opulence like income or commodity or utility happiness, (immediate) desire fulfillment. In order to take an overall measure of human well-being, it might required to focus on more direct approach of human functioning and the capability to achieve the functioning. Once people (or society) become capable to achieve the alternative functioning(s), it can be infer that they expand their un-freedom state to real freedom. Development can be seen as a process to achieve alternative functioning, which focuses on human freedom (Sen, 1999).

Capability can be seen as an inherit quality which enables individuals to choose many different functioning depend on their choices. But utilities do not offer any choices and concentrate within the offered utility to individuals. Any strategic intervention to improve life along watershed area may not consider various choices a person may value or people might desire from its objective. So the direct approach of development would be to focus on the 'concept of functioning'. The 'concept of functioning' reflects various things a person may value doing or being. The valued functioning can be very elementary or basic ones to complex activities or personal tastes or advanced ones. In the present research context these two functioning(s) are called "elementary functioning" and "advanced functioning". Elementary functioning can be like access to safe water throughout the year, whereas advanced functioning might be access to sustainable livelihood opportunities without harming ecology. Functioning reflects the state of individuals and depends on variety of elements ranges from personal and social factors. A wide variety of data and survey is required to analyze functioning of the villages within the watershed areas. However, functioning of individuals and institutions has direct and indirect impact in functioning of the villages as a system. Any progress in individual or institutional functioning implies a substantial advantage in village functioning.

An individual's 'capability' refers to the alternative combinations of functioning that is feasible for her/him to achieve. Capability is thus a kind of freedom – the substantive freedom to achieve alternative functioning (Sen, 1999). For example, an individual belong to economically weaker section can choose to built her/his house or choose to startover a livelihood opportunity on her/his own with the help of certain factors like legal (with land allotment), financial (resource to buy/rent land, credit from financial institutions), and livelihood option (secured job). These factors can be called as the "functioning vector" in the present paper. In the process of evaluation these functioning vectors actually are individual dataset collected either by interview or from secondary data which then transformed into a real number. And freedom of having own shelter of that particular individual depends on the selection of these three alternative functioning(s) of land, credit from financial institutions, and secured livelihood to repay the credit and sustain in daily life. While discussing capability approach, it can be seen that the evaluative focus of capability approach can be based on

either ‘realized functioning’ or the ‘real opportunity’ she/he has. Realized functioning implies what a person is actually able to do and ‘real opportunity’ implies the ‘capability set’ exists for her to choose but for some reason or so she is unable to choose the functioning. The two forms of capabilities give different types of information – while the first one gives information about the things an individual does and the second one gives information about the things a person is substantively free to do but presently is not able to do for some reasons. For example, the government has asked SHGs to approach private financial institutions or for market credit for community projects. The government has already earmarked guarantee against the credit. So, the ‘real opportunity’ to avail finance exists in the system but due to some reason, till now no SHGs have not able to access fund under this program. So, it can be infer that the financial freedom cannot be achieved due to the absence of some ‘elementary functioning’, even though the ‘real opportunity’ to achieve financial freedom does exist. Learning from the analysis of capability approach augment the present research to consider analytical criteria which have greater public value than the crude indicators often recommended on technological ground.

3. Evaluative Framework for Capability Approach

The capability perspective is inescapably pluralist, which increases the range of evaluative reasoning and theoretical support to answer the problems considering various perspectives. Alkire 2008, argues that capability has two separate emphases; prospective and evaluative (Alkire, 2008). Both are important but distinct. The primary focus of evaluative role is, whether capabilities have expanded, rather than how and why such expansion occurs.
The objective set out in the watershed management strategy or achieved during watershed management strategy implementation are actually the achievement which benefit people with additional opportunity arises from those strategy. In other words, it is the ‘functioning set’ available to people from the strategy implementation. Opportunities and strategies empower people with the required resources to obtain ‘functioning set’. In other words, the freedom to choose among the different ‘functioning set’ available to people depends on whether the people have the capability to achieve all the ‘functioning set’. Analysis of capability shall have an interim findings and inferences. In the present research, we have adapted a version of the analysis process suggested by Martinetti and Comim (Martinetti, 2006; Comim, 2001).

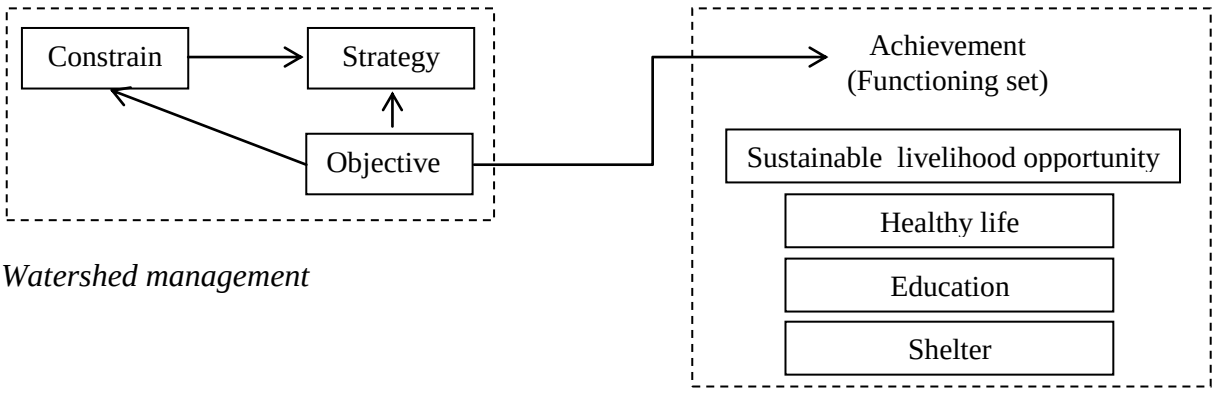

Figure 2: Representation of Capability Analysis of Randullabad village in the Present Research Context (Source: Authors)

The analysis weighs the provided functioning with the benefits provided by the policy strategies. Following the objective rules, the research has identified list of essential

capabilities and related functioning and set of indicators related to the selected dimensions of wellbeing. Figure 2 shows the diagrammatic representation of the capability analysis for the people of Randullabad village in the context of the present research.

Since the research has moved from an income or utility based approach to an overall analysis of the well-being, it has presumed to work with a wide set of indicators that can assume quantitative or qualitative (dichotomous and ordinal[3]) values or linguistic attributes such as good, bad, low, high and so on. Characteristic function of the qualitative value or some data found from the field survey has been transformed into 0 and 1, where 1 denotes higher degree of presence of any elementary indicator of functioning vector. Intermediate values between 0 and 1 describe gradual positions within the arrangement. But in case of dichotomous variables like here the only two membership values shall be 0 or 1. There are two possible basic levels of aggregation can be aimed in capability approach - horizontal and vertical level of aggregation. In the present context, we can think of a matrix where different functioning sets are in the columns and different groups are in the row. In this process, horizontal aggregation shall refer as the aggregation of different functioning for one group across the different dimensions. The process shall substantiate in reducing any possible collapse of the multidimensional nature of functioning into one or a couple of aggregate. Vertical aggregation shall represent the total level of a particular functioning for the groups in consideration. It shall imply that the inter group diversity among different group gets reduced. Later horizontal and vertical aggregate can be merged into a unique aggregate representing the general level of functioning across all dimensions for all individuals (Comim, 2001). Each dimension of human well-being is considered as equally relevant. A neutral choice is assigned as an equal weight to all constitutive elements. By this process we can eliminate the difficulty of judgments or to define a ranking among the different functioning. Every functioning here is assumed to be equally important for villagers or group of villagers. The selected functioning set for analysis of people's capability and the data inventories for the purpose are presented in Table 2 below.

Table 2: Elementary Indicators Included in the Assessment of Functioning Sets of Villagers

Functioning Set	Indicator	Data type/collection method
Sustainable livelihood opportunity	Increase in real income	Questionnaire survey
	Cropping pattern diversification	Questionnaire survey
	Livelihood opportunity throughout the year	Questionnaire survey
	Annual savings	Questionnaire survey
	Access to institutional credit	Questionnaire survey
Healthy life	Access to Medical clininc/hospital	Questionnaire survey
	Child death	Published Data
	Nutriotion value	Published Data
	Malaria or any othe disease	Questionnaire survey
Education	Access to nursery school, high school	Questionnaire survey
	Appropriate teachers and facility	Questionnaire survey
	Awareness for education	Questionnaire survey
Shelter	Access to land	Questionnaire survey
	Access to credit/finance to construct shelter	Questionnaire survey
	Maintain/Augment shelter or rent shelter	Questionnaire survey

[3] A scale on which data is shown simply in order of magnitude; when there is no standard of measurement of differences is available. For example, a squash ladder is an ordinal scale since one can say only that one person is better than another, but not by how much. The main characteristic of the ordinal scale is that the categories have a logical or ordered relationship to each other.

In the empirical analysis, we have extended the functioning set to understand and explain the existing situation better way. In order to analyze the functioning sets, relevant indicators has been identified against those functioning sets. The table above signifies the functioning sets, relative indicators and data collection method of the functioning set for Randullabad village. The measurement methods, assumptions and the process of aggregation have been discussed in the previous sections. Level of existig capability of villagers of Radullabad village is given below (Table 3).

Table 3: Capability Analysis of Randullabad village

	Sustainable livelihood opportunity						**Healthy life**				**Education**				**Shelter**			
	Increase in real income	Cropping pattern diversification	Livelihood opportunity throughout the year	Annual savings	Access to institutional credit	Sub-total/ mean	Access to Medical clininc/ hospital	Child death	Nutriotion value	Sub-total/ mean	Access to nursery school, high school	Appropriate teachers and facility	Awareness for education	Sub-total/ mean	Access to land	Access to credit/finance to construct shelter	Maintain/Augment shelter or rent shelter	Sub-total/ mean
Randullabad village	1	1	1	0	1	**4/ .80**	0	1	0	**1/ .33**	0	0	1	**1/ .33**	1	0	1	**2/ .66**

The present capability of villagers living in Randullabad village are recorded below (Figure 3).

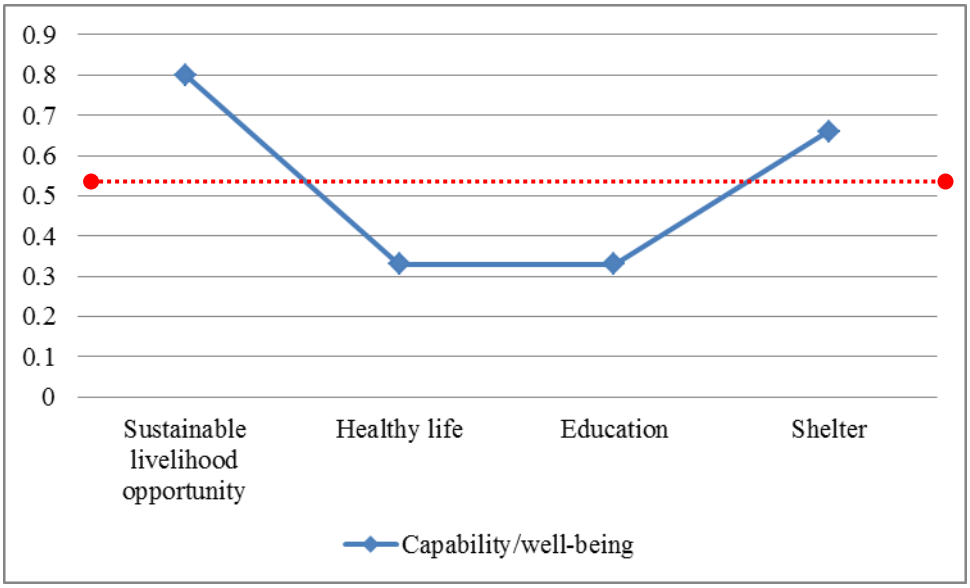

Figure 3: Capability of Randullabad Village to Choose Functioning Set Provided in Integrated Watershed Management

4. Conclusions

The analysis has identified five functioning sets for capability analysis of Randullabad village. Average capability of four functioning sets or overall well-being is little better than 0.5. The analysis finds that villagers of Randullabad do not have the capability to achieve the

functioning sets of sustainable livelihood opportunity, healthy life, shelter and education. The data shows some improvement in physical state of affair in Randullabad Village but the improvement has not completely transformed overall well-being of the villagers. The analysis also shows that the improvement in physical status due to watershed management does not automatically reflect in improvement of overall well-being of people. Initial state of the existing infrastructure in these villages are very low and improvement in infrastructure augmentation evident in its improvement. But any substantial improvement in overall well-being requires much more input. People of Randullabad village have not yet achieved substantial freedom to choose among alternative functioning. Some of the functioning sets are not yet developed and many are outside the reach of common citizen. Increase in access to these functioning and awareness on the benefits needs to be conveyed to common citizen. Although it can be said, that the watershed management program has immense opportunity in enhancing well-being among people, if addressed judiciously.

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