Chapter 16
An Indexing Method for Evaluating Managerial Effectiveness of a Watershed Project and Functional Involvement of Participant Organizations

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Abstract Integrated Watershed Management Program (IWMP) envisages multi-stakeholder participation in different watershed management processes. Usually, a conglomeration of participant community-based organizations (CBOs) manages an IWMP project. Therefore, the managerial effectiveness of the organizations towards performing essential management functions is vital. In this study, we propose two indexing methods: (a) a project management effectiveness index (PMEI), to gauge the degree of overall managerial effectiveness of a watershed project by measuring what management functions covered in the project, and (b) an organizational involvement index (OII), to gauge the degree of managerial involvement of various participant organizations, by measuring the number of management functions performed by all organizational elements.

Firstly, we derived the universal management processes and functions for any human endeavor from the functional theory of management. Then, we undertook a structured open-ended questionnaire survey among the randomly selected inhabitants of an IWMP project area in Assam to determine the management functions of different participant organizations. The indexing system is built on an analysis of the quantified opinion of the respondents.

The project effectiveness index is 47.03%, and the organizational involvement index is 45.55% for the surveyed project. Notably, the management function share is unevenly distributed, and most surprisingly, two participant organizations have zero managerial involvement.

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This management function indexing system will help the watershed planners track and compare the management environment at different points of time or compare the functional status of various projects. In addition, it will facilitate the design of suitable interventions for the management process reengineering for more congruent function sharing.

Keywords Watershed indexing · Management · Process reengineering

16.1 Introduction

The Integrated Watershed Management Program (IWMP) has envisaged participatory watershed management by building and developing community-based organizations (CBO). These CBOs are an integral part of all IWMP projects, and therefore, the overall success of these programs depends on how efficiently CBOs are roped into the watershed organizational structure (Fawcett et al. 1995; Sreedevi et al. 2008; Kozlowski and Bell 2012; FAO 2017). However, a conglomerate of organizations with inefficient function share cannot induce management transfer of created assets, however lofty the objectives might be.

So, the question is: Are the present participant organizations getting involved in the process as expected?

16.1.1 Integrated Watershed Management Program (IWMP) Organizational Structure

Many states in India have been implementing watershed projects under IWMP with significant objectives for achieving sustainable community participation (NITI Aayog 2019). The Indian planning authority, NITI Aayog, has formed the State Level Nodal Agency (SLNA) for the overall planning, management, and monitoring of IWMP projects, emphasizing the indispensability of CBOs in the organizational infrastructure (SLNA 2010a). In addition, IWMP guidelines acknowledge collaboration among local government organizations like Zila Parishads, Gaon Panchayatas, schools, and voluntary organizations (Gaur and Milne 2015). Table 16.1 shows some details of the prescribed participant organizations.

16.1.2 What Do the Managers Supposed to Do?

The term "management" refers to the process of getting things done effectively and efficiently, through and with other people. By the functional approach of management theory, managers plan, organize, lead, and control (Robbins et al. 2013; Goyal

Table 16.1 Present organizational structure in IWMP

IWMP participant	Members	Defined activity
Watershed Development Team (WDT)	The team members are a government employee	It provides technical assistance to watershed activities and oversees project implementation
Watershed Development Committee (WDC)	Ten members (including one chairman, one secretary, and members from general/SC/ST and other CBO selected by Gram Sabha)	Project implementation activities
Self-Help Group (SHG)	The village producers cooperative committee, Women's Group	Implementation of livelihood schemes
Villages/Users	Users of the watershed activities	Use of project deliverables
Gram Sabha (GS)	Local government representatives	Formation of WDC in collaboration with the PIA
Project Implementation Agency (PIA)	Government departmental officers selected by SLNA	Project planning to implementation

et al. 2018; Poonia et al. 2021). In the early part of the twentieth century, French industrialist Henry Fayol mentioned five categories of essential management processes or functions: planning, organizing, commanding, coordinating, and controlling (Hannan et al. 2003). These processes have generally been condensed to primary four: planning, organizing, leading, and controlling (Robbins et al. 2011). In the definition of management, two essential and related terms are efficiency and effectiveness. Generally, efficiency refers to minimizing resource utilization, and effectiveness means doing the right task to maximize goal attainment. Goal articulation is an essential step in infrastructure planning (Parkin and Sharma 1999).

In management theory, the planning component encompasses defining goals, establishing strategies, and developing plans to coordinate activities. The organizing component includes determining what tasks are to be done, who is to do them, how the tasks are grouped, who reports to whom, and where decisions are to be made. The leading component includes motivating employees, directing the activities of others, selecting the most effective communication channel, and resolving conflicts. Finally, the controlling element monitors performance, compares it with goals, and corrects any significant deviations (Carpenter et al. 1986; Ali et al. 2001; Darnall and Preston 2010).

Here a question arises: Are management activities universally applicable? Management theories are based on standard human behavior. Explaining management as a generic activity, Robbins et al. (2011) observes that "what a manager does should be essentially the same regardless of whether he or she is a top-level executive or a first-line supervisor; in a business firm or a government agency; in a large corporation or a small business; or located in Salt Lake Kolkata, or Salt lake city, USA."

16.1.3 State of Affairs in Watershed Management

A watershed is a complex infrastructure designed for natural resources and environmental management involving many biophysical and anthropogenic factors (Easterby-Smith and Lyles 2003; Conservation Ontario 2010; Bach et al. 2011). Moreover, a watershed project is a multi-stakeholder initiative to collaboratively govern water management issues by constituting some structured stakeholders' groups (2008). Therefore, the watershed organizational environment is a network of groups acting as an individual managerial unit. Thus, watershed planners should know that each constituent group should define internal management functions (Devine et al. 1999; Daspit et al. 2013; Wang et al. 2016). Also, it is expected that the groups finally perform as a cross-functional team with a collaborative work ethic.

The present performance of many IWMP projects shows that many predefined critical management functions remain unattended by organizational components, due to which the scope for better coordination remains underutilized. There are two significant reasons for this: (a) CBOs are largely unstructured with minimum defined functionality. (b) Allotted functions are not well implemented (Goyal and Ojha 2010, 2012; Das et al. 2020).

In that context, scrutinizing watershed organizational involvement is essential to study the scope of critical management functions by watershed organizations and analyze their present state of functioning. The primary question is: What kind of management functions the watershed organizations are undertaking against what they are supposed to do? Moreover, can there be an indexing method for evaluating the managerial effectiveness of a watershed project and participant organizations? Unfortunately, there is a shortage of research regarding the adaptability of standard management functions or indexing managerial effectiveness in a watershed organizational environment.

Therefore, we studied the present state of affairs in the management environment of an IWMP project by opinion survey among the beneficiaries. After analyzing the result, we have framed an indexing system to determine the effectiveness in sharing management functions among the watershed organizational elements and the overall managerial effectiveness of the project. The system might apply to any IWMP project to redesign the present organizational model for improving stakeholders' participation.

16.2 Materials and Methods

16.2.1 Study Area and Data Collection

We have reviewed the applicability of the functional theory of management to watershed management. We have identified essential management functions of an organization from literature review, IWMP project documents, and local

observation. In each IWMP project, there are six active organizational components, namely, PIA, WDT, WDC, GS, SHG, and villagers. These components are supposed to undertake different management functions under four management processes or function categories: planning, organizing, leading, and controlling. For examining the management functions carried out by the present watershed organizational components under IWMP, we selected four project areas in the Brahmaputra Valley, Assam, namely, Turkunijan IWMP Kaldia IWMP, Satpokholi IWMP, and Maloibari IWMP (SLNA 2010a, b, c, 2011). To give a broader base to our observation, we conducted an opinion survey among 120 watershed beneficiaries with a close-ended questionnaire having a two-point scale. Each person can give his opinion by choosing "y" for yes and "n" for no (numerically, $y = 1$ and $n = 0$). The questionnaires are distributed to a random sample of stakeholders in the project area.

We have established a final response table (as presented below) after summing up individual opinions. In the last response table, management function-wise scores of each component organization are denoted as Y or N.

For a question, if Σy denotes total numbers of "yes" responses and R represents whole numbers of respondents,

then the final response table score is Y, when $(\Sigma y/R) > = 0.5$. The score in the final response table is N, when $(\Sigma y/R) < 0.5$. A Y against a function implies that, by the majority opinion, the function is carried out. Similarly, N against a function implies that, by the majority opinion, the function is not carried out. We suppose that, numerically, $Y = 1$ and $N = 0$.

16.2.2 Organizational Involvement Index (OII)

The share of management functions an individual organization undertakes reflects its involvement.

So, for any organization "X_i,"

The organizational involvement score of $X = OIX_i$ = (total management functions undertaken by X)/total management functions allotted to X.

The total involvement score by all component organizations will show the present state of affairs regarding function sharing. Therefore, for "m" numbers of organizations, the overall organizational involvement index (OII) is

$OII = \frac{\Sigma OIX_i}{m}$ where $i = 1, 2, \ldots, m$.

16.2.3 Project Managerial Effectiveness Index (PMEI)

The number of management functions carried out by the organizations will reflect the managerial effectiveness. There may be two types of management effectiveness index:

(a) Process-wise effectiveness index (PEI) and (b) the overall project management effectiveness index (PMEI). Therefore, for a process "P_i,"

$PEIP_i$ = (total numbers of management functions covered by all organizations in process P_i)/total functions under P_i.

Therefore, for the "*n*" number of management processes,

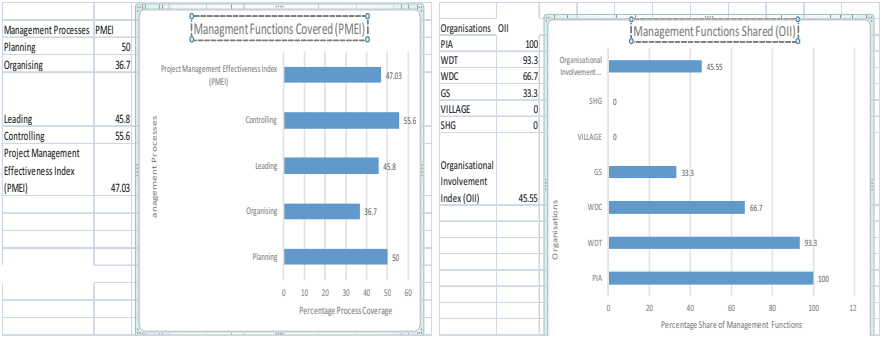
PMEI = (total functions covered score in all management processes by all organizations)/numbers of management processes = $\Sigma PEIP_i/n$, $i = 1, 2, \ldots, n$.

We have shown the results as a percentage of scores based on obtained positive responses to the maximum positive score in an ideal case.

We invited three experienced watershed experts and three watershed beneficiaries from CBOs for a validation interview to justify the result.

16.3 Results

Table 16.2 shows the summarized results based on primary field data.



16.4 Discussion

16.4.1 Functional Involvement of Participant Organizations

Since IWMP focuses on people's participation in watershed management, there should be maximum numbers of organizations allotted with essential management functions. Here, the degree of organizational involvement given by the OII is only 45.55%. It means the participant organizations are either not allotted their functions share or slackness in their sides. It indicates a review of the present situation.

The result shows that the PIA, the watershed developer, involves a 100% share of management functions. The WDT also involves a good number of functions (66.7%). On the other hand, the 33.3% share of Gram Sabha, a statutorily elected

Table 16.2 Summarized response analysis

Management functions category	Management functions	PIA	WDT	WDC	GS	SHG	Villagers	Function-wise score	Management functions category-wise score
Planning	A1—defining goals	Y	Y	Y	N	N	N	3/6	$PEI_P = 9/18 = 50\%$
	A2—establishing strategies for achieving goals	Y	Y	Y	N	N	N	3/6	
	A3—developing comprehensive plans to integrate and coordinate	Y	Y	Y	N	N	N	3/6	
Organizing	B1—determining what tasks are to be done	Y	Y	Y	Y	N	N	4/6	$PEI_O = 11/30 = 36.7\%$
	B2—determining who is to do them	Y	Y	N	N	N	N	2/6	
	B3—determining how is to group the tasks	Y	Y	N	N	N	N	2/6	
	B4—determining who reports to whom	Y	Y	N	N	N	N	2/6	
	B5—determining where decisions to be made	Y	N	N	N	N	N	1/6	
Leading	C1—motivating employees	Y	Y	N	N	N	N	2/6	$PEI_L = 11/24 = 45.8\%$

(continued)

Table 16.2 (continued)

Management functions category	Management functions	PIA	WDT	WDC	GS	SHG	Villagers	Function-wise score	Management functions category-wise score
	C2—directing activities	Y	Y	Y	N	N	N	3/6	
	C3—selecting effective communication channels	Y	Y	Y	N	N	N	3/6	
	C4—resolving conflicts among members	Y	Y	Y	N	N	N	3/6	
Controlling	D1—monitoring the performance	Y	Y	Y	N	N	N	3/6	$PEI_C = 10/18 = 55.6\%$
	D2—comparing the results with goals	Y	Y	Y	N	N	N	3/6	
	D3—correcting	Y	Y	Y	Y	N	N	4/6	
Functions shared score by component organizations		$OI_{PIA} = 15/15 = 100\%$	$OI_{WDT} = 14/15 = 93.3\%$	$OI_{WDC} = 10/15 = 66.7\%$	$OI_{GS} = 2/15 = 13.3\%$	$OI_{SHG} = 0/15 = 0$	$OI_{VILL} = 0/15 = 0$	41/90	
Organizational involvement index (OII)		=Total functions shared score/no. of participant organizations = (100 + 93.3 + 66.7 + 13.3 + 0 + 0)/6 = 45.55%							
Project management effectiveness index (PMEI)		= Total functions covered score/no. of management processes = (50 + 36.7 + 45.8 + 55.6)/4 = 47.03%							

body, is not up to mark. Notably, the function shares decrease gradually toward community groups. Thus, it shows a top-heavy, spinning-top type of function share structure instead of the desired square one. This structure denotes a heavily centralized management environment.

Most surprisingly, villages and SHO groups are entangled with zero function shares. The probable reason for it may be that the planners' management scope is not well-defined or these are not percolated to the community level. Hence, it invites stringent reengineering interventions.

16.4.2 Managerial Effectiveness of the Watershed Project

For effective project management, it is expected that the project should cover all the management functions under all management processes. Here we see that all organizations' total functions for all management processes are only 47.03%. Therefore, we can expect a better value in the range of 70–80%.

The functions covered in the controlling process are maximum (55.6%). On the other hand, it is minimum for the organizing process (36.7%), which shows that the project gives a more crucial controlling process and lesser thrust in the organizing process. Practically significant project inefficiency occurs due to slackness in organizing. In such a case, a more powerful thrust on control cannot improve the project.

Primarily, watershed projects emphasize the participatory planning process. However, the coverage of management functions under the planning process is only 50%.

Many planners often downplay the leading process. It is also apparent here. Conflict resolution and the selection of effective communication channels are essential functions for a watershed project. A score of 45.8% is much less than expected.

16.5 Conclusion

This study assumes that the essential management functions are generic and apply to watershed management. In general, there may be a misconception that the management of a watershed project does not suit the purview of project management theory. Management functions are not adequately delineated for the cluster of participant organizations owing to such perception. This cluster acts like a cross-functional work team with complex inter-relationship. It should not deter the applicability of management functions to participant organizational units. Instead, watershed managers can improve project efficiency by focusing on managerial deficiencies.

In watershed projects, beneficiaries are project partners. Although the planners aim at improving their livelihood, assets are primarily created in build-operate-transfer mode. So, the diagnosis of managerial laxity will pave the way for an appropriate intervention designed for better involvement and sustainability. In this

regard, the proposed indexing method will be a valuable tool for watershed managers.

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