

VARIABLES PREDICTING FARMER PARTICIPATION IN THE MANAGEMENT OF SMALLHOLDER IRRIGATION SCHEMES; IMPLICATION FOR PROJECT PLANNING AND DESIGN IN KENYA

Mr. Ismael O.Oduor*

Abstract

In smallholder irrigation schemes in Kenya, cost recovery that is also used as measure sustainability is low and extent to which farmers' income, access to irrigation water and individualism predict farmer participation in the management of irrigation water and cost recovery is not known yet this knowledge may be useful to project designers in helping to increase area of land put under irrigation. This paper used desktop study methodology of peer reviewed empirical literature to analyze how these variables may predict farmer participation in irrigation water management and cost recovery. Literature reviewed suggested that these variables may predict farmer participation and cost recovery which in turn determines payback period and therefore has implications on project planning and design. Based on these findings this paper concluded that extent to which farmers' income, access to irrigation water and individualism predict farmer participation and cost recovery was a knowledge gap that needed to be investigated. This paper suggested that an empirical study may adopt descriptive cross sectional survey research design and correlation research design to establish the extent to which these variables may predict farmer participation and cost recovery and concluded that such study may add knowledge to project designers and help reduce payback period through increased cost recovery, enhanced sustainability of smallholder irrigation schemes and by extension help attain Kenya's national irrigation target of 300,000ha from a baseline of 160,840ha by 2030.

Key words: Farmer participation; Famer's income; Cost recovery; Access to water; Individualism.

* Doctorate Program;Department of Open & e-Learning,School of Open, Distance & e-Learning,University of Nairobi, Kenya.

1. Introduction

Until the late 1970s, development discourse emphasized the role of State and development partners in delivering community projects through top down processes. This approach was progressively challenged because it failed to address the underlying causes of low sustainability of community projects as Steen (2012); Pennington (2004); Dorsan (2004) acknowledged that beneficiaries were ignorant, couldn't decide what was appropriate and therefore were not expected to identify their own needs (Mulwa, 2008). The ineffectiveness of this externally imposed and expert-oriented planning and management became evident in late 1980s and early 1990s, when development partners and state agencies started adopting participatory approaches as alternative strategies to project implementation (Elaine and Sundeep, 2007) because failure of such projects led to a shift in interest by public policy makers and academicians towards beneficiary participation. This shift was the evidence that most projects were not sustainable upon completion.

By late-1990s, application of participatory approaches in project planning and design was common practice (Yercan 2003) lending credence to a shift in donor mindset that failure of most community initiatives was due to attempts to impose standard projects on diverse local realities that did not address beneficiary needs (Nici and Wright, 1997). This shift was (and still is) based on the maxim that community projects are people centered and not production oriented as (Kurt and Warren, 1989; FAO, 2003) argue that such unsuccessful initiatives were (and still are) due to absence of beneficiary participation in planning and implementation. Ministry of Water and Irrigation (2013) observe that participatory approaches are the basis of farmer participation in management of irrigation water that influences sustainability; a fact that is empirically observable through cost recovery. However, despite these indications, extent to which farmers' income, access to irrigation water and individualism predict farmer participation and cost recovery is not known among smallholder irrigation schemes in Kenya yet this knowledge may be useful to project designers in increasing area of land put under irrigation from a baseline of 161,840 ha to 300,000 ha by 2030 (Ministry of Planning and National Development (2007). This paper discusses how these variables may predict farmer participation in the management of irrigation water and cost recovery. The objectives of this paper therefore are;

- i. To discuss how income from irrigation may predict farmer participation in the management of irrigation water and cost recovery of smallholder irrigation schemes in Kenya.
- ii. To discuss how access to irrigation water may predict farmer participation in the management of irrigation water and cost recovery of smallholder irrigation schemes in Kenya.
- iii. To discuss how individualism may predict farmer participation in the management of irrigation water and cost recovery of smallholder irrigation schemes in Kenya,

2. Research Method

This is a theoretical paper that adopted desk top review methodology. The researcher first identified key themes based on variables related to the topic and then explored various empirical literature on each theme. Evaluation, Analysis and synthesis were then used to identify gaps on each theme.

3. Discussion and Analysis

In order to recover the cost of investments in an irrigation scheme, farmer participation in the management of smallholder irrigation scheme, their management of irrigation water is mandatory. However, the influence of farmer participation on cost recovery may not be that obvious due to their income, access to irrigation water and individualism as factors within the scheme that may moderate this relationship. This relationship in turn has a bearing on the payback period of irrigation scheme and is important in cost recovery. *Payback period* is the time taken to recover the cost of an investment. Project Management Institute (2013) conceptualize payback period as the number of years needed by an organization to recapture initial investment cost of a project while (Johnson 1999) defines it as the expected time for aggregate positive cash flows to equal the initial cost. Similarly, Scheepers (2003) describes it as the measures of time (or simply the expected number of years) it takes to recoup the cost of an investment. From these conceptual understanding, it is clear that payback period of a smallholder irrigation scheme is that period time it takes for the project to start operating sustainably after paying back all investment cost.

Farmers' income is money earned from irrigation enterprises. Ngigi (1999) conceptualizes farmers' income as 'earnings' from the irrigation while (Asayehegn, 2012) conceive it as earnings generated from the use of irrigation water. Cost recovery on the other hand is the value of irrigation investment paid out by farmers when they use irrigation water. The most commonly used cost recovery method is area-based water charges in which fixed cost on irrigated land or land that is supposed to be irrigated is divided by the total area of land put under irrigation over time to give an indicative of the total cost operation and maintenance and the cost of the irrigation systems (Prato, 1998). Based on these explanations, Bamidele, Ogunlade, Ayinde, and Olabode (2010) established that farmers' income has direct influence on cost recovery. Gbenga, Babatunde, Adenuga and Olagunju (2014); Adeniji (2011) concur with this finding when they also showed that the higher the income earned by farmers, the higher the cost recovery of the irrigation scheme. This means that when farmers' income increase, a corresponding increase in cost recovery is realized. Van den Berg (2013) however disagrees when he demonstrated that farmer's income does not influence cost recovery. This means that farmer's income may not necessarily influence cost recovery. In all the cases reviewed other than that by (Van den Berg, 2013), it was established that farmers' income positively predicts cost recovery. It is therefore logical to deduce that if farmers' income has influence on cost recovery, then it may as well predict both farmer participation and cost recovery. This knowledge is not known yet it may be critical in increasing cost recovery of irrigation projects thereby reducing the payback period.

Similarly, access to irrigation water is the ease with which farmers distribute water amongst themselves within an irrigation scheme. Phansalkar (2006) visualizes access to irrigation water as the equitable water distribution condition within the scheme command area. Van der Zaag (2007) on his part conceptualizes it as upstream and downstream asymmetry in water distribution while (Ngigi, 1999) states that any effort to improve water distribution arrangements must consider its accessibility. That is why Chibisa, Mautsa and Mukoto (2008) demonstrated that farmer participation is higher among head end water users compared to their middle and tail-end counterparts in the scheme command area because of its accessibility for which (Chadran and Chakacherry, 2004) established a regression coefficient of 0.756 between farmer participation and access to irrigation water. Similarly, Kalkheili and Zamani (2008) showed that when water is

not accessible, farmer participation is considerably reduced. This means that access to irrigation water and farmer participation in management of irrigation water is positively related.

Masicat, Sandanan and Pascaul (1990) however disagree with these finding when they demonstrated that access to irrigation water does not influence farmer participation since tail end water users usually adopts water use efficient methods without necessarily withholding their effort in participation. This means that access to irrigation water has varying influence on farmer participation. Whereas Kulkarni and Tyagi (2015); Chibisa, Mautsa and Mukoto (2008) used descriptive survey design (Masicat, Sandanan and Pascaul (1990) used case study while (Chadran and Chakacherry 2004) adopted correlation design yet their results are different. These study findings reveal that access to irrigation water does not necessarily predict farmer participation. Other than Chadran and Chakacherry (2004) the other researchers did not demonstrate the extent to which access to irrigation water determine farmer participation in management of irrigation water yet this relationship may be important to cost recovery with possible implications on reducing the payback period. From this discussion, it is apparent that access to irrigation water may or may not influence farmer participation in irrigation water management. It is therefore it is only logical to deduce that access to irrigation water may or may not predict influence of farmer participation and cost recovery. However if it does then the extent to which this access to water may predict farmer participation and cost recovery is not known to project designers yet this knowledge is critical for increasing cost recovery that can reduce payback period.

Hornby (2010) defines individualism as an act of self-interest while Plateau (2004) conceives it as a situation where a farmer may reduce his own effort from where he alone gains in benefits shared among many others in the irrigation scheme. Bardhan (1993) similarly conceptualize individualism as a situation in which some farmers get substantial benefits from irrigation water that exceeds their marginal cost of participation; implying that some farmers take advantage of their colleagues by abstracting water for irrigation without compensating for it. That is why Hardin (1968) argues that internalizing externalities that avoids such exploitation requires imposition of a management system that discourages such individualistic tendencies. Olson, (1965) argues that the number of farmers who extract water for free is proportional to those

unwilling to pay for its abstraction. That means that as the number of farmers accessing water for free increases, most likely the number of those who do not participate in its management also increases.

Wade (1998) established that when the number of farmers in an irrigation scheme is small, each farmer may benefit in excess of their marginal cost of participation thereby substantially reducing the possibility of individualism. However, when the size of an irrigation scheme is large, the number of farmers who exhibit individualist tendencies also increases leading to reduced participation. Faysse (2005) concurs when she too observed that an individual's benefit from collective action was higher in smallholder irrigation schemes than in large ones. This means that the larger the number of farmers who access water without compensating for it the lower so is their level of participation in the management of irrigation water. From this discussion, it is clear that individualism has influence on farmer participation in irrigation water management, yet it is also true that farmer participation has influence on cost recovery. It is therefore logical to deduce that individualism may predict the influence of farmer participation on cost recovery. However, the extent to which individualism predict farmer participation and cost recovery is not known to project designers yet this knowledge may be critical in increasing cost recovery so as to help reduce payback period.

4. Conclusion

This paper examined how farmers' income, access to irrigation water and individualism may predict farmer participation in the management of irrigation water and cost recovery of smallholder irrigation schemes. For the first objective this paper tentatively concludes that income from irrigation enterprises may predict farmer participation and cost recovery yet the extent to which it may predict these variables is not known to project designers and therefore a knowledge gap. For the second objective, this paper tentatively concludes that access to irrigation water may predict farmer participation and cost recovery yet the extent to which it may predict these variables is unknown to the project designers and therefore a knowledge gap. For the third objective, this paper tentatively concludes that individualism may predict farmer participation and cost recovery yet the extent to which it may predict these variables remains unknown to project designers. This paper therefore tentatively concludes that the extent to which

farmers' income, access to water and individualism predict farmer participation and cost recovery is a knowledge gap that needs further investigations. Knowledge gained from this study may be useful to project designers for increasing cost recovery and reducing payback period of smallholder irrigation schemes. This paper suggests that an empirical study is necessary for establishing the extent to which these variables predict farmer participation and cost recovery. Such a study may adopt descriptive cross sectional survey research design and correlation research design to establish the extent to which farmers' income, access to water and individualism may predict farmer participation and cost recovery of smallholder irrigation scheme. Such a study may add knowledge among project designers in reducing payback period through increased cost recovery and by extension increasing sustainability of smallholder irrigation schemes. This knowledge may be useful in the development of human capital of smallholder irrigation farmers in the attainment of Vision 2030 target of 300,000ha in smallholder irrigation schemes in Kenya.

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