Towards Developing a set of Indices to assess the Effectiveness and Efficiency of Agricultural Extension Policy

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Abstract: This paper identified and proposed the measurement of indicators that would ascertain effectiveness, efficiency and accountability of extension policy. This is based on the fact that a major problem of organizing agricultural extension in developing countries is the absence of a legal and policy framework for providing service and the determination of the impact of existing framework for extension delivery. This paper explored the procedure for extension policy formulation process, approaches to identifying extension policy indicators, categorization of indicators into cluster and their measurement of indicators. The indicators discussed in this paper were isolated from extension policy studies from different part of the world. From a list of 33 indicators, 5 clusters were identified which include extension effectiveness, efficiency, productivity, capability and accountability with 10, 5, 6, 16 and 5 indicators respectively.

Introduction

According to several authors the forms of extension policy are provisional extension policies, decrees and proclamation and legislated extension policy, which are often driven by factors such as population, natural resources and environment. Increasing population will demand more resources from extension in forms of skills, training, diversification of livelihoods and pressure on natural resources. Agricultural extension policy is a part of national development policy in general and of agricultural and rural development policy in particular (Jones, 1986). Each country should have a comprehensive agricultural extension policy which provides for coordination with research, education, input supply, and credit and marketing systems, as well as some flexibility to reflect the dynamic nature of the agricultural sector. The policy should include the mission and goals for agricultural extension, the responsible agencies and personnel, the clientele to be served, the broad programmatic areas to be addressed, and other relevant guidelines. This should be developed through a multi-stakeholder process; however, the development of extension is dependent on agriculture in most sub-Saharan Africa countries which is often tied to government stability and system of government (Contando, 1997).

Provisional extension policies is the most common form of extension policy in most developing countries that is operational in the absence of more formalized extension policies or during suspension of formally enacted policy. Decrees and proclamations are policies issued by the head of state which does not go through the process of consultation and debate involving various stakeholders and beneficiaries.

Extension policy formulation process

Several authors have alluded to the fact that there is no standard formula to be used in formulating agricultural extension policy because it is usually a broad based process including many stakeholders and made as participatory as possible. Chowdhury (2003) noted that a general description of steps followed in the formulation and approval of national policies are: formation of a working group or expert group with the representatives of the concerned agencies, departments, consultants, to prepare a draft policy; reviewing of existing sector policy and legislation; data collection, scrutiny of the data and studies for draft preparation; preparation of discussion paper on 'proposed policy directions. This is followed by arrangement of workshop, inter-ministerial meetings, on proposed policy direction, which are attended by various interest groups including Ministers and wider consultations with civil society, stakeholders, target groups, local government. functionaries and formal & informal local and public representatives. Other steps in the process are revision of the draft using feedback from workshop and meetings; circulation of the first draft to different Ministries, agencies, groups, institutions and organizations for review and written comments; incorporation of comments and observations on the first draft, consultations or workshop are arranged with wider representation.

The process would be concluded by finalization of the draft policy through an inter-ministerial meeting after discussing the comments and observations

received through the consultations, discussions and workshop; the sponsoring Ministry formally approves the draft policy through usual procedures, sending the draft policy to Cabinet/ Council of Ministers for final approval, the Cabinet / Council Ministers accords the final approval to the draft policy after discussions in its formal meeting; the approved policy is then published in the official gazette for information of the members of the public, the sponsoring Ministry initiates institutional and administrative actions for implementation of the policy statements and the sponsoring Ministry also initiates formulation of strategies, plans and programs supporting the approved policy. Swanson, (1990) noted that farmers involvement in policy formulation and periodic review is the most effective means of creating a demand driven' national extension system.

In Bangladesh, for the development of an effective extension policy, a Task Force was constituted under the chairmanship of the Secretary, Ministry of Agriculture. The Task Force comprised representatives from three sectors: the private sector, the non-government organization sector and the public sector. The Task Force made full use of the experience and expertise of all three sectors prepared a draft New Agricultural Extension Policy which was circulated the draft for comment, and finally prepared the document (Bangladesh Ministry of Agriculture, 1996). According to Leach, (2007), the process of extension policy development in Australia included an Extension Policy Workshop which involved the Australasia Pacific Extension Network (APEN) executive, a small number of Cooperative Joint Venture for Capacity Building (CVCB) members as well as Rural Development Committee (RDC) and academic representatives. This workshop resulted in draft extension policy documents and a recommendation for a higher order extension policy process involving wider practitioner, funder, beneficiary and political input. A key resolution from the workshop was to conduct a wider extension policy forum in 2004. Evaluation processes showed that the majority of participants believed the event to be an effective step in the development of an APEN position on extension policy. Workshop participants considered that this needed to be contextualized however, alongside a character description of' good extension practice.'

FAO (1997) indicated that the characteristics of extension policy indicators are: simplicity (the indicator should be simple enough to be understood by non-specialists); unambiguous definition(it should be clearly defined); ready determination (the data can be obtained without undue difficulty); accurate measurement (the indicator should be measured accurately, which is often difficult when dealing with farming communities); validity (the indicator should actually measure what it is supposed to measure); relevance (it should be geared to the specific needs of decision makers and be relevant to project objectives); and specificity (it should reflect changes only in the situation concerned and should measure specific conditions that the project aims to change). Others include consistency (the value of indicators should stay constant so long as they are collected in identical conditions, no matter who does the collecting. Indicators should be objective and verifiable); sensitivity (indicators should be sensitive to changes in the situation being observed and reflect changes in the phenomenon) and prioritization (indicators should be prioritized and a minimum feasible list prepared) (Asian Productivity Organization (APO) 2006). The objective of this paper is to explore the procedure for extension policy formulation process, describe approaches to identifying extension policy indicators, categorize extension indicators into cluster and describe the measurement of extension policy indicators. This is predicated on the fact that extension policy is lacking in many countries and at best exists as appendages in agricultural policy. This form of extension policy had negative consequences on extension service delivery.

Approaches for determining extension policy indicators

This paper proposes a methodological approach to determine indicators to be included in an agricultural extension policy and how they can be measured. In developing extension policy through participatory process, many features, characteristics and indicators would be advocated for inclusion by different stakeholders. In order to make extension policy effective, efficient and accountable, the process of item analysis will help to identify indicators to be included and how each of the indicators could be measured. Item analysis shows how well a set of questions (or items) measures one characteristic (or construct) and helps to identify questions that are problematic. As individuals attempt to quantify constructs which are not directly measurable they oftentimes use multiple-item scales and summated ratings to quantify the construct(s) of interest.

Spector (1992) identified four characteristics that make a summated rating scale as follows: First, a scale must contain multiple items. The use of *summated* implies that multiple items will be combined or summed. Second, each individual item must measure something that has an underlying, quantitative measurement continuum. In other words, it measures a property of something that can vary

quantitatively rather than qualitatively. Each item in a scale is a statement, and respondents are asked to give rating about each statement. This involves asking subjects to indicate which of several response choices best reflects their response to the item. Nunnally and Bernstein (1994), McIver and Carmines (1981), and Spector (1992) discuss the reasons for using multi-item measures instead of a single item for measuring psychological attributes. They identify that, individual items have considerable random measurement error, thus unreliable.

Nunnally and Bernstein (1994) state that measurement error averages out when individual scores are summed to obtain a total score. An individual item can only categorize people into a relatively small number of groups. An individual item cannot discriminate among fine degrees of an attribute. For example, with a dichotomously scored item one can only distinguish between two levels of the attribute thus lack precision. Individual items lack scope. McIver and Carmines (1981) noted that it is very unlikely that a single item can fully represent a complex theoretical concept or any specific attribute for that matter. The most fundamental problem with single item measures is not merely that they tend to be less valid, less accurate, and less reliable than their multi-item equivalents. It is rather, that the social scientist rarely has sufficient information to estimate their measurement properties. Thus their degree of validity, accuracy, and reliability is often unknowable.

Blalock (1970) observed, "With a single measure of each variable, one can remain blissfully unaware of the possibility of measurement [error], but in no sense will this make his inferences more valid". The item analysis typically yields three statistics for each item: 1) an item discrimination index, 2) the number and/or percentage of respondents making each choice to each item, and 3) the item mean and standard deviation. The item discrimination index shows the extent to which each item discriminates among the respondents in the same way as the total score discrimination. If high scorers on an individual item have high total scores and if low scorers on this item have low total scores, then the item is discriminating in the same way as the total score. The item discrimination index is calculated by a computer by correlating item scores with total-scale scores. To be useful, an item should correlate at least .25 with the total score. Items that have very low correlation or negative correlation with the total score should be eliminated because they are not measuring the same thing as the total scale and are therefore not contributing to the measurement of the attitude. The other statistics from the item analysis indicate the extent to which the respondents have used the various options. Items on which the respondents

are spread out among the response categories are preferred over items on which the responses are clustered in only one or two categories.

Data sources

This would include a review of the scientific literature using on-line scholarly and scientific databases as well as more general search engines such as Google, Asian Productivity Organization (APO) (2006); FAO (1997), Davidson (2006); Khan, (2006) and Qamar, (2006) on extension policy to assess the procedure for extension policy formulation process, approaches to identifying extension policy indicators, categorization of extension indicators into cluster and measurement of extension policy indicators and indicators to be included in extension policy

Universe of indicators

Items should be collated from the pre-research survey and pre-tested by finding out ambiguous and localized items. The localized items could be items found in few countries whereas all other found in many countries policy (Asian Productivity Organization (APO) 2006). These items had perfect negative value (-1) or perfect positive value (+ 1) discrimination indexes. Localized items found in few countries were regarded as ambiguous.

Uniform scoring method and Point-Biserial correlation

The uniform scoring method used by Akinola and Patel (1987) can be adopted in scoring the items. This method assigns a value of one (1) for possession and zero (0) for non-possession. For quantitatively measured items, possession scores ranged from one (1) to six (6) depending on the number of items listed against the indicator. Following this procedure, a score will be obtained for each respondent. The scores will be arranged from low to high to form the criterion scores. For quantitatively measured items the criterion scores, possession scores and the total for each criterion score will be tabulated. The scores of the upper twenty five percent (25%) and lower twenty five percent (25%) can be compared using the t-test at 0.01 level of significance. Significant items will then be selected as valid. In the case of dichotomous items, the point-biserial correlation coefficient (rpbis) was used for the item analysis. The criterion scores, number of possession, number of non-possession and total for each criterion score were tabulated, and items with rpbis (0.55) and above were selected as valid. All valid items will be weighted or standardized using the sigma scoring method. Jagne and Patel (1981) explained that the sigma scoring method assigns scores to items in reverse proportion. The sigma scoring procedure is shown in Tables 1 and 2.

Table 1: Sigma scoring method for continuous variable

No. of Possession	F*	CF	CFM	CPM	Z	(Z+2) x 2	Standard score rounded
0	89	89	44.5	0.087	-1.359	1.282	1
1	97	186	137.5	0.270	-0.613	2.774	3
2	156	342	264	0.518	0.045	4.09	4
3	93	435	388.5	0.762	0.713	5.426	5
4	39	474	454.5	0.891	1.232	6.464	6
>4	36	510	492	0.965	0.812	7.624	8

*F   =   Frequency
CF   =   Cumulative Frequency
CFM   =   Cumulative Frequency to Mid-Point
CPM   =   Cumulative Proportion to Mid-Point
Z   =   Sigma Score

Table 2: Sigma scoring method for dichotomous variable

Possession category	F	Percent (%)	Proportion	Z	Standard score (z+2)x2	Standard score rounded
Yes	199	39.02	100-19.51/100 = 0.805	0.860	5.720	6
No	311	60.98	60.98/2= 30.47 =0.305	-0.510	2.98	3

*F= Frequency
Z= Sigma scores

Extension policy indicators

The different indicators an extension policy should highlight include variables as indicated in Table 3 FAO (1997) indicated that extension monitoring indicators can be grouped into: extension capability indicators which reveal status of extension's capability at a certain point in time, but also to determine changes in it over time. Extension performance indicators reflect extension's operational and technical efficiency to highlight the effectiveness and efficiency of the extension service. The clusters are effectiveness, efficiency, productivity, capability and accountability

Table 3: Extension policy Indicators, clusters and measurements

Clusters	Indicators	Measurement
Extension effectiveness	Awareness	Number of farmers aware of extension activities
	Visit	Number of visits/contact received by farmers
	Field Meetings	Number of meetings with farmers
	Regularity	Number of meetings of with farmers on the fixed day
	Field Day	Number of field days organized
	Demonstration	Number of method and result demonstrations
	Supervision	Number of supervisory visits by extension manager
	Research-Extension Linkage	Number and types of linkage activities involving research extension and farmers
	Farmer Training	Number of farmers trained based on training needs
	Extension Effectiveness	Average of extension effectiveness indicators
Extension efficiency	Performance Index	Actual number of farmers reached out of the target number
	Penetration Index	Number of farmers adopting the recommended practice
	Achievement Index	Number adopting the recommended practice
Extension	Yield	Yield per hectare for main crop(s) (average)

Productivity	Productivity Index	Increase in yield over base year compared with base year (percentage)
Extension capability	Coverage	Area under cultivation per Extension Worker
	Intensity	Number of Farm Families per Extension Worker
	Competence	Number of Extension Workers with the basic educational qualification
	Subject-Matter Specialist	Number of Subject-Matter Specialists per hundred Extension Workers
	Research-Extension Ratio	Number of Agricultural Scientists per hundred Extension Workers
	Monitoring	Number of Monitoring Unit Personnel per thousand Extension Workers
	Gender Ratio	Number of Female Extension Personnel out of total number of Extension Personnel
	Mass Contact	Number of group meetings held per month per Extension Worker in a year
	Computerization	Number of personal computers in Extension Organization per thousand Extension Personnel
	ICT	Number and types of ICT available to extension workers
	ICT -effectiveness	Functionality and competence of extension workers on ICT
	Print Media	Number of leaflets/pamphlets distributed per month per Extension Worker
	Audio-Visual Media	Number of audio-visual organized per month per Extension Worker
	Training	Number of Extension Personnel out of total number of Extension Personnel trained in specialized training courses in a year
Extension accountability	Finance	Budgetary expenditure on Agricultural Extension out of total budgetary expenditure on agriculture per year
	Investment	Expenditure on Agricultural Extension as percentage of Agricultural Gross Domestic Product per year
	Transport	Number of vehicles, per thousand Extension Workers
	Equity	Number of Small and Marginal Farmers out of total number of Contact Farmers

Conclusion

This paper has shown what types of indicators extension policy should consist and how each of the indicators can be measured in order to ascertain the applicability of the indicators to determining extension delivery. This is predicated on the fact that extension policy is lacking in many countries and at best exists as appendages in agricultural policy. This form of extension policy had negative consequences on extension service delivery. The paper also described the process for extension formulation and item analysis process. From a list of 33 indicators, 5 clusters were identified which include extension effectiveness, efficiency, productivity, capability and accountability with 10, 5, 6, 16 and 5 indicators respectively.

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