International Journal of
Human Resource and Leadership Journal
(HRLJ)

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CARI Journals

Human Resource and Leadership Journal
ISSN 2520-4661 (Online)
Vol.2,Issue No.2,pp 108 -130, 2017
www.carijournals.org

ROLE OF STAKEHOLDER PARTICIPATION IN GOVERNANCE OF RICE PRODUCTION IN KIRINYAGA COUNTY, KENYA

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Abstract

Purpose: The purpose of the study was to examine the participation of key stakeholders in the governance of rice production in Mwea Irrigation Scheme (MIS) in Kirinyaga County in Kenya.

Research Methodology: Data were also collected through interview of farmers and employees of National Irrigation Board and MIAD using a structured questionnaire. The questionnaire was tested using the Cronbach's Alpha Index and showed a high (+0.8) internal consistency and reliability. The study used multi-stage cluster sampling technique to select one zone from the five zones in MIS and randomly selected a sample of 50 farmers from the selected zone. The employees of National Irrigation Board and MIAD were clustered into management and field/technical staff and a purposive sample of 12 and 8, respectively, was drawn from each cluster. A sample of 60 respondents were interviewed. A time series model was used to generate a trend line for rice production. A regression correlation model, generated using SPSS Version 23, was used to analyze the relationship between variables.

Findings: The findings showed that farmer participation in governance has a positive and significant relationship to rice production. Specifically, farmers' participation in governance has a positive linearly significant influence on rice production. Further, the study found that the governance role of NIB has a positive and significantly influence on rice production. Finally, the role of MIAD was found to be positively and significantly related to rice production. Specifically, the role of MIAD was found to have a positive linearly significant influence on rice production. The three key stakeholders considered explained a significant variation of 58 per cent in rice production, with NIB role explaining more followed by farmer participation and then MIAD.

Recommendation: This study has shown that farmers' participation in governance of rice production has a positive and significant relationship with rice production. It is therefore recommended that their involvement in governance activities be structured so that their participation directly and indirectly through committees or their cooperative is deliberative and meaningful. This means that they participate in discussions, debates and presentations and in making decisions on substantive policy, and operational issues.

Keywords: *governance, NIB participation, MIAD, rice production and MIS*

1.0 Introduction

Governance, leadership and management which enlist the participation of key stakeholders, have been established as the driving forces behind the achievement of improved food supply, nutrition and health outcomes. Behind declining food production, devastating effects of drought, declining state of health service delivery, there is a deterioration in governance, leadership and management, (Rice, 2012; Kelly, 2010; Sen, 1999). This realisation motivated this study. This study sought to find out the influence of participation of key stakeholders in governance on rice production in a large, complex irrigated scheme in rural Kenya.

Kenya is a food and nutrition insecure country. Food shortages have been a common phenomenon over the last two decades because of declining farm productivity which has been occasioned by low fertility levels, high input costs, unreliable weather and rising population. Climate change has worsened weather unreliability in a country whose food production mostly depends on rain-fed agriculture. Because of food shortages, the state has had to provide food relief for part of the population, and farmers have been provided with input subsidies. These actions have diverted funds meant for investment in other priority social and economic programmes to relief food and farm input subsidies, thus slowing the overall economic development, (Republic of Kenya, 2007; Karina & Mwaniki, 2011).

In the last five years (2010/2011-2014/2015), the rice production rose by unprecedented 94% from 52,000 tonnes to 91,624 tonnes (KNBS, 2016), continuing a growth trend that started after NIB took over the overall governance, leadership and management of the scheme in 2003. Some initiatives such as System of Rice Intensification (SRI) programme has completely changed the quality and improved some of the farmers' crop. The system enlists farmer participation in sensitization, training, crop quality management, and all value chain activities. This approach seems to resonate with the theory and practices promulgated globally about public participation as a key performance indicator in community-based development.

Public participation at all levels is highlighted in the Sustainable Development Goals (SDGs), (United Nations, 2015) as a pillar in the achievement of those goals. The Kenya Constitution (Republic of Kenya, 2010) recognizes and entrenches public participation as a key pillar in decision making on matters affecting the public. The County Public Participation Guidelines, (Republic of Kenya, 2016) institutionalizes the practices of public participation in decisions and issues that affect them in all Counties. Earlier, public participation was established as a "central element in public policy-making", (Warburton, Wilson and Rainbow, 2012), and a tool for creating space for real dialogue, building trust and discussing the consequences, costs, and trade-offs of various policy options as well as working through the emotions and making decisions that the participants own, (NCDD, 2010). It is a process through which stakeholders can influence and share control over development initiatives, and over the decisions and resources that affect them, (AfDB, 2006). Kimani et al, (2011) demonstrated in their empirical study that farmers' participate at development and selection stages of improved crop varieties and promoted adoption of the varieties and related technologies.

Diversity and gender have been considered as critical factors which strengthen democracy, empower citizens and reinvigorate citizen participation. Organizations need to ensure that diverse participation is valued, rigorously sought and routinely implemented, to sustain organizational growth and productvity over the long term, (Feldman,& Khademian,. 2007). Including men, women, youth and people from different backgrounds and orgnizations bring different perspectives which enable a broader range of choices, improved decision-making and contributions of effort and resources, without which the perfromance of an organization would be sub-optimal, (Oxfam/GROW, 2015). The leadership and governance approach which enlist participation of stakeholders, and which encompass diversity and gender was explored in this study.

Studies in Kenya, for example, Kabutha and Mutero, (2002), have stated that the world over, large scale rice schemes have been governed, led and managed by centralized agencies under which farmers have been passive participants in schemes meant to benefit them. But they recognize that with increased awareness, farmers demand for inclusion and greater say in the way the scheme is governed, led and managed. According to them, this is what happened in the case of Mwea Irrigation Scheme.

Ndegwa, (2014) states that when farmers in MIS failed to deliver their crops to the NIB in 1998 and stopped utilizing all government systems relating to the management of the scheme, the action put "an end to nearly 60 years of government control over the scheme". This statement seems to imply that the government had excluded the farmers in the control and management of the scheme. It also implies that when the farmers took over, they excluded NIB and related government agencies in the control and management of the scheme. Either way, there has been exclusion of one stakeholder by another.

1.2 Problem Statement

From the theoretical and empirical studies reviewed, governance which enlists stakeholder participation involving both government agencies and farmers, and other interested parties underlie the success of most rice farming success. Global rice production has been supported by stakeholder participation, key among which are the government, research institutions, farmers and their social networks such as cooperatives. Through participation, farmers become receptive to policy decisions, new initiatives and adopt improved rice varieties and other technologies and thus influence levels of rice production, (Avritzer, 2012; GreenSpan, 2014; Oxfam, 2015; Maclean, Handy and Hettel, 2013).

But Kabutha and Mutero (2002), in their study of MIS leadership and governance by NIB and farmers' cooperative, opines that large scale rice schemes have been managed and led by centralized agencies under which farmers have been passive participants in schemes meant to benefit them. The participation of farmers in governance in MIS was explored in this research. MIS has had three successive governance, leadership and management regimes in the period before 1998, the period between 1998 and 2003, and from 2003 to date. Other empirical studies such as Ndegwa, (2014) indicate that the first period was characterized by governance, leadership and management provided by a government agency with the farmers playing a peripheral role. In the second period, the farmers managed the affairs of Mwea Irrigation Scheme with the government agency (NIB) playing no role at all. In the third period, the NIB played a lead governance, leadership and management role, with farmers participating in various roles in

the rice value chain activities. This study mapped the relationship between the governance roles of both NIB, MIAD and farmers, on the one hand, and the production of rice at MIS on the other. The data from Economic Surveys (KNBS, 2016), indicate an unprecedented overall increase in rice production by 94% in the last 5 years (2011-2015). But local studies reviewed including Ndegwa, (2014), have not explained this phenomenal increase in production. This study explored the governance and leadership practices of NIB during this period that contributed to the significant change in rice production. The governance practices in the years before NIB was thrown out in 1998 and after the farmers took over for five years were also explored to provide lessons for practices that work or not work in that context with respect to rice production.

While governance and, in particular, stakeholder participation, and crop production has been studied in other jurisdictions, (including studies conducted by Maclean, Handy and Hettel, (2013), local studies on MIS reviewed did not focus on the relationship between governance (specifically stakeholder participation) and changes in rice production. This study has filled that gap.

1.3 Objectives of the Study

The general objective of this study was to establish the role of stakeholder participation in governance of rice production in Kirinyaga County, Kenya.

Specifically, the study sought:

1. To establish how farmers participate in the governance of rice production in MIS,
2. To determine how NIB participation in governance influences rice production in MIS.
3. To ascertain how MIAD influences rice production in MIS

2.0. Theoretical Framework

2.1 Agency Theory

Agency theory is defined as the relationship between the principals, such as shareholders (in this study, farmers), and agents including executives and managers. In this theory, shareholders, who are the owners or principals of the organization, hire the agents to perform work. Principals delegate the running of business to the managers who are the shareholder's agents. Agency theory reduces the organization to two participants of managers and shareholders and suggests that employees or managers in an organization can be self-interested. Under this theory, the shareholders expect the agents to act and make decisions in the principal's interest. But on the contrary, the agent may not necessarily make decisions in the best interests of the principals, thus falling short of congruence between the aspirations of the principal and the agent's pursuits. Agency theory was therefore introduced basically as a separation of ownership and control. (Solomon, 2013).

The assumptions in Agency theory including the fact that both the principal and the agent are motivated by self-interest, appear to lead to inherent conflicts because the agent may pursue objectives that serve self-interest and deviate or conflict with the goals of the principal. Yet, agents are supposed to act in the sole interest of their principals. The greater the propensity of the agent to pursue his or her own interest, the greater the loss to the principal. Loss is minimized when there is a congruence between the agent's goals and those of the principal. Secondly, loss may be minimized when the principal is knowledgeable about the consequences of the agent's activities. The assumption that the agent has a moral responsibility to act in the best interest of the principal may hold as long as the agent is moral enough or his or her interests are sufficiently

covered by the incentives given by the principal to the extent that there is little temptation to act otherwise, (Eisenhardt, 2009).

2.2 Stakeholder Theory

Stakeholder theory relates to any group or individual who can affect or is affected by the achievement of organizational objectives. The theory suggests that managers in organizations have a network of relationships to serve including the suppliers, employees and business partners. Other than the owners, managers and employees, this network is important and requires management attention. According to this theory all stakeholders participate in a business to gain benefits, and the purpose of the organization is to create wealth for its stakeholders. While this theory is concerned with the relationships in terms of processes and outcomes for organization and its stakeholders, it focuses on managerial decision-making and stakeholder interests. It does not assume existence of any set of interests dominating the others, (Tricker, 2015). The study sought to find whether NIB acts to gain benefits for itself and the farmers and whether it made decision in the interest of all other stakeholders.

3.0 Research Methodology

This research adopted a longitudinal research design. It is longitudinal because rice production data was collected over a period of 27 years. The rationale for choosing such a period is to enable patterns of leadership and governance initiatives and practices, on the one hand, and their relationship with rice production, on the other, to be mapped out over the period of three regimes. The target population for this study was all the farmers in Mwea Irrigation Scheme (MIS), and all NIB and MIAD employees in MIS. The population comprised an estimated 400 farmers, 100 NIB employees and 50 MIAD employees. These sets of populations were targeted because they participate directly in various governance and operational roles in the rice value-chain activities at MIS.

The sampling frames for this study were the lists of all farmers, NIB and MIAD employees at MIS. These lists were available and were obtained from NIB offices in Mwea Irrigation Scheme. This study obtained a sample of 50 farmers which was more than 6 times the theoretical minimum sample size of 8. For NIB, a purposive sample of 12 employees which was 1.5 times the theoretical minimum which was taken. For MIAD, a purposive sample size of 8 employees was taken. In total a sample size of 70 was selected for this study. The information from secondary data was obtained from documents which were identified in advance such as annual reports of NIB relating to all value-chain activities and roles played by various stakeholders. Other documents reviewed include rice production 2008-2018 strategic plan available on-line and empirical studies on MIS. The rice production data were obtained from KNBS annual *Economic Survey* reports for 1990 to 2016.

Quantitative data obtained such as the rice production statistics over the period under study and the number and frequency of various interventions/engagements were reviewed, compiled and analyzed using time series model. Time series analysis concerns the analysis of data collected over time to identify whether there is some pattern in the values collected. In the case under study, the level of stakeholder involvement (independent variable) was mapped against governance in rice production (dependent variable) over the period 1989 to 2015 and graphical patterns emerging identified. A regression model of correlation analysis complete with ANOVA was used to establish the relationship among the variables. The data was analysed using SPSS Version 23. Qualitative data was analysed and described according to themes. The findings were presented in narrative format, tables, graphs and figures, as appropriate.

4.0 RESEARCH FINDINGS AND DISCUSIONS

4.1 Response Rate

The researcher received filled questionnaires from 60 out of the targeted 70 respondents, giving an overall response rate of 85.7 per cent which was high enough to provide sufficient data to answer research questions. There were 47 farmers out of 60 respondents with the rest (13) being NIB and MIAD employees. From Table 4.1, 94% of the farmers targeted were interviewed, while 58.3% of NIB employees and 75 of MIAD employees targeted responded to the questionnaire. These percentages indicate a significantly large number of each group of targeted respondents participating in the interviews. Table 1 below summarizes the response rates against the target.

Table 1: Response rate.

Respondent Description	Actual Respondents	Target Respondents	Actual/Target Percentage
Farmers	47	50	94.0
NIB Employees	7	12	58.3
MIAD Employees	6	8	75.0
Total	**60 (85.7%)**	**70 (100%)**	**-**

4.2 Descriptive Analysis of Study Variables

4.2.1 Farmers Participation in Governance of Rice Production in MIS

To gauge the extent to which farmers participated in the governance of rice production, this study examined various aspects that would give indications about their participation in governance. Among the key aspects was the farmer's participation in election of officials or representatives to various governance committees; key functions of elected committee members; as well as farmers' attendance at consultative meetings and annual general meetings. In addition, the study examined whether farmers or their representatives made key decisions such as replacing MIS's governance, leadership and management agent. Also, examined, was farmers' participation not only in training and sensitization programmes to improve their skills in rice husbandry and advocacy for desired changes in policy, prices of produce and other aspects of leadership and governance that affect their interests.

The findings of the study regarding the participation of farmers in the governance of rice production are detailed in Table 2. For purposes of interpretation of these findings, the study considered the responses of "agree" and "strongly agree", together, as indicating that the farmers clearly participate in the aspect under examination. For example, in terms of election of officials or representatives to serve in various governing committees, 85% of the respondents agreed that farmers elect water management committee members, while 58% of the respondents agreed that farmers elect representatives to work with NIB technical staff on other aspects of rice production. In addition, 87% agreed that farmers elect officials of Mwea Rice Growers Multi-Purpose Cooperative Society (MRGMCS). These significant ratios indicate that farmers elect members to the various committees which oversee different functions in MRGMCS.

In terms of decision making, 57% agreed that elected committee members make decisions on procurement of service providers such as transporters or marketing agents, and that 55% agreed that elected committee members make decisions on changes to policy and operating systems. These percentages indicate that through their representatives, farmers make high level decisions

to a notable extent. But major decisions are made at the cooperative annual general meetings (AGMs) of farmers. The study found out that 61% of the respondents confirmed that farmers attended meetings called by NIB, and they have occasionally made key decisions such as replacing a governance, leadership and management agency such as NIB or their cooperative when they did not meet their expectations as confirmed by 37% of the respondents. Farmers are also consulted when important decisions need to be made. A significant 63% of the respondents agreed that farmers attend consultation meetings with NIB and other stakeholders.

In terms of advocacy, 78% of the respondents agreed that farmers demand accountability of actions and use of resources by NIB. In addition, 74% of the respondents agreed that farmers advocate for better prices for their produce and for other desired changes in policy and operational procedures. Farmers also participate in training to enhance their capacity to increase rice production. This was confirmed by 81% of the respondents who agreed that farmers attend training and sensitization on new farming techniques. Farmers also participate in research and extension activities such as pilot schemes and giving feedback to researchers, among others. This was confirmed by 53% of the respondents.

Table 2: Farmers Participation in Governance of Rice Production in MIS

Statements	Strongly Disagree (%)	Disagree (%)	Neither agree nor Disagree (%)	Agree (%)	Strongly Agree (%)
Farmers elect water management committee members	2	11	1	44	41
Farmers elect representatives to work with NIB technical staff on other aspects of rice production	6	14	23	42	16
Farmers elect officials of Mwea Rice Growers Multi-Purpose Cooperative Society	1	3	9	40	47
Elected committee members make decisions on procurement of service providers such as transporters or marketing agents	5	7	32	40	17
Elected committee members make decisions on changes to policy and operating systems	13	10	22	36	19
Farmers attend meetings called by NIB	10	19	9	50	11
Members have replaced a governance, leadership and management agency such as NIB or their cooperative when they did not meet their expectations	6	25	33	24	13
Farmers attend consultation meetings with NIB and other stakeholders	15	16	6	49	14
Framers demand accountability of actions and use of resources by NIB	16	2	5	65	13
Farmers advocate for better prices for their produce and for other desired changes in policy and operational procedures	6	9	11	53	21
Farmers attend training and sensitization on new farming techniques	6	9	3	55	26
Farmers participate in research and extension activities-pilot schemes, giving feedback to researchers	24	16	7	44	9

Farmers' Cooperative

Framers participation takes two forms. These are: Direct participation such as in consultative forums and annual general meetings; Indirect participation through representation in committees and through an agent that they create to provide leadership, governance and management such as their cooperative. At some point between 1998 and 2003, the farmers' cooperative took over the role of leadership, governance and management of MIS from National Irrigation Board. But after the cooperative relinquished that role to NIB, it continued playing certain roles on behalf of the farmers. These roles were examined in this study as part of farmers' participation in governance of rice production. The results are as indicated in table 3.

Table 3: Governance Roles of Farmers' Cooperative

Statements	Strongly Disagree (%)	Disagree (%)	Neither agree nor Disagree (%)	Agree (%)	Strongly Agree (%)
MRGMCS mills farmers' rice produce	3	1	3	48	44
MRGMCS markets rice on behalf of farmers	3	1	5	38	53
MRGMCS maintains rice irrigation system	9	35	2	14	40
MRGMCS transport of rice to the millers and markets	5	19	9	25	42
MRGMCS lobbies for farmers' rights	5	17	6	28	45
MRGMCS finances farmers to obtain farm inputs and other needs	2	2	2	48	46
MRGMCS has developed policies, procedures and systems for rice production, processing and distribution	3	10	14	32	41
MRGMCS has in the past provided governance, leadership and management of production, processing and marketing of rice	3	9	3	49	35
MRGMCS in Annual General Meeting presents annual reports and accounts to members	0	13	2	35	51
Farmers trust MRGMCS as the management agent of their rice production, financing and other support	1	9	9	39	42

4.2.2 Governance Role of MRGMCS and its Influence on Rice Production in MIS

To be able to get an indication about the extent of influence of MRGMCS through its participation in governance of rice production in MIS, this study examined various aspects that would give indications about their participation in governance. Among the key aspects are existence of structures, policies, procedures and systems known to farmers; degree of farmer involvement including gender inclusion; methods and frequency of farmer engagement; and legitimacy as measured by specified key indicators.

From the findings, 92% of the respondents agreed that MRGMCS mills farmers' rice produce; 91% agreed that MRGMCS markets rice on behalf of farmers; 54% agreed that MRGMCS maintains rice irrigation system, and 67% agreed that MRGMCS transport of rice to the millers and markets. Additionally, 94% agreed that MRGMCS finances farmers to obtain farm inputs and other needs. In terms of performing functions that pool together farmers' produce, and mills, markets and transports, and maintaining the irrigation systems, and providing critical inputs, the cooperative also performs what are typically governance functions.

For example, the farmers' cooperative (MRGMCS) lobbies for farmers' rights. This was confirmed by 73% of the respondents. The cooperative has also developed policies, procedures and systems for rice production, processing and distribution. This was also confirmed by 73% of the respondents. In addition, 84% of the respondents confirmed that MRGMCS has in the past provided governance, leadership and management of production, processing and marketing of rice. As part of its governance role, MRGMCS calls annual general meetings, where it presents annual reports and accounts for adoption and approval by members. This was confirmed by 86% of the respondents. Accounting for actions to the members is one way of satisfying legitimacy criteria of a governance agency. Legitimacy is also demonstrated when an agency is trusted by the led or beneficiaries. The respondents (81%) confirmed that they trusted MRGMCS as the management agent of their rice production, financing and other support.

Overall, the farmers participate in governance activities directly through attending consultative meetings and annual general meetings and making important decisions that affect their interests. They also participate indirectly through elected committee members who oversee the various functions such as water management within the scheme. Finally, farmers participate in governance activities through their cooperative which not only provide common services such as facilitating financing and provision of inputs but also milling, marketing and transportation of produce. The evidence provided is strongly indicative of farmer participation in governance of rice production in MIS. But, it does not say much about whether the same level of participation was evident before 1998 when farmers took over the running of the scheme from NIB. The findings are shown in Table 4.

Table 4: Governance Role of NIB

Statements	Strongly Disagree (%)	Disagree (%)	Neither agree nor Disagree (%)	Agree (%)	Strongly Agree (%)
There are structures, policies, procedures and systems for operations and finance	6	32	5	52	6
NIB policies, procedures and systems are known to farmers	10	24	17	38	11
NIB involves farmers in decision making on issues relating to research, governance, leadership and management of rice production, processing and distribution	15	28	23	28	6
NIB includes women farmers in decision making on governance, leadership and management	13	30	28	30	0
When NIB engages farmers, it allows them sufficient time to consider and discuss an issue in depth before they make decisions	14	43	14	26	3
In forums with farmers, NIB making expert presentations and farmers ask questions	8	38	11	32	11
When consulting farmers, NIB presents proposals and allows discussions, debate and obtain consensus on issues touching production, processing and marketing of rice produce	14	14	18	45	9
NIB meets farmers more than twice in a year	28	38	16	14	5
NIB Lobbies for farmers' rights	29	39	13	14	6
NIB has power and autonomy, and is trusted to maximize production of rice	16	32	22	23	8
NIB pays farmers for their produce on time	37	33	13	9	8
NIB ensures that inputs such as fertilizers, seeds, new rice varieties are available on time for use by farmers	26	30	21	17	7
NIB uses processes and procedures that are transparent, fair and efficient in delivering services to the farmers	15	50	6	25	5
Farmers value the quality of services delivered by NIB	16	30	16	22	17
Farmers trust the leadership and managers of NIB	17	32	15	23	14
Leaders and managers of NIB are people of integrity	21	23	17	26	14

Structures, Policies, Procedures and Systems

NIB has structures, policies, procedures and systems, known to farmers to some extent (49%), to guide all aspects of rice operations. This was confirmed by 57% of the respondents. But the level of involvement of farmers in decision-making is relatively low. Only 34% of the respondents agreed that NIB involves farmers in decision making on issues relating to research, governance, leadership and management of rice production, processing and distribution. In terms of gender inclusion, 30% agreed that NIB includes women farmers in decision making on governance, leadership and management (being members of committees that set scheme/cooperative/group direction, making key decisions; advocating for better prices for rice produce, etc.), and management. From these data, it does not appear that the structures, policies, procedures and systems in place are widely known by the farmers. Further, the degree of involvement of farmers, including women farmers appears relatively low. This contrasts with the responses about farmer participation where the respondents (mostly farmers) had indicated that farmers participated significantly in governance activities. On observation is was found out that the respondents talked very positively about themselves but negatively about NIB who could have done one or more things that displeased them and which shape their attitude towards it. If this is the case, the role of NIB in governance of rice production is not necessarily negative but may raise questions about its continued legitimacy. But these views need to be taken together with other considerations before measuring the level of influence and performance of NIB in rice production.

Methods of Farmer Engagement

The manner of engagement of farmers would be indicative of whether the engagement is an empowering one which allows participants to make significant input and shape decision making, or one which is meant to make them feel they have participated yet their contribution is negligible and cannot, in any meaningful way, influence decisions. The respondents indicated that when NIB engages farmers, it does not allow them sufficient time to consider and discuss an issue in depth before they make decisions. Only 30% of the respondents thought that NIB does that. Respondents indicated that NIB, some of the time, uses ratification approach. This was confirmed by 43% of the respondents who agreed that in forums with farmers, NIB make expert presentations and farmers ask questions. But a significant percentage (54%) use a distributive/power-sharing approach, that is, when consulting farmers, NIB presents proposals and allows discussions, debate and obtain consensus on issues touching on production, processing and marketing of rice produce. From the responses, it is apparent that NIB uses distributive/power sharing approach more than other approaches. The theory of participation indicate that this approach allows participants a more in-depth involvement which has a greater effect on the level of their influence in shaping decisions than other approaches. The use of ratification approach is common and works efficiently where experts objectively and honestly disseminate policy, and other proposals for the benefit of participants. From the responses, this approach appears to have been occasionally used.

Frequency of NIB Engagement with the Farmers

The frequency of NIB engagement with the farmers was twice or less per year. Only 18% of the respondents agreed that NIB meets farmers more than twice in a year. This would be expected especially where there are committees to deal with specific functional issues and make certain decisions on behalf of farmers. Farmers exercise their decision-making role during meetings

which take place once a year; and occasional special meetings which are called when there is a major decision to be made.

Legitimacy of NIB as a Governance Agent

Legitimacy is measured by the degree to which an agency such as NIB has the power, autonomy, trust; and has established processes and procedures that are transparent, fair and efficient as well as leadership with integrity, to deliver expected quality of services that meet the expectations of farmers. Some of the expectations include lobbying for the rights of farmers, providing inputs in time, paying competitive prices for rice produce and accounting for actions and resources.

Table 5, derived from Table 4, gives indication of the degree of legitimacy of NIB. The data excludes responses of undecided respondents, those who neither agreed nor disagreed with the statements presented. The scores against the criteria for legitimacy listed in Table 5 indicate that the level of legitimacy of NIB is yet to reach a level where the farmers have sufficient confidence. It is observable from the data that the perception of NIB as an organization including its leadership has scores of between 30 and 40 per cent. On service delivery, NIB scores between 17 and 39 with a modal average of about 22. These scores appear relatively low compared with respondents who perceived the organisation as not legitimate with scores ranging from 44 to 65 per cent; and service delivery scores ranging from 46 to 80 per cent.

Table 5: Legitimacy of NIB

Aspect /Criteria for Legitimacy	Disagree (%)	Agree (%)
Perception about the organization		
NIB has power and autonomy, and is trusted to maximize production of rice	48	31
NIB uses processes and procedures that are transparent, fair and efficient in delivering services to the farmers	65	30
Farmers trust the leadership and managers of NIB	49	37
Leaders and managers of NIB are people of integrity	44	40
Service Delivery		
NIB Lobbies for farmers' rights	68	20
NIB pays farmers for their produce on time	80	17
NIB ensures that inputs such as fertilizers, seeds, new rice varieties are available on time for use by farmers	56	24
Farmers value the quality of services delivered by NIB	46	39

From the data collected from respondents, NIB has some degree of legitimacy but has a long way to go in attaining a higher and more acceptable level of confidence of farmers. But NIB is still the preferred choice of a governance agency compared to farmers' cooperative because of several key strengths. NIB has the backing of government, and access to government and external resources (e.g. JICA) that MRGMCS may not easily have. In addition, it has research and agricultural expertise,extension capacity, and specialized irrigation systems expertise than what MRGMCS have. To a good degree (55%), NIB has credible, independent, and reputable

leadership. However, though NIB has established policies, procedures and standards for delivering services, these are not widely known. Further, respondents thought that NIB has, to a relatively lesser extent (35%), consistently delivered what farmers expect. But despite these shortcomings, they considered NIB as having the technical, financial and organizational capability to be a choice agency to lead, govern and manage rice production in MIS. The data giving indication of reasons for preference of NIB over farmers' cooperative are detailed in Table 6.

Despite the apparent reservations about the legitimacy of NIB as a lead governance agency, the strengths cited as reasons for preference of it over the farmers' cooperative, appear to mitigate the legitimacy issues that respondents presented. Thus, NIB remains the accepted lead agency for governance, leadership and management of MIS.

Table 6: Preference of NIB as an Agency for Leadership, Management and Governance

Statements	Strongly Disagree (%)	Disagree (%)	Neither agree nor Disagree (%)	Agree (%)	Strongly Agree (%)	% Agreeing
NIB has the backing of the government	0	7	2	58	33	**91**
NIB has research and extension capacity	3	22	2	40	33	**73**
NIB has specialized irrigation systems expertise that MRGMCS does not have	6	15	2	52	25	**77**
NIB has agricultural expertise than MRGMCS	7	24	7	32	30	**62**
NIB has access to government and external resources (e.g. JICA) that MRGMCS may not easily have	7	6	6	53	28	**81**
NIB has credible, independent, and reputable leadership	6	32	8	31	24	**45**
NIB has consistently delivered what farmers expect	16	42	7	14	22	**36**
NIB uses established, known policies, procedures and standards in delivering services	7	27	18	33	15	**48**
Overall, NIB has the technical, financial and organizational capability	1	29	8	30	32	**62**

4.2.3 Role of MIAD and its Influence on Rice Production in MIS

The study sought to establish how the role of MIAD influences on rice production in MIS. The results are as indicated in Table 7.

Table 7: The role of MIAD and its influence on rice production in MIS

Statements	Strongly Disagree (%)	Disagree (%)	Neither agree nor Disagree (%)	Agree (%)	Strongly Agree (%)
MIAD has established infrastructure (laboratories, demonstration farms, research networks, information data bases, etc.) for research in rice production	5	8	2	51	34
MIAD has the human and technical resources to carry out research on rice production	3	2	9	56	30
MIAD has policies, procedures and systems for engaging farmers in research and extension activities	1	10	5	63	22
MIAD mobilises resources from partners for purposes of rice farming research	3	7	21	64	6
MIAD convenes forums for engagement with farmers and other stakeholders to discuss and find new or improved ways of managing and increasing rice production	1	15	19	58	7
MIAD identifies farmers to work with, trains them and involves them pilot testing and introduction of new rice farming techniques	6	9	5	67	14
MIAD follows up farmers engaged in research and receives feedback on the performance of new rice farm inputs and techniques	5	8	7	69	11
MIAD encourages farmers to integrate livestock farming and rice production	3	9	6	75	7
MIAD encourage farmers outside MIS to grow rain-fed rice	6	23	13	55	5
MIAD use feedback from farmers to improve research products and services	7	12	10	66	6
MIAD make reports and present account of the work and use of resources at least once a year	6	24	23	36	11

From the findings, 85% of the respondent agreed that MIAD has established infrastructure (laboratories, demonstration farms, research networks, information data bases, etc.) for research in rice production, and 86% of them confirmed that MIAD has the human and technical resources to carry out research on rice production. In addition, 85% agreed that MIAD has policies, procedures and systems for engaging farmers in research and extension activities. Further, 70% of the respondents agreed that MIAD mobilises resources from partners for purposes of rice farming research. In terms of engagement with farmers, 65% of the respondents

indicated that MIAD convenes forums for engagement with farmers and other stakeholders to discuss and find new or improved ways of managing and increasing rice production. As part of the engagement, MIAD identifies farmers to work with, trains them and involves them in pilot testing and introduction of new rice farming techniques. This was confirmed by 81% of the respondents. MIAD also follows up farmers engaged in research and receive feedback on the performance of new rice farm inputs and techniques. This was the position of agreed by 80% of the respondents. MIAD also encourages farmers to integrate livestock farming and rice production according to 82% of the respondents. According to 60% of respondents, MIAD encourage farmers outside MIS to grow rain-fed rice. Most of the respondents (72%) agreed that MIAD use feedback from farmers to improve research products and services. In terms of accountability, 47% of the respondents indicated that MIAD make reports and present account of the work and use of resources at least once a year.

From the evidence, MIAD, to a very significant extent, performs the functions or roles expected of a research institution. It has the infrastructure, human resource and organizational capacity and has been engaging farmers, building their capacity and having them adopt new technologies and improvements that enhance higher production of rice.

4.2.4 Rice Production

While the foregoing discussions indicate that farmers, NIB and MIAD have been participating in governance, leadership and management roles, which theoretically should lead to improved production of rice, the respondents confirmed that rice production has mainly been declining over time (67%), because of exhausted soils (74%), drought and shortage of water (65%), and wrangles among stakeholders (63%) and, to some extent, to leadership, management and governance (37%).

From the percentage scores in Table 8, the respondent did not consider improved knowledge of rice farming methods, the use of improved rice varieties, fertilizers, pest control methods as well as increased support by the government or better supply and management of water for irrigation as significant reasons for decline in rice production. This would negate the theoretical assertion that these factors increase rice production. These factors could be responsible for occasional rise in production which 32% of respondents indicated.

Table 8: Trends and Reasons for Rice Production Levels

Statements	Strongly Disagree (%)	Disagree (%)	Neither Agree nor Disagree (%)	Agree (%)	Strongly Agree (%)
Trend in rice production					
Rice production has remained the same as previous years	41	48	5	3	3
Rice production has been increasing consistently	39	31	16	11	3
Rice production has been declining	9	13	11	35	32
Rice production has been going up and down but increasing overall	15	29	24	17	15
Reasons for trend in rice production					
Use of improved rice varieties, fertilizers, pest control methods	26	30	9	32	3
Improved knowledge of rice farming methods	16	36	13	26	9
Better supply and management of water for irrigation	36	27	11	16	9
Better prices for rice produce	24	43	11	14	8
Leadership, management and governance by NIB	22	32	9	19	18
Stronger lobbying by farmers to participate in leadership and governance	10	52	13	24	1
Increased support by government to irrigation	18	44	8	21	9
Exhausted soils	9	10	7	49	25
Drought and shortage of water	6	5	6	30	55
Wrangles among stakeholders	15	10	13	40	23

The data obtained from the field may represent the short-term view of individual farmers. The trendline from 1988 to 2015, shown in Figure 1 below indicate an overall rising trend, with periods of decline and sharp production increase.

The production data shows that prior to NIB being removed from leadership, management and governance of MIS in 1998, production averaged around 25,000 tonnes but when it declined to

20,000 tonnes, farmers took over and ran the scheme through their cooperative. Production rose to reach around 45,000 tonnes by 2000 but started declining drastically reaching a low of 12,000 tonnes in 2002. This unprecedented decline prompted the farmers to accept NIB back as a lead governance and management agency in 2003. Immediately NIB took over, production consistently rose to reach 60,000 tonnes and declined in 2007-2009 due to the effects of post-election violence. Thereafter, the upward trend has continued recoding an unprecedented growth of between 30,000 tonnes in 2009 and 91,000 in 2015.

Secondary literature review (NIB, 2005- 2016) indicate that the increased rice production is attributable to improved knowledge of rice farming methods, the use of improved rice varieties, fertilizers, pest control methods, as well as better management of soil and water. In recent years, NIB attributes increased rice production to sharing leadership management and governance with farmers, their cooperative and outsourcing some of the non-core activities to contracted service providers. This has helped to leave NIB to perform core technical support services. In the last four years, there has also been increased funding support to irrigation from the government increased support by the government. MIAD has benefitted from government support and has been able to play its role effectively. Finally, the stakeholder squabbles have significantly died down, leaving all parties to perform their roles smoothly, delivering improved results.

Trend of rice production from secondary data (1988/89-2014/15)

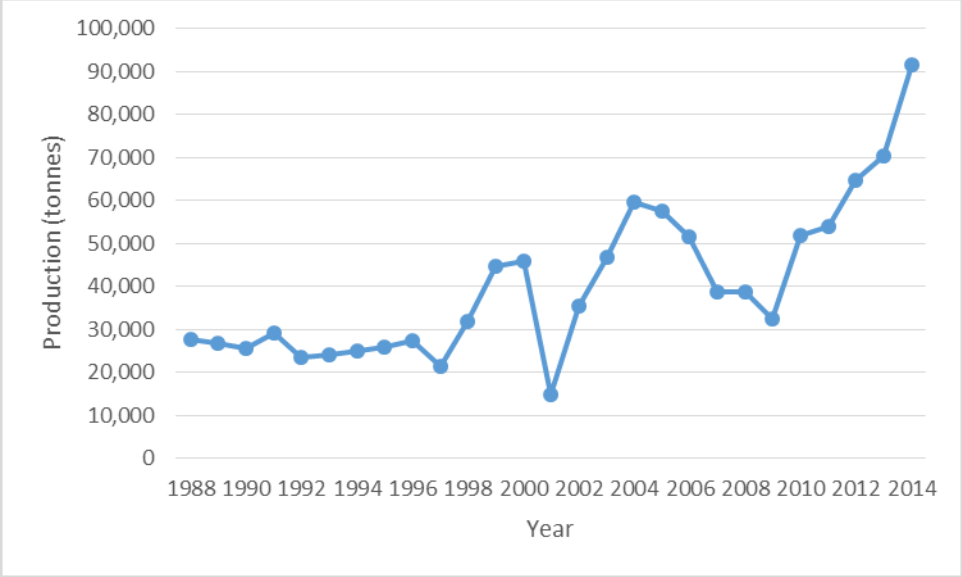

Figure 1 Time series plot for rice production, 1988/89-2014/15

4.3 Inferential Analysis for Study Variables

4.3.1 Reliability Analysis.

The internal consistency of the items under each variable was assessed using Cronbach's Alpha. The Cronbach's Alpha values for agency leadership, farmers' cooperative, Farmers participation, role of MIAD, role of NIB and rice production were 0.856 ,0.934 ,0.776, 0.819, 0.854 and 0.856 respectively, indicating good subscale reliability as indicated in Table 9.

Table 9: Reliability Analysis for Variables.

Factor	Number of items	Cronbach's Alpha
Agency leadership	9	0.856
Farmers' Cooperative	10	0.934
Farmers participation	12	0.776
Role of MIAD	11	0.819
Role of NIB	16	0.854
Rice production	4	0.856

4.3.2 Correlation Analysis.

Farmers participation was found to be positive and significantly related to rice production (r = 0.561, p-value=0.000<0.05). Governance role of NIB was found to be positive and significantly related to rice production (r = 0.600, p-value=0.000<0.05). The role of MIAD was found to be positive and significantly related to rice production (r = 0.571, p-value=0.000<0.05) as indicted in Table 10.

Table 10: Correlation Analysis for Study Variables

Variable	Statistics	Farmers participation	Role of NIB	Role of MIAD
Rice production	Pearson Correlation	.561**	.600**	.571**
	Sig. (2-tailed)	.000	.000	.000
	N	68	68	68

**. Correlation is significant at the 0.01 level (2-tailed).

4.3.3 Normality Test

Normality of response variable allows the application of statistical analyses such as ordinary least squares (OLS) estimation methods in this case multiple regression analysis. The normality is tested using skewness and kurtosis. All the values of skewness and kurtosis indices for all the variables did not exceed the absolute values of 1 and, therefore, the data set was considered to follow normal distribution and consequently the relationship would be tested using multiple linear regression. The results are presented in Table 11.

Table 11: Normality Test

	N	Skewness		Kurtosis	
Variable	Statistic	Statistic	Std. Error	Statistic	Std. Error
Rice production	68	.406	.291	-.599	.574
Farmers participation	68	.102	.291	-.522	.574
Role of NIB	68	.633	.291	-.701	.574
Role of MIAD	68	-.684	.291	-.293	.574

4.3.4 Regression Analysis

The R square value in this case is 0.580 which clearly suggests that there is a strong relationship between farmer's participation, governance role of MIAD, governance role of NIB and rice

production as indicated in Table 12. This indicates that farmer's participation, the role of MIAD, governance role of NIB share a variation of 58 % of rice production.

Table 12: Regression Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.761[a]	.580	.560	.68946

a. Predictors: (Constant), Role of MIAD, role of NIB, Farmers participation
b. Dependent Variable: Rice production

The ANOVA in Table 13 indicates that the overall model was a good fit since (F-value=29.442 and p-value=0.000<0.05).

Table 13: Analysis of Variance (ANOVA[a])

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.986	3	13.995	29.442	.000[b]
	Residual	30.423	64	.475		
	Total	72.409	67			

a. Dependent Variable: Rice production
b. Predictors: (Constant), role of MIAD, role of NIB and Farmers participation

Influence of farmer participation (FP), governance role of NIB and the role of MIAD in rice production: Regression Model

From Table 14, the regression model is calculated to be

$$\text{Rice production} = 0.197 + 0.333_{FP} + 0.505_{NIB} + 0.218_{MIAD} + \varepsilon$$

This means that farmer's participation has a positive linearly significant influence on rice production. (β=0.333, T-value=3.124, p=0.003<0.05). Here one unit change in farmer's participation results in 0.333 unit increase in rice production. The governance role of NIB was found to have a positive linearly significant influence on rice production. (β=0.505, T-value=5.453, p=0.000<0.05). Here one unit change in governance role of NIB results in 0.505 unit increase in rice production. The role of MIAD was found to have a positive linearly significant influence on rice production. (β=0.218, T-value=2.019, p=0.048<0.05). Here one unit change in governance role of MIAD results in 0.218 unit increase in rice production.

Table 14: Regression Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.197	.086		2.291	.025
	Farmers participation	.333	.106	.339	3.124	.003
	Governance role of NIB	.505	.093	.468	5.453	.000
	Governance role of MIAD	.218	.108	.205	2.019	.048

a. Dependent Variable: Rice production

The beta coefficients indicate the relative importance of each independent variable (Farmers participation, the ole in MIAD, governance role of NIB) in influencing the dependent variable (rice production). Governance role of NIB is the most important in influencing rice production (βeta=0.468) followed by Farmers participation (βeta=0.339) the least is the role of MIAD (βeta=0.205).

5.0 Conclusion

This study concludes that farmers' participation, directly and indirectly, in governance in MIS has a positive linearly significant influence on rice production. Secondly, the study concludes that the governance role of NIB has a positive and significant influence in rice production. Thirdly, this study concluded that the role of MIAD has a positive and significant influence in rice production in MIS. Together, farmer's participation in governance, the role in NIB in governance and the role of MIAD explain a significant variation of 58 % in rice production, with NIB role explaining more followed by farmer participation and then MIAD. Thus, the three stakeholders' participation in governance of MIS positively and significantly positively influence rice production in MIS.

5.1 Recommendations

5.1.1 Farmers' Participation in Governance of Rice Production

This study has shown that farmers' participation in governance of rice production has a positive and significant relationship with rice production. It is therefore recommended that their involvement in governance activities be structured so that their participation directly and indirectly through committees or their cooperative is deliberative and meaningful. This means that they participate in discussions, debates and presentations and in making decisions on substantive policy, and operational issues.

5.1.2. The Governance Role of NIB in the Production of Rice in MIS

While NIB was demonstrated in this study to be a preferred agency for governance, leadership and management of MIS, stakeholders had some reservations about its legitimacy. The score for legitimacy was between 30-40 per cent. The reservations were mitigated by the strengths that it had compared to the alternative agency, the farmer's cooperative. Despite its shortcomings, NIB has steered MIS to achieve unprecedented levels of rice production in the last five years. Given its potential to take rice production to the next higher levels, it is recommended that NIB address inefficiencies inherent in its organizational systems such as failure to effectively manage water resource, avail farm inputs and maintain irrigation infrastructure. Secondly, it is recommended that in large complex irrigation scheme such as MIS which is striving to increase rice production, a legitimate central governance, leadership and management agency (NIB), should enlist the participation of key stakeholders and meaningfully involve them in various governance roles. This way, the production of rice would sustainably increase over a long time.

5.1.3 Role of MIAD in Rice production

MIAD was shown in this study to play a significant role in improving rice production through its research work that involve farmers in the various processes. Given its established infrastructure, resource mobilization and technical capacity, it is recommended that MIAD use more of innovation platforms such as the Agricultural Innovation Systems that have been demonstrated to yield breakthroughs in agricultural research. This way, MIAD could deliver many newer technologies that could enhance rice production beyond the current levels.

5.1.4 Rice Production

Given the very high demand for rice in Kenya which is currently met with substantial imports from Asia, and given the potential that key stakeholder participation can increase rice production, it is recommended that NIB or other agency, gives special attention to appropriate involvement of stakeholders in governance and management in addressing rice production challenges.

6.0 References

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