AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Asian Journal of Agriculture and Rural Development, 3(5) 2013: 321-336

Asian Journal of Agriculture and Rural Development

journal homepage: http://aessweb.com/journal-detail.php?id=5005

The Impact of Integrated Agricultural Research for Development on Collective Marketing among Smallholder Farmers of Southern Africa

Kefasi Nyikahadzoi

Post Doctoral Fellow, Forum for Agricultural Research In Africa (FARA), C/0 Bunda College, Lilongwe Malawi.

Shepherd Siziba

Post Doctoral Fellow, Forum for Agricultural Research In Africa (FARA), C/0 Bunda College, Lilongwe Malawi.

Nelson Mango

Social Scientist, International Centre For Tropical Agriculture (CIAT), Mt Pleasant Harare, Zimbabwe.

Byron Zamasiya

Socio-economist, International Centre For Tropical Agriculture (CIAT), Mt Pleasant Harare, Zimbabwe.

Adenkule Adewale Adekunhle

Forum for Agricultural Research in Africa (FARA), PMB CT 173 Accra, Ghana

Abstract

This article demonstrates how Integrated Agricultural Research for Development (IAR4D) impacts on collective marketing among smallholder farmers of southern Africa through increased crop productivity, yields and income. We use a quasi-experimental design to compare outcomes under IAR4D and under two other states namely conventional approach and non-intervention. The study relies on primary data collected from 665 households during baseline and end line survey. Results from the study show that IAR4D had a positive and significant impact on improving collective marketing in intervention sites as compared to the control sites. In conclusion, the paper demonstrates empirically that collective marketing can help smallholder farmers to reduce barriers to entry into lucrative agricultural markets through IAR4D by lowering transaction costs of accessing input and produce markets. This finding is particularly very important given that middlemen and small traders face huge transaction costs of dealing with many sellers each selling small quantities.

Keywords: Collective action, Smallholders, Africa, Agriculture, Development, Marketing

Corresponding author's details:

Kefasi Nyikahadzoi

Email: *knyika@gmail.com*

Introduction

There has been a marked fall in income poverty in all regions of the world except in Sub Saharan Africa, where there has been an increase in both the incidence and absolute number of people who live on less than US$1 per day (United Nations, 2012). Within the whole region, rural poverty still accounts for 90% of total poverty and approximately 80% of the poor still dependent largely rain fed on agriculture (Morales, 2006). Literature argues that among other production constraining factors, smallholder farmers also have small nutrient depleted landholdings and therefore cannot produce enough surpluses for sale (Sanchez, 2002). Their inability to produce larger volumes of well sorted and graded quality crops means that they receive lower prices from traders who would pay for bigger quantities. As individuals, they face difficulties to transport their produce to wholesale buyers, have little bargaining power and are at the mercy of itinerant traders. This leaves them to deal with unscrupulous small market vendors who offer them very low prices for their produce (Barret, 2008). Consequently, most sub Saharan smallholder farmers are caught up in a vicious cycle of semi subsistence poverty with low output, low incomes, low savings and low investments as no single buyer is willing to incur transaction costs of dealing with many uncoordinated small sellers each selling small quantities. The recent structural adjustment policies implemented by governments within Sub Saharan Africa in the early 1990s brought significant changes in the national and global food markets (Jayne and Jones, 1997). Trade liberalization, price de-control, imports of cheap foods, increased quality consciousness and expanding agribusiness brought a new culture in the agricultural market that smallholder farmers are not familiar with (Dash and Purohit, 2006; Barret, 2008). Smallholder farmers are ill equipped to take advantage of these developments in national and global markets. Unlike their counterparts – large corporations, smallholder farmers still lack appropriate access to production enhancing technologies, investment and agricultural and market information.

To survive in this borderless economic environment, smallholders must seek new ways of competing in the market by unlocking the necessary opportunities for improved income (Dorward *et al.*, 2004). Improved market participation accords smallholder farmers an opportunity to specialise based on comparative advantage and enjoyment of welfare gains (Boughton *et al.*, 2007). Literature suggests that collective marketing is one of the institutional arrangements that can increase the competitive advantage of smallholder farmers in an increasingly commercialized and integrated world market (Narrod *et al.*. 2009; World Bank, 2008; Dash and Purohit, 2006). The institutional arrangement enables smallholder farmers to produce the required quantity and quality for a specified market (Valentinov, 2007). Collective marketing reduces cost of getting the product to the

markets and improves the bargaining power of farmers. According to Markelova and Meinzen-Dick (2009), collective marketing reduces transaction costs and enable smallholders to access services that private sector or government would not provide for.

Integrated Agricultural Research for Development (IAR4D), a concept promoted under the auspices of Sub Saharan African Challenge Programme (SSA CP) seeks to improve the competitiveness of smallholders in the market (Adekunle *et al.*, 2012). IAR4D promotes institutional innovations such as collective marketing that reduces transaction costs of dealing with several uncoordinated production units. It promotes the interaction of smallholder farmers, farmer organisations, researchers and other service providers, NGOs and market chain actors in identifying and developing potential business opportunities for smallholders and private sector (World Bank, 2007). IAR4D seeks to build networks that will continuously seek ways of overcoming limiting factors in policy, markets and territorial contexts and valorise enabling factors in these domains through applied research (Hawkins *et al.*, 2009). IAR4D put emphasis on Lundy *et al.*'s (2002) proposition, which argues that 'farmers must produce for the market rather than market what they produce'. It argues that research and consented effort must be put in easing factors driving changes in supply and mobilise farmers to market collectively – to benefit from changes in market. The Integrated Agricultural Research for Development concept has been experimented with for the last two years within the Zimbabwe, Malawi and Mozambique Pilot Learning Site. This paper seeks to investigate the impact of IAR4D approach to agricultural development on promoting collective marketing of agricultural produce.

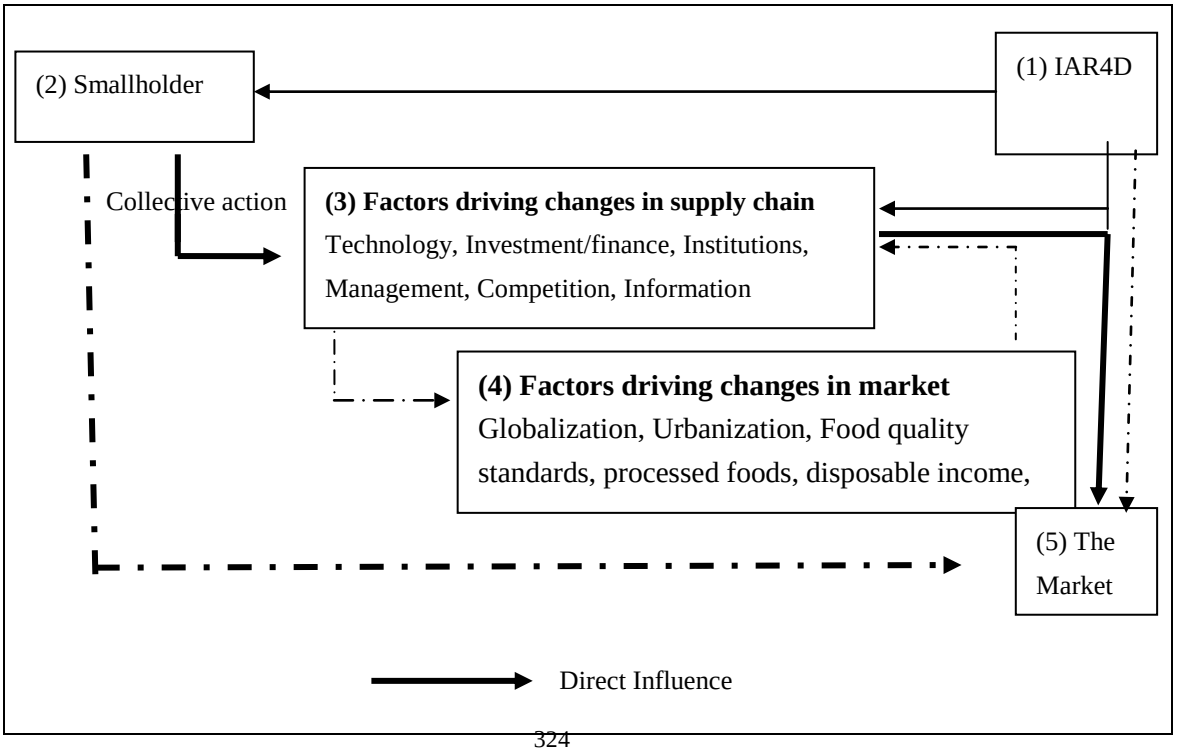
The rest of the paper is arranged as follows: Section 2 discusses the context of Integrated Agricultural Research for Development in Agriculture system followed by the description of the approach used in the study in section 3. While section 4 presents the description of the study sites where the study was conducted within the Zimbabwe, Malawi and Mozambique Pilot Learning Site. Section 5 presents an outline of the empirical model and estimation strategy used in the analysis of data in this paper. The results and discussion, conclusion and recommendations are dealt with in sections 6 and 7 respectively.

Context of IAR4D in Agriculture System

Collective action is a necessary but not a sufficient condition that allows smallholders to fully take advantage of their competitive position in the global market. Royal Tropical Institute, (2008) argues that smallholders are less attentive to market signals and on their own they may not be able to take advantage of changes in markets. Figure 1 below suggests that smallholder farmers do not have a direct control over factors driving market changes (such as globalisation, urbanisation – see Figure 1). However, it's in their choice and control to establish institutions of collective action which

enables them to acquire market information, create new markets opportunities, attain economies of scale, make consistent supplies to a given market at lower production and transaction costs.

Integrated Agricultural Research for Development (IAR4D), a concept promoted under the auspices of the Sub Saharan African Challenge Programme, seeks to improve the competitiveness of smallholders in the market (Hawkins *et al.*, 2009). IAR4D does not claim to have an influence on the factors driving changes in the market (Figure 1). It however seeks to influence market indirectly through a number of activities. IAR4D seeks to promote adoption of relevant technological innovations that will increase production at least cost. To achieve these broad objectives, IAR4D promotes institutional innovations such as collective marketing that reduces transaction costs of dealing with several uncoordinated production units. It promotes the interaction of smallholder farmers, farmer organisations, researchers and other service providers, NGOs, market chain actors in identifying and developing potential business opportunities for smallholders and private sector. IAR4D seeks to build networks that will continuously seek ways of overcoming limiting factors in policy, markets and territorial contexts and valorise enabling factors in these domains through applied research. IAR4D put emphasis on Lundy *et al.*'s (2002) proposition, which argues that 'farmers must produce for the market rather than market what they produce'. It argues that research and consented effort must be put in easing factors driving changes in supply (Figure 1) and mobilise farmers to market collectively – to benefit from changes in market.



Indirect Influence

Missing Link

Direct Influence and IAR4D control Modified from Dash and Purohit, (2006)

Figure 1: How IAR4D Can Promote Collective Marketing

There are debates whether the tendency towards collective action is a spontaneous process or a deliberately created process. Literature argues that if smallholder farmers are confronted with unrealised collective gains, they will create institutions that make it in their private interest to make socially correct decisions (Norman, 1982). Some scholars argue that social engineering by technical experts cannot build social capital necessary for collective action (Johnson *et al.*, 2002). They argue that a collective is a self-organising system. Daumann (2007) argues that in a free market economy with rational agents, the spontaneous institutional change may drive the economy towards a set of efficient outcomes. These efficient outcomes are a product of human action and not human design. The constructivism school view human institutions as arising from intentional acts. According to the social constructivist approach, instructors have to adapt to the role of facilitators (Huang, 2001). The social constructivist approach emphasizes facilitated learning, which is the approach that IAR4D has adopted. It is important to investigate which of the two processes – the unintentional and the constructivist approaches is promoting collective action among the smallholders farmers.

The Approach

In this paper we use a quasi-experimental design to compare outcomes under IAR4D and under two other possible states namely conventional approach and non-intervention. This involves experimental district, which receives the treatment, and two control groups, which do not receive treatment. According to Binam *et al.*, (2011), randomization under ideal conditions allows mean program impact to be assessed through simple comparisons of outcomes for treated and control groups. The districts were stratified on the basis of market access and agro-climatic potential. For each intervention (or IAR4D) district there is one controls district (non IAR4D), which were selected using stratified random sampling method. In the IAR4D district, five villages were then selected using stratified random methods. These were sampled from the 'clean' villages. From the control district, five clean and five conventional villages were then selected using stratified random sampling techniques. "Clean" villages generally refer to villages in which there is absence or very minimal level of any agriculture developmental intervention in the last 2-5 years. Conventional villages are villages with projects identifying, promoting and disseminating technologies in the last 2-5 years. In each of the selected villages ten

households were randomly selected for monitoring and impact evaluation. The objective of the programme is to determine whether or not IAR4D has more impact in the intervention district relative to the clean and counterfactual districts.

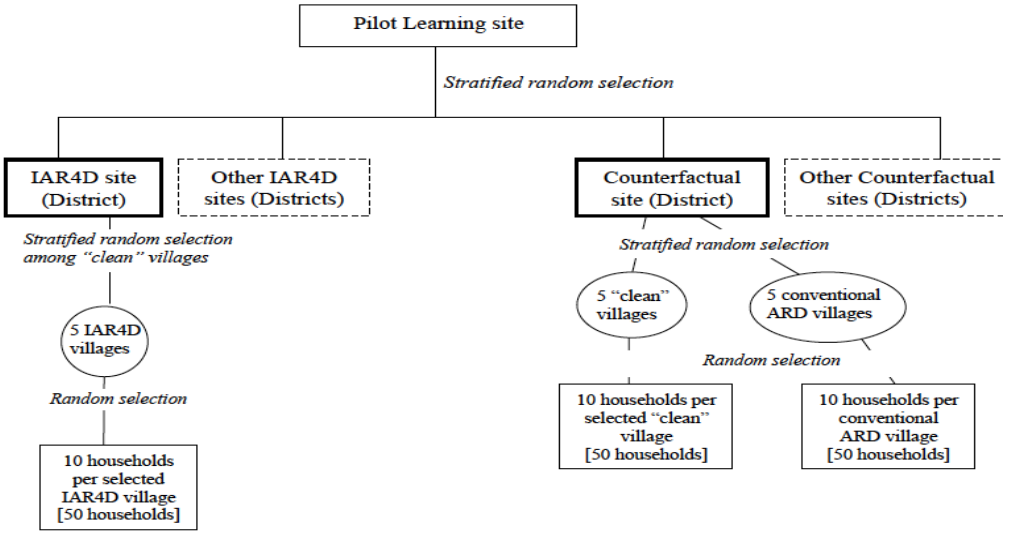


Figure 2: Random Selection of Sites and Household

Source: SSA CP, 2008

In this study we use two panel data sets collected from Zimbabwe Malawi and Mozambique. The first one was collected at the inception of the programme in 2008 and it solicits for baseline conditions of the smallholder farmers. The second data set was compiled after two years of project implementation in 2010. Each survey had a sample size of 1 200 households. Nevertheless, data on some households were dropped during analysis. The sampling frame is composed of only those smallholders who participated in both surveys. This is to ensure that we deal with the farmers with the same conceptualisation point, with changes in perception and attitude based on the same time frame. Consequently, the evidence presented in this paper is based on data for 665 households. Table 1 shows the distribution of households by treatment.

Table 1: Distribution of Sample

Country	Number of Farmers			Total
	Clean	Conventional	Intervention	
Zimbabwe	68	67	81	216
Malawi	93	89	68	250
Mozambique	62	69	68	199
Total	223	225	217	665

The household data was collected using a structured questionnaire that sought information on general household characteristics, awareness and use of improved technologies, access and use of improved agricultural inputs, marketing of agricultural produce and interaction among key stakeholders in the IAR4D district.

Description of the Study Sites

The Zimbabwe-Mozambique-Malawi Pilot Learning Site (ZZM PLS) is a corridor through north east Zimbabwe, central Mozambique and Southern Malawi. The ZMM PLS is dominated by the maize-mixed farming system. Principal livelihoods are based on maize, tobacco, cotton, grain legumes, small ruminants, and poultry and off-farm work activities. The maize-mixed system is currently in crisis because smallholder farmers have reduced levels of use of science-based inputs resulting from shortages of seed of improved varieties, fertilizers and agro-chemicals and the high input to output price ratios. There are also problems of declining farm sizes and draught animal ownership; reduced labor supply due to HIV/AIDS; and falling migrant remittances. Soil fertility is declining, yields are falling and smallholder farmers are reverting to extensive production practices. This is resulting in mutually self-reinforcing mechanisms of increasing land degradation and, in turn, accelerating poverty and food insecurity. Drought and market volatility result in vulnerability, thereby reinforcing the vicious cycles.

Despite the current crisis, there exist significant opportunities for long term agricultural growth and high potential for poverty reduction. In the more densely populated areas with better services, strategies include intensification and diversification out of maize into higher value cash crops such as vegetables and livestock combined with increasing off-farm income activities with strong linkages to agriculture. Implementation of these strategies depends on productive and profitable technologies for improved soil fertility management, conservation agriculture, integrated pest management (IPM), private sector investment for the development of viable input and output markets and farmers' collective action (bulk buying, rotational savings, joint marketing, and rural micro-finance institutions). Diversification could also involve development of low-lying areas for irrigated or rain-fed vegetable production. In the low population density areas priorities include area expansion and intensification through zero tillage, conservation farming, grain legumes integration, farmer-based multiplication of seeds and planting materials, and community-based land tenure reform. The principal challenge against which the ZMM PLS project is utilizing IAR4D hinges around the need to reduce vulnerability through improved soil, water and nutrient use, intensification, diversification and improved functioning of markets and value chains. This paper assesses how IAR4D improved farmers' access to markets through collective action.

The Empirical Model for Data Analysis

In this paper, we are interested in measuring the causal effect of the conduct of IAR4D activities improve upon collective marketing. The impact of IAR4D on outcomes such as collective marketing is assessed at the household level. Also the variable y_t is used generically to designate any outcome variable measured at time *t* after. However, to simplify the notation we will then drop the subscript *t* except when we introduce the baseline outcome measured at time t_0 which we will denoted by y_{t_0}. We will then refer to y_t as the endline outcome for simplicity.

For any given population unit, we define the following three potential outcome variables[2]:

y_1 = outcome if the population unit is located in a clean site;

y_2 = outcome if the population unit is located in a conventional site, and;

y_3 = outcome if the population unit is located in an IAR4D site,

Let us also define the following three treatment status variables for the same population unit:

$D_1 = 1$ if the population unit is located in the clean site and, 0 otherwise;

$D_2 = 1$ if the population unit is located in the conventional site and, 0 otherwise;

$D_3 = 1$ if the population unit is located in the IAR4D site and, 0 otherwise.

For each population unit we have $D_1 + D_2 + D_3 = 1$ because each population unit can only receive one treatment at the same time. Hence, $D_1 = 1 - D_2 - D_3$.

It is important to note that the three potential outcomes y_1,y_2 and y_3 defined above are not simultaneously observable for any given population unit. Only the potential outcome that correspond to the treatment status which has its value equal 1 is observed. The other two unobserved potential outcomes variables are the counterfactuals. What one always observes unconditionally for any given population unit are the three treatment status variables D_1, D_2, D_3 and the outcome variable y. However, the observed outcome variable y can be written as a function of unobserved potential outcome variables and the treatment status variables as:

$$y = D_2 y_2 + D_3 y_3 + (1 - D_2 - D_3) y_1 \quad (1)$$

The differences $y_3 - y_1$, $y_2 - y_1$ and $y_3 - y_2$ give us the unit level impacts of IAR4D compared to clean, conventional

[2] We are comparing three treatments, the clean, conventional and IAR4D (for more detail see FARA, 2009)

compared to clean and IAR4D compare to conventional, respectively. Since two of the potential outcomes (the counterfactuals) are always missing, we cannot compute the unit level treatment effects. However, it is possible to estimate the mean of the distribution of each unit level treatment effect in the population. This mean is referred to in the literature as *average treatment effects* and noted ATE. The following three average treatment effects parameters measure respectively the mean impact of IAR4D compared to no intervention, the mean impact of conventional approach compared to no intervention and the mean impact of IAR4D compared to the conventional approach:

$$ATE_{3\to1} = E(y_3 - y_1)$$

$$ATE_{2\to1} = E(y_2 - y_1)$$

(2)

$$ATE_{3\to2} = E(y_3 - y_2)$$

These are the three impacts parameters that we want to estimate and test their equality to 0 in order to answer the first two questions above.[3] We note that $ATE_{3\to2}$= $ATE_{3\to1}$ - $ATE_{2\to1}$. Hence we can focus on the estimation of the first two impact parameters and deduce the value of the third by taking their difference.

Equation (1) can be rewritten as:

$$y = y_1 + D_2(y_2 - y_1) + D_3(y_3 - y_1)$$

(3)

By taking the mean of both sides of equation (3) conditional on D_1 and D_2 we obtain:

$$E(y|D_2,D_3) = E(y_1|D_2,D_3) + D_2E(y_2 - y_1|D_2,D_3) + D_3E(y_3 - y_1|D_2,D_3)$$

(4)

If assignment of villages to the three treatment groups (clean, conventional and IAR4D) was carried randomly and if all villages have complied to their assignments, then we should have the distribution of the three potential outcomes y_1,y_2 and y_3 variables in the population to be independent of that of the three treatment status variables D_1, D_2 and D_3. This would then imply $E(y_1|D_2,D_3)$ = $E(y_1)$, $E(y_2 - y_1|D_2,D_3)$=$E(y_2 - y_1)$ and $E(y_3 - y_1|D_2,D_3)$= $E(y_3 - y_1)$ so that equation (4) would simplifies to:

$$E(y|D_2,D_3) = E(y_1) + D_2E(y_2 - y_1) + D_3E(y_3 - y_1)$$

(6)

$$= E(y_1) + ATE_{2\to1} * D_2 + ATE_{3\to1} * D_3$$

Or

$$E(y|D_2,D_3) = \alpha_1 + \alpha_2D_2 + \alpha_3D_3$$

(7)

[3] The third question is not addressed in this report

Where $\alpha_1 = E(y_1)$, $\alpha_2 = ATE_{2\to1}$ $\alpha_3 = ATE_{3\to1}$. Equation (7) shows if we can assume that the assignment of sample villages to the three treatment groups was perfectly randomized and they all have complied, then the two impact parameters of interest can be estimated by a simple ordinary least squares (OLS) procedure of that regress the two treatment status variables D_2 and D_3 on the observed outcome y. This is one of the estimations carried below.

However, if the assignment of sample villages to the three treatment groups is not perfectly randomized so that the distribution of the three potential outcomes y_1,y_2 and y_3 variables in the population are no longer independent of that of the three treatment status variables D_1, D_2 and D_3, then the OLS procedure described above will not yield us consistent estimates of the two impact parameters of interest. However, even if the above independence condition fails, the change in the three potential outcomes between the baseline and endline times may end up being independently distributed with respect to the three treatment status variables D_1, D_2 and D_3. If true, such independence condition can be used to estimate the two impact parameters of interest.

To see how such assumption and the difference in the observed endline and baseline outcomes $\Delta y = y_t - y_{t_0}$ can help estimate the two impact parameters of interest let:

y_{1t0}, y_{1t} be the base and end line outcomes of a population unit located in clean;

y_{2t0}, y_{2t} be the base and end line outcomes of a population unit located in conventional site, and

y_{3t0}, y_{3t} be the base and end line outcomes of a population unit located in IAR4D site.

The changes in the three potential outcomes between time t_0 and time t for population units located in the clean, conventional and IAR4D sites are then given respectively by:

$$\begin{cases} \Delta y_1 = y_{1t} - y_{1t0} \\ \Delta y_2 = y_{2t} - y_{2t0} \\ \Delta y_3 = y_{3t} - y_{3t0} \end{cases} \quad (8)$$

However, because IAR4D was not operational at baseline time, we necessarily have $y_{1t0} = y_{2t0} = y_{3t0}$. An equation similar to equation (1) linking the difference in the observed endline and baseline outcomes Δy and the changes in the three potential outcomes Δy_1, Δy_2 and Δy_3 does also hold:

$$\Delta y = D_2\Delta y_2 + D_3\Delta y_3 + (1 - D_2 - D_3)\Delta y_1 \quad (9)$$

Using Equation (10) and the assumption of independence between the distribution of changes in the three potential outcomes Δy_1, Δy_2 and Δy_3 and that of D_1, D_2 and D_3, one can follow the same steps as above to derive an equation similar to equation (7) with Δy as the dependent variable instead of y:

$$E(\Delta y|D_2,D_3) = \alpha_1 + \alpha_2 D_2 + \alpha_3 D_3$$

(10)

Where $\alpha_1 = E(\Delta y_1)$, $\alpha_2 = ATE_{2\to1}$ $\alpha_3 = ATE_{3\to1}$. Hence, as above, the two impact parameters of interest can be estimated by a simple ordinary least squares (OLS) procedure of that regress the two treatment status variables D_2 and D_3 on the difference in the observed endline and baseline outcomes.

It may also be the case that even if assignment of sample villages to the three treatment groups was not perfectly randomized, sample villages were selected using some criteria based on observable characteristics X, which was used to assign sample villages a particular treatment group or to stratify the population of the villages into groups within which randomization was carried out. If this is the case, then we may have independence of the distribution of the endline potential outcome variables y_1, y_2, y_3 from, that of the treatment status variables D_1, D_2, D_3 conditional on X and by taking the mean of both sides of equation (3) conditional on D_2 , D_3 and X we will get:

$$E(y|D_2,D_3,X) = +E(y_1|D_2,D_3,X) + D_2E(y_2 - y_1|D_2,D_3,X) + D_3E(y_3 - y_1|D_2,D_3,X)$$

$$= E(y_1|X) + D_2E(y_2 - y_1|X) + D_3E(y_3 - y_1|X)$$

$$= E(y_1) + ATE_{2\to1}(X) * D_2 + ATE_{3\to1}(X) * D_3$$

(11)

Or

$$E(y|D_2,D_3,X) = \alpha_1(X) + \alpha_2(X)D_2 + \alpha_3(X)D_3$$

(12)

Where $\alpha_1(X) = E(y_1|X)$, $\alpha_2(X) = ATE_{2\to1}(X)$ $\alpha_3 = ATE_{3\to1}(X)$.

With the two impact parameters of interest given by the mean with respect X of the conditional means $ATE_{2\to1}(X)$ and $ATE_{3\to1}(X)$ respectively.

If we parameterize (12) by assuming that:

$$\alpha_j(X) = \alpha_j^0 + \alpha_j^1 x_1 + \alpha_j^2 x_2 + \cdots + \alpha_j^k x_k$$

$j = 1, 2, 3$, then we have:

$$E(y|D_2,D_3,X) = \alpha_1^0 + \alpha_1^1 x_1 + \cdots + \alpha_1^k x_k + \alpha_2^0 D_2 + \alpha_2^1 x_1 D_2 + \cdots + \alpha_2^k x_k D_2 + \alpha_3^0 D_3 + \alpha_3^1 x_1 D_3 + \cdots + \alpha_3^k x_k D_3$$

(13)

Equation (13) can be estimated by an OLS estimation procedure with interaction between each one of the two treatment status variables D_1 and D_2 and the covariates X to obtain the two impact parameters of interest as the marginal effects of the respective treatment status variable taken at the means of the covariates. Again it can be easily shown that the same relationship holds exactly when we use the difference between the end line and the baseline outcome variables in place of the end line outcome y and we assume $\Delta y_1, \Delta y_2, \Delta y_3$ independent of D_1, D_2, D_3 conditional on X instead of assuming y_1, y_2, y_3 independent of D_1, D_2, D_3 conditional on X. In either case, whether we use the endline outcome or the difference of endline and baseline outcomes as dependent variable the OLS regression with interaction defined by equation (13) will give us estimate of the two impacts parameters of interest as described above. The estimated impact parameters from the two OLS procedures need not be equal, though. At the end, which dependent variable one uses between the two (i.e. endline or difference) depend on which one of the two conditional independence assumptions one believes hold. We have used both dependent variables in the estimation below to compare results.

Results and Discussions

Table 2: A Comparative Analysis in Change of Selected variables Over two Years

	Clean n = 209		**Conventional n = 201**		**Intervention n = 247**		**ZMM PLS n = 657**	
Variables	**Baseline**	**End line**	**Baseline**	**End line**	**Baseline**	**End line**	**Baseline**	**End line**
C/marketing	2.62	2.59	2.00**	2.44**	2.29	2.64**	2.31***	2.57***
Education	3.91	4	3.45	3.66	3.91	3.96	3.79	3.89
Gender	0.85	0.86	0.69**	0.80**	0.71*	0.82*	0.75***	0.83***
Household size	5.61	5.57	5.88*	6.38*	5.69	6.07	6.00*	5.72*
Dependence ratio	1.06	1.11	1.07	1.26	1.08	1.01	1.05	1.11
Age	43.01	44.45	45.63*	48.29*	45.74	46.73	44.87***	46.50***
Duration	16.99	16.67	17.92	18.32	17.38	18.78	17.77	17.52
Cultivated land	4.00	3.36	5.05*	4.11*	4.66*	3.98*	4.60***	3.84***
Land Owned	5.99	5.59	5.15	4.66	5.95	5.67	5.72	5.34

*=10 % level of significance, **=5% level of significance ***=1% level of significance

The results in table 2 show that the proportion of smallholder farmers engaged in collective marketing has improved significantly in interventions sites as compared to the control ones between 2008/9 and 2009/10. There is also an unexpected and significant increase in proportion of male-headed households in the conventional and counterfactual sites during the period under review. As expected, average land owned by interviewed smallholder remained the same in all the three sites. However, average land under cultivation has declined significantly in the conventional and intervention sites during the period under review. The results also show that the dependence ratio and education level have remained unchanged in all the sites under the period under review.

Table 3: Impact of IAR4D on Collective Marketing

Outcome	OLS		OLS interacted	
	As compared to		As compared to	
	Clean	Conventional	Clean	Conventional
Collective marketing	0.03909(0.028)	0.0255(0.072)	0.032 (0.033)	0.0248 (0.085)

Numbers in parentheses are p-value

Table 3 shows that IAR4D has had a positive and significant impact on improving collective marketing in intervention sites compared to the control sites. However, the coefficients are weak. This suggests that institutions of collective action take time to build. Collective marketing is a product of repeated transactions, so that with each transaction, transactors know each other better than they did for the first transaction. Frequent successful exchanges, therefore, lead to decreased transaction costs since trust among economic agents increase and create disincentives for opportunistic behaviour. The change noted in collective action is only after two seasons of transaction and hence the low explanatory powers.

Conclusion and Policy Recommendation

There is clear and uncontested evidence from both empirical and theoretical literature that collective marketing can help smallholders to reduce barriers to entry into lucrative agricultural markets, by lowering transaction costs of accessing input and produce markets (Markelova and Muinzen-Dick, 2009). Collective marketing can also improve the share of the consumer price received by smallholder farmers through improved bargaining power (Giuliani, 2006; Komarudin *et al.*, 2006). Additionally, collective marketing reduces the share of profit that is available to other market chain actors. However, findings from this study suggest that collective marketing does not happen spontaneously. We note that collective action has improved only in IAR4D sites. This defies the logic of natural law of spontaneous order which presumes that regularities in social world order will emerge (out of unaided actions of

individuals) as men generate and adapt to those institutions appropriate for mutual benefit of all.

Collective marketing requires some degree of outside assistance in terms of finance and capacity building for smallholder groups to be formed and operationalized. Despite the presence of group characteristics such as social capital, trust among stakeholders and willingness to work together for a common goal, collective marketing fails to emerge spontaneously. These characteristics may have helped in aiding collective action in other aspects of social life such as natural resources management. There are success stories of how a collective sense of responsibility generated broad based participation in creating good will to solve the 'Tragedy of the Commons'. In commercial systems, agricultural markets transcend sphere beyond the boundaries of the villages and without access to market information, smallholders' access to markets is compromised.

Innovation Platforms created under the Integrated Agricultural Research for Development (IAR4D) provides access to information on markets, farming technologies and innovations. Smallholder farmers in the Innovation Platforms realising that they cannot meet the quantities demanded by the markets were ready to engage in collective action. Activities in the platform are governed by self-interest and are promoted by each stakeholder caring for his/her own welfare. IAR4D is an institutional arrangement designed to encourage stakeholders to pursue their own long run interest at the same time promoting public interest.

As discussed earlier, the explanatory power of IAR4D on collective marketing are very weak. This is understandably so because social capital, a variable upon which collective action is dependent on takes time to build (Nyikahadzoi *et al.*, 2011). The IAR4D participative approaches allow stakeholders to share information, capacity building and collective decision making at local level. The approach also promotes social learning from experience, reflection and action. In the process social capital (which embodies trust) is built in small increments by individual farmers stepping out of isolation, enjoying the connectedness and then taking an active responsibility in promoting public interest.

In conclusion, the idea of spontaneous order – that most of those things of general benefit in a social system are a product of spontaneous forces that are beyond direct control of men is a fallacy. It may have been the case in environmental management. In a commercial system some sort of social engineering is necessary.

References

Adekunle, A. A., J. Ellis-Jones., I. Ajibefun., R. A. Nyikal., S. Bangali., O. Fatunbi and A. Ange, (2012). Agricultural innovation in sub-Saharan Africa: experiences from multiple-

stakeholder approaches. Forum for Agricultural Research in Africa (FARA). Accra, Ghana

Barret, C. B. (2008). Smallholder market participation: Concepts and evidence from eastern and southern Africa. *Food Policy*, 33: 299-317.

Binam, J. M., T. Abdoulaye., L. Olarinde., A. Kamara, and A. Adekunle, (2011). Assessing the Potential Impact of Integrated Agricultural Research for Development (IAR4D) on Adoption of Improved Cereal-Legume Crop Varieties in the Sudan Savannah Zone of Nigeria. *Journal of Agricultural & Food Information*, 12(2): 177-198.

Boughton, D. D., Mather, C. B. Barret., R. Benfica., D. Abdula., D. Tschirley and B. Cunguara. (2007). Market Participation by Rural Households in a Low-Income Country: An Asset Based Approach Applied to Mozambique. *Faith and Economics*, 50: 64-101.

Dash, R. and A. Purohit (2006). Collective Action by Smallholders for Market Access: An Exploration of Farmers Initiatives and Best Practices. A paper presented in Research Workshop on Collective Action and Market Access for Smallholders, 2-5 October 2006, Cali, Colombia

Daumann, F. (2007). Evolution and Rule of Law: Hayek's Concept of Liberal Order Reconsidered. *Journal of Libertarian Studies*, 21(4): 123–150.

Dorward, A. J., Kydd, J. Morrison and I. Urey (2004). A Policy agenda for pro-poor agricultural growth. *World Development*, 32(1): 73.

Giuliani, A. (2006). Collective action for small-scale producers of agricultural biodiversity products" Paper presented in Research Workshop on Collective Action and Market Access for Smallholders, 2-5 October 2006, Cali, Colombia.

Hawkins, R. R., Heemskerk, R., Booth, J., Daane, A., Maatman and A. A. Adekunle (2009). Integrated Agricultural Research for Development (IAR4D). A Concept Paper for the Forum for Agricultural Research in Africa (FARA). Sub-Saharan Africa Challenge Programme (SSA CP).. FARA, Accra, Ghana.

Huang, H. (2002). Toward Constructivism for Adult Learners in Online Learning Environments. *British Journal of Education and Technology*, 33: 27-37.

Jayne, T. S. and S. Jones (1997). Food marketing and pricing policy in eastern and southern Africa: a survey. *World Development*, 25(9): 1505–1527.

Johnson, N., R. Ruth and M. Lundy (2002). The Importance Of Social Capital In Colombian Rural Agro-Enterprises. Capri Working Paper No. 26

Komarudin, H. Y. Siagian and N. P. Oka (2006). Linking Collective Action to Non-Timber Forest Product Market for Improved Local Livelihoods: Challenges and Opportunities", paper presented in Research Workshop on Collective Action and Market Access for Smallholders, 2-5 October 2006, Cali, Colombia

Lundy, M., C. F. Ostertag and R. Best (2002*)*. Value Adding Agro enterprise and Poverty reduction: A territorial Approach for Rural Business Development. Rural Agro enterprise Development Project, CIAT, Cali, Colombia

Markelova, H. and R. Meinzen-Dick (2009*)*. Collective action for Smallholder Access, Collective Action and property rights", Policy brief No. 6.

Morales, E. G. G. (2006*)*. Institutional Arrangements to Improve the Responsiveness of Agricultural Innovations Systems to the Needs of the Poor: An Investigation of Participatory Monitoring and Evaluation in Bolivia. Degree of Doctor of Philosophy, University of London, London, UK

Norman, B. (1982*)*. The Tradition of Spontaneous Order. *Literature on Liberty*, 5(2): 7-58.

Narrod., C. D. Roy., J. Okello., B. Avendaño., K. Rich., A. Thorat (2009*)*. Public-private partnerships and collective action in high value fruit and vegetable supply chains. *Food Policy*, 34(1): 8–15.

United Nations (2012*)*. Millenium Development Goals Report 2012. http://www.un.org/millenniumgoals/pdf/MDG%20Report%202012.pdf.

Uphoff, N. and C. Wijayaratna (2000*)*. Demonstrated benefits from social capital: The productivity of farmer organizations in Gal Oya, Sri Lanka. *World Development*, 28(11): 1875-1890.

Valentinov, V. (2007*)*. Why are cooperatives important in agriculture? An organizational economics perspective. *Journal of Institutional Economics*, 3(1): 55–69.

World Bank (2007*)*. Enhancing agricultural innovation. How to go beyond strengthening of research systems. The World Bank, Washington DC, USA.

World Bank (2008*)*. World Development Report 2008: Agriculture for Development. Washington, World Bank Publication.