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Optimal Level of Participatory Approach in an NGO Development Project

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Many authors, Bradley (2006), Banerjee (2007), Mohan (2008) and Sen (1999) among others, argue that the participatory approach in the development projects of a non-governmental organization, NGO, is more effective and sustainable than the externally imposed expert-driven approach. According to this research stream, the participatory approach promotes self-respect, dignity, inclusiveness, and empowerment of people involved in the project and, simultaneously, it improves the external local environment for the NGO. The key point of this paper is that adopting only the participatory approach may not be optimal, as this approach involves costs to learn about local culture, values and attitudes, and to design and implement feasible participatory development practices. Accordingly, an economically sensible and sustainable strategy for the NGO will be to use a mixture of both approaches. In this paper, the optimal level of participatory approach is theoretically derived and numerically illustrated.

1. Introduction

Non-governmental organizations, NGOs, have been claimed to have become one of the powerful players in economic development of emerging countries for several reasons. Firstly, the number of NGOs working in developing countries has gone up significantly in recent decades (Huggett, 2012; Reimann, 2006). For example, in Pakistan, more than 100,000 NGOs were operating in 2009 relative to a handful in early 1980s (Naviwala, 2010). Secondly, the average size of a typical NGO has increased due to constantly rising funding from Western donors (Reimann, 2006). Thirdly, the NGOs bring modern technology, accounting standards, operating procedures, and up-to-date managerial techniques to host countries, thereby, improving their overall business environments. Finally, by the provision of employment and the payment of relatively higher wages to local workers, they create higher purchasing power for goods and services which through the Keysian multiplier effect, should be conductive to economic growth.

There are, however, negative aspects of NGOs' operations in host countries. The local public perception of NGOs is mostly negative as they are perceived to be imposing the Western values, culture

and way of life, putting local values, culture and way of life under stress. Moreover, the local people may perceive NGOs as carrying political motive of imperialism and hegemonic attitude from their donors' countries. In addition, it has been argued that NGOs are creating a new elite class, particularly in the urban areas, which adopt Western values (Bano, 2008; Jamal, 2013). This can create class struggle and resentment which should be detrimental to growth.

To reduce the negative perception of NGOs' projects and make of development a community based inclusive process, development thinkers emphasize on the adoption of the participatory approach as opposed to the Westernized externally imposed expert-oriented approach (Cornwall, 2003; Sen, 1999; Mohan, 2008). The participatory approach requires showing respect for the worth of local population as persons of high potential and ability to accomplish tasks (Bano, 2008), acquiring knowledge about the needs, customs, religious practices and attitudes towards life of local community, and designing and implementing managerial practices that incorporate inputs from the local community. This inclusiveness is expected to create motivation among local individuals for NGOs' projects. It is interesting to note that, in last decade, the World Bank has allocated close to $80 billion towards participatory development projects (Mansuri and Rao, 2012).

In critique of the participatory approach, some development thinkers argue that this approach has been presented as the best standard in development practice, usually because it draws on such modernist Western assumptions that prioritize democracy, tolerance for difference, and representation for marginalized and elite groups alike (Bradley, 2006). Participatory development, in theory at least, is supposed to give a voice to people whose society restricts their access to power (Morgan 2001) and should be a process that empowers and gives voice to an oppressed segment of the society. In practice, however, as indicated by many field studies, participatory development is used to satisfy the needs of donors, sustain hegemonic power relations, and secure the dominant discourse in the developed world (Desai 2002; Cornwall, 2003; Bradley, 2006).

Through a review of some 400 studies of participatory development based programs, Mansuri and Rao (2013) found limited evidence that this approach has any significant contribution in reducing poverty or increasing accountability and civic capacity. Moreover, practitioners working in the gender and development (GAD) programs argue that participation can become a 'new tyranny' for development workers when it raises unrealistic expectations or overestimates non-governmental organizations (Mikkelsen, 2005). Mikkelsen (2005) contends that participation is not the universal remedy for all problems, as many assume, because there are limits to what interactive participation can achieve in terms of equality and efficiency. There are significant socio-economic inequalities and complex relations of power at the grass roots in developing communities.

In this paper we argue that in order to develop and implement the participatory approach, an NGO needs to incur costs. These costs will involve the value of time, efforts, and money which will be needed to be spent on: (a) learning about the values, customs, culture, religious practices, and the attitude toward life of local public, (b) having cultural sensitivity training, (c) having dialogues, interviews and meetings with the members of local community, and, (d) finally, costs of designing and implementing participatory methods and strategies. Due to these costs, this paper shows that it will be advisable for an NGO to evaluate and implement an adequate and sustainable level of participatory approach which provides the lowest production costs of its project.

NGOs undertake both social projects (schools, hospitals, training centers) and non-social projects (roads, bridges, manufacturing units). This paper focuses on social projects where the level of output is generally targeted a priori by the NGO (for example, for a school: the size of capacity for students, for a hospital: the number of patients' beds). Given the target output of a social project, the success of the project depends on the minimization of total operating costs of the project. This paper suggests a cost minimization model which is theoretically analyzed and subsequently, results are illustrated numerically.

The rest of the paper is organized as follows. Section 2 describes the assumptions and specifications of the model. In Section 3, the theoretical analysis of the model is presented. Section 4 provides a numerical simulation of the model. The summary and conclusions of the paper are presented in Section 5.

2. Model

2.1 Assumptions of the model

An NGO is assumed to undertake a single period project. In an NGO project, there is a serious possibility of agency problem as donors' (who are the principals) specifications of the project may not be exactly followed by the agents, who are the NGO management and host participants, due to their opportunistic behavior. In order to focus on the impact of the costs of participatory approach, we assume that the agency problem either does not exist or stays constant throughout the analysis.

For production, three inputs are required: capital, indicated by K, labour, indicated by L, and the participatory factor, denoted by θ. θ can also be perceived as a favorable motivational factor among project's labour and members of local community, which is positively caused by the participatory approach of the NGO.

It is assumed that each unit of capital costs a rental fee of r, each unit of labour costs a wage rate of w, and each unit of participatory factor entails a cost of c. All these inputs prices are assumed to be known and constant.

The above assumptions imply a production function, in a generalized form is as follows:

$$Q = f(K, L, \theta) \tag{1}$$

Where: Q is the output level
K is the quantity of capital,
L is the quantity of labour, and
θ is the level of the participatory factor

And the total cost, TC, function is given by:

$$TC = rK + wL + c\theta \tag{2}$$

We assume that the NGO undertakes a social project where the level of output is specified a priori, providing the following output constraint:

$$Q_0 = f(K, L, \theta) \quad (3)$$

Where Q_0 is the targeted output.

2.2 Behavioral specifications

As usual, it is assumed that the marginal productivity of each input is positive, that is $\partial Q/\partial K > 0$, $\partial Q/\partial L > 0$, $\partial Q/\partial \theta > 0$, and the marginal productivities of K, L and θ decline with their increasing levels. All cross partials of input factors are assumed to be positive.

Additionally, θ is positively caused by the participatory efforts of the NGO and is specified to be very low when the participatory efforts are zero, that is, the NGO adopts the Westernized expert-driven approach, ignoring local values, customs, religious practices and attitudes. With zero participatory approach, there is more possibility of disruption, sabotages and terrorist acts against the project, adversely affecting the output of the project. As the degree of the participatory approach rises, θ also rises, favourably affecting the productivity of the project.

2.3 Optimization problem about the choice of the participatory factor, θ

Given the above assumptions and specifications, the NGO's management problem is to choose K, L and θ so as to minimize the total costs of the project subject to the output constraint. Namely:

$$\underset{K, L, \theta}{\text{Minimize}} \{rK + wL + c\theta - \lambda (Q_0 - f(K, L, \theta))\} \quad (4)$$

Where λ is the Lagrange multiplier

3. Analysis

3. 1 Graphical illustration of the choice of θ

At given levels of capital, K and labour, L, and denoting the value of per unit of output as P, the following graph provides optimal choice of θ1. (Note that θ is measured in units of fraction 0.1).

In Figure 1, without any cost of the participatory approach, this approach will be adopted fully at point F on the value of output curve. With the introduction of the cost of using the participatory approach, the optimal level of participatory approach is given by point E, where the value of marginal productivity of θ, given by the slope of the tangent at point E, equals the slope of the cost curve of the participatory approach. At the optimal level of participatory approach, denoted by θ*, the profit is maximized or alternatively, the cost is minimized.

$\theta^* < 1$ means that the NGO has to use a mixture of the participatory approach and the expert-driven approach in order to minimize the total costs of the project and achieve its targeted output. The

degree of mixture obviously depends on the value of θ*. If θ* is closer to 1, more will be the participatory relative to the expert-driven approach, and if θ* is closer to zero, more will be the expert-driven approach relative to the participatory approach.

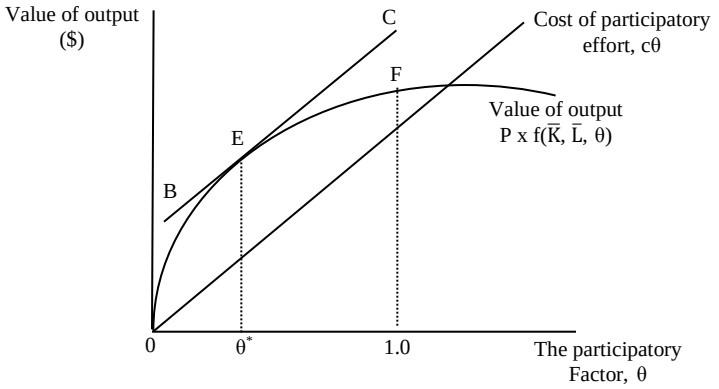

Figure 1: Optimal level of the participatory factor, θ, given capital, $\bar{K}$, and labour, $\bar{L}$

In Figure 1, the levels of other inputs, capital and labour, are held constant. Obviously, if any of the two inputs will change, the value of output curve will shift, and as a consequence, a new optimal level of θ will ensue. Actually, the optimal levels of all inputs, capital, labour, and participatory factor have to be determined simultaneously. We turn to this simultaneous determination in the next sub-section.

3.2 Optimal levels of capital, K, labour, L, and the participatory factor, θ

The optimality conditions are obtained by partially differentiating equation (4) with respect to K, L, θ, and the Lagrange multiplier λ, and equating each differential to zero. Namely[2],

$$\left.\begin{aligned} r - \lambda f_K &= 0 \\ w - \lambda f_L &= 0 \\ r - \lambda f_\theta &= 0 \\ Q_0 - f(K, L, \theta) &= 0 \end{aligned}\right\} \qquad (5)$$

Where $f_K = \delta f/\delta K$, $f_L = \delta f/\delta L$, and $f_Q = \delta f/\delta Q$.

From the first order conditions, we obtain the usual result that the input price marginal productivity ratio must be the same for all inputs, that is:

$$r/f_K = w/f_L = c/f_\theta = \lambda. \qquad (6)$$

Where λ can be interpreted as the marginal cost of production.

The optimal level of each of the inputs can be obtained from the set of conditions in (5) as a function of input prices or costs, the specified level of output, Q_0, and the parameters of the production functions. Thus, the optimal level of the participatory factor, θ^*, can be written as:

$$\theta^* = \theta(r, w, c, Q_0, \text{and parameters of production function}) \qquad (7)$$

It is obvious that θ^* will decline as the cost per unit of θ, c, will rise. The reason is that the participatory factor will become relatively more expensive and will therefore, be substituted by other inputs, capital and labour. Similarly, keeping c constant, if the rental cost of capital, r, or the wage rate, w, would rise, the demand for θ will go up, raising its optimal level. However, the effects of changes in the target output, Q_0, and parameters of production functions are not that obvious. A numerical example in the next Section will show the results of this paper specifically.

The minimum total costs, TC, are given by:

$$TC^* = rK^* + wL^* + c\theta^* \quad (8)$$

4. Numerical Example

For a numerical illustration, we assume a Cobb-Douglas type production function as:

$$Q = A\, K^{\alpha}\, L^{\beta}\, \theta^{\mu} \quad (9)$$

Where A is a positive constant, representing the dis-embodied technical factor, and α, β, and μ are positive fractions.

We assume that α = 0.25, β = 0.75, and μ = 0.5. In addition, we assume the targeted level of outputs, Q^0, is 50 units, A = 5, the rental cost of capital, r = 0.1, the wage rate, w = $4.0, and c = $20 per unit of θ.

With the numerical assumptions above, the first order conditions in (5) become:

$$r - \lambda\, A\, \alpha\, K^{\alpha}\, L^{\beta}\, \theta^{\mu} / K = 0 \quad (10)$$
$$w - \lambda\, A\, \beta\, K^{\alpha}\, L^{\beta}\, \theta^{\mu} / L = 0 \quad (11)$$
$$c - \lambda\, A\, \mu\, K^{\alpha}\, L^{\beta}\, \theta^{\mu} / \theta = 0 \quad (12)$$
$$Q_0 - A\, K^{\alpha}\, L^{\beta}\, \theta^{\mu} = 0 \quad (13)$$

Equations (10) and (12) provide:

$$K^* = \left(\frac{\alpha}{\mu} \times \frac{c}{r}\right)\theta \quad (14)$$

Equations (11) and (12) solve for:

$$L^* = \left(\frac{\beta}{\mu} \times \frac{c}{w}\right)\theta \quad (15)$$

Replacing equations (14) and (15) into equation (13) and solving for θ and simplifying obtains:

$$\theta^* = \left(\frac{Q_0}{A} \times \frac{\mu^{\alpha+\beta} r^{\alpha} w^{\beta}}{c^{\alpha+\beta} \alpha^{\alpha} \beta^{\beta}}\right)^{\frac{1}{\alpha+\beta+\mu}} \quad (16)$$

From this equation, it can be easily seen that the optimal level of θ rises with w or r – the input prices, because as other inputs become relatively expensive, the substitution effect implies that more participatory efforts will be applied. However, with respect to its own cost, c, the relationship is negative as one would expect.

Inserting the numerical values given above in this section obtains the optimal level of participatory factor, θ^*, as:

$$\theta^* = \left(\frac{50}{5} \times \frac{0.5 \times 0.1^{.25} \times 4^{.75}}{20 \times 0.25^{.25} \times 0.75^{.75}}\right)^{\frac{1}{1.5}} \quad (17)$$

$$= 0.786$$

Then, optimal K^* and L^* from equations (14) and (15) are respectively:

$K^* = 78.664$ units of K. (18)
$L^* = 5.899$ units of L. (19)

Replacing these values in the output constraint provides the satisfaction of the constraint as:

$$Q = 5(78.664)^{.25}(5.899)^{.75}(0.786)^{.5}$$

$$= 50 \text{ units of output} \quad (20)$$

And, the minimum total costs of the project is given by:

$$TC^* = 0.1 \text{ x } 78.664 + 4 \text{ x } 5.899 + 20 \text{ x } 0.786$$
$$= 7.866 + 23.596 + 15.72 \quad (21)$$
$$= \$47.182$$

In table 1 below, it is shown elaborately that θ* = 0.786 does provide the minimum cost of production of the NGO's social project.

Numerical values and the constraints are:
A = 5, α = .25, β = .75, μ = .5, r = .1, w = \$4.0, c = \$20, the output constraints: Q_0 = 50 units and K = 78.766 units.

Table 1: Total Cost of the Project for Different Levels of the Participatory Factor, θ

Level of Participatory Factor, θ	Units of Labour, L, to Satisfy the Output Constraint	Cost of the Participatory Factor	Total Costs
0.1	23.342	\$2	\$103.22
0.2	14.693	4	70.57
0.3	11.224	6	58.77
0.4	9.257	8	52.89
0.5	7.977	10	49.78
0.6	7.065	12	48.13
0.7	6.375	14	47.37
*0.786	5.899	15.72	47.18

0.9	5.394	18	47.43
1.0	5.016	20	47.97

In column 1 of Table 1, the values of θ are assumed. In column 2, given capital, K, at its optimal level of 78.664 units, the units of labour, L, are chosen from the production function in order to satisfy the output constraint of 50 units[3]. The cost of using the participatory factor, cθ, and the total costs of the project, TC = rK + wL + cθ, are provided in the last two columns of the table respectively. It is evident from the table that total costs are minimized when θ is chosen to be at its optimal level of 0.786.

5. Summary and Conclusions

While acknowledging the importance of the participatory approach in undertaking development projects in developing countries, this paper argued for an adequate balance between participatory approach and an expert-driven cost effective approach. We argue that the participatory efforts of an NGO has two opposing effects: (1) its increasing levels raise the output level of the project, like other inputs (capital and labour), and (2) the use of the participatory approach entails tangible costs, like costs of using capital and labour. Therefore, the main point of the paper was to demonstrate that using participatory approach 100% might not be optimal for the NGO's project as economic analysis requires equating the value of marginal productivity of participatory factor with the cost per unit. This indicates that a better strategy for an NGO in undertaking and implementing a project in a developing country is to use a mixture of both the participatory approach and an expert-driven approach.

The paper has shown its results using a single period social project with specified target output. The cost minimization method is used. The optimal level of participatory factor is derived as a function of input prices or costs and the output constraint. The results were the theoretically derived and then, numerically illustrated.

While this study focused on a single period development project, there are several research implications in diverse directions, including: (1) the estimation of costs of participatory approach and we suspect that these estimates will differ regionally within a country and will be significantly different among different developing countries. One of the key reasons of these differences is the variations in perceptions and attitudes toward NGOs and foreign donors within different cultures; (2) this paper proposed a single period investment model and a natural extension will be to apply its approach to a multi-period investment project. In a multi-period model, the longevity of the project, its salvage value, and its annual operating cash flows will be dependent on the participatory approach and its associated costs. (3) The ensuing policy considerations by the host government are another dimension of future research on the costs of participatory approach. The host government may design policies to promote a better understanding among local population about the usefulness of the NGO projects thereby lowering the costs of developing the participatory approach by NGOs.

Notes:

[1] Figure 1 represents the profit maximization context which is simply the dual of the cost minimization.

[2] Given the assumptions of the model in Section 2 and some further restrictions on cross partials, the second order conditions for minimization are also satisfied.

[3] Or equivalently, L can be kept at its optimal level of 5.899 units, and K is chosen at different levels of θ in order to satisfy the output constraint.

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