

LOOKING FOR THE TREES IN THE FOREST: FARM TYPOLOGY AS A USEFUL TOOL IN DEFINING TARGETS FOR EXTENSION¹

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ABSTRACT

Interventions designed to improve the livelihood of small farmers cannot be everything to everybody. One extension strategy or education package simply cannot meet the needs of a diverse farming system. The small farm system in the Caribbean is still regarded as a fairly undifferentiated entity and interventions are designed from this mindset. This study, conducted among small farmers (<1 ha.) in Trinidad, addresses this issue, asking the basic questions: Do all farm systems constitute one group and should they be treated as such? Data were obtained from 176 randomly selected commercial-oriented small farm units on pertinent characteristics of the farmer, the farm and associated incomes. A Multivariate analytic technique, Non-hierarchical Cluster Analysis was used to establish and assess latent groupings. Results confirmed the existence of subgroups within the sample. This suggests that even among "small farm systems" an appreciable level of diversity exists. Having established the existence of sub-groups, profiles were developed using Univariate Analysis of Variance of the sub-groups identified to highlight their characteristics and associated farm incomes. The identified sub-groups were significantly different in farm income generated, the experience, training, goals, and entrepreneurial ability of the farmer, as well as the farms' size, capital and resource bases and technology used. Actions based on such information would result in more appropriate and effective policies and strategies.

Introduction

One of the several metatheoretical assumptions made as agricultural extension and education programs are conceptualized and developed is that there exists a homogeneous mass of small farmers “out there.” A coterminous homogenization of capabilities, circumstances, and resources is implicitly assumed, and policies treat with the small farm sector as basically an undifferentiated entity. This failure to look beyond “the forest” has led to programs being developed by central planning agencies that are fairly standardized and do not address farmers’ particular needs, further complicating the development effort.

This issue is important because the majority of farms in the Caribbean can be described as small, because of their minimum land sizes, often <1ha. (Rajack, 1990). Operators of these farm systems are loosely characterized as “small farmers.” Beets (1990) indicated that these systems are complex, operating under a myriad of biophysical, socio-cultural and economic arrangements. Ellis (1990) described small farmers as being always and everywhere typified by internal variations among many lines. In spite of this, FAO (1994) noted that there is a continued heavy emphasis on centralized planning based on aggregated information from a large number of producers, and this has failed to stimulate rapid economic growth. It suggested in the report that the development of more effective policy requires a better understanding of the characteristics and behavior of different types of agricultural producers, and they called for an appreciation of the heterogeneity, complexity, and interdependence of small farm systems as interventions are planned.

While in recent times gender-based differences have been acknowledged, most programs are designed for the entire sector and implemented through groups segregated mainly on the basis of farm geographic location. These are then given for implementation regardless of any other special characteristics that may distinguish one set of small farmers or farm systems from the other. In addition, casual observation reveals several other features that may be important to consider. Some of these are differences in the topography of the farm, resources, soil types, and farmer ethnicity and culture. If these relatively easily observable characteristics are not considered in planning, other important characteristics may also be omitted, and programs are not going to be as client-focussed as they should be and therefore less effective. The small farm system is indeed very complex and its differentiation into meaningful subsystems is a first step toward the development of realistic and effective programs for transformation.

A review of literature shows that some attempt has been made to differentiate farm systems based on known characteristics. For example, the need to target adoption of improved practices led to the development of recommendation domains (CIMMYT, 1988). This concept was based on the acknowledgement that some measure of heterogeneity exists in the wider farming system. Among all farm systems, groups of farmers may have similar problems and there is increased probability that these farmers may be interested in the same solutions to identified problems, technology etc.

In general, regardless of size of farm, typology has been found useful. In Zimbabwe it has been used to identify and group farmers based on access to resources to improve production

(Bratton, 1986) and in the Lake Crescent Region of Uganda to identify research needs, constraints and opportunities of smallholder dairy farms (Fonteh, 1998). It has also been used in Goias, Brazil to divide up sets of farming units to determine sub-units that have characteristics in common to stimulate adoption of technology (Bonnal, 1992).

The study challenges the prevailing assumption of the homogeneity of small farm systems. And on the basis of statistical evidence, attempts to establish that the smallholder farm system is composed of diverse sub-systems with unique profiles and outcomes. In other words, we address the broad question: “Are all small farm systems the same?” and attempt to classify small farm systems into typologies that are distinct from each other. Further, because differences in the characteristics of small farm systems may result in different financial outcomes, the identification and comparisons of the characteristics and incomes of the various sub-groups is a good entry point for action. Typology, as it relates characteristics to performance, is useful in this regard.

Objectives

To (1) identify any latent subsystems within the small, commercial oriented farm system in Trinidad and

(2) profile the typical characteristics of identified subsystems.

Method

The data set comprised 176 limited-resource farm households in Trinidad selected by random sampling within the vegetable-based farm system. All farms were <1ha. in size. Variables examined included farm income, farmer personal variables (age, experience, education, training, aspirations, abilities, goals and influence of extension) and farm related variables (size, and number of parcels, land use intensity, farm risk ability, labor base, capital base, resource base, access to resources, and technology used).

Income

Farm income was measured (Dillon and Hardaker, 1993), incorporating facets of limited-resource systems in the Caribbean such as monetary gifts received to assist farm operations, sale of cottage products and off-farm wage earnings. It was assessed as:

Farm Receipts - Farm Payments = Farm Net Cash Flow

Farm Net Cash Flow + Loans received - Interest paid = Farm Cash Surplus

Net Cash Income = Farm cash surplus + Gifts received + Sale of products + Off farm wages.

Farmer-Related Variables

Age: Actual years.

Experience: Number of years in farming.

Education: Years of formal education.

Training: Total number of educational activities attended in last year.

Aspirations: Assessed using a summated Likert-type scale consisting of six questions about future developments of the farm. Range; 6-24.

Managerial ability: Assessed over a summated self-rating scale of six questions about respondents' perception of his management abilities. Range; 6-24.

Technical Ability: Assessed over a summated self-rating scale of six questions about respondents' perception of his technical abilities. Range; 6-24.

Entrepreneurial Ability: Assessed using a summated self-rating scale of six questions about respondents' perception of his entrepreneurial abilities. Range; 6-24

Goals: Five economic goals were assessed and scored to place farmers on a continuum to reflect their economic orientation. Scores ranged between 1 (high economic orientation) and 0 (low economic orientation).

Extension influence: Assessed using a rating scale ranging from the highest (4) to the lowest (0).

Farm-Related Variables:

Farm size: Acreage farmed.

Technology Used: Summated score of respondents use of 12 practices (Yes=1; No=0)

Capital base: Total dollar value of money spent on last crop, value of farmlands, machinery, equipment etc.

Labor base: Amount of additional labor available for farm work, and recorded as man/days.

Resource base: Summated score based on size of farm, labor base, capital base, and farmers' satisfaction with farming.

Labor Intensity: Average hours spent on farm per day.

Land use intensity: Proportion of acreage under crops in rows or close spacing. Responses scored: All = 4, $\frac{3}{4}$ = 3, $\frac{1}{2}$ = 2, $\frac{1}{4}$ = 1, none = 0.

Risk ability: Operators' perception of the ability of the farm to recover from some disaster e.g. pests, diseases, flooding. Very Good = 4, Good = 3, Fair = 2, Poor = 1.

Non-hierarchical Cluster Analysis was used to identify any groups that existed in the sample. ANOVA was then used to identify the variables associated with identified groups. All analyses were done using Genstat and Minitab software packages.

One farmer, not included in the original data set, was randomly selected on completion of the analysis and interviewed. His characteristics were compared to the groups identified and reported.

Results

Based on the analysis, farmers were classified into three distinct sub-groups.

Typical Characteristics of the Three Sub-groups:

Group 1 (n=77): This subsystem was characterized by least number of parcels, smallest farm size, lowest capital base, lowest resource base, used lowest levels of technology and spent least hours in the farm. The operators were the youngest and least experienced, but had highest training score, and generated least income.

Group 2 (n=36): This subsystem had moderate levels of capital base and resource base. Operators were also moderately experienced in farming, and had lowest economic goal orientation and moderate income.

Group 3 (n=63): This subsystem was characterized by highest number of parcels of land farmed, highest capital base and resource base. Operators were most experienced, had lowest training scores, and generated highest income.

Table 1: Mean Values, Standard Deviations, and Overall P-values of Variables.

Variables	Groups			SD	P-Values	Farmer values.
	1 n=77	2 n=36	3 n=63			
Income (US\$)	1875	1996	2683	1365	.002	5,555
Farmer Related						
Age	39.3	43.5	45.8	13.38	0.015	50.0
Experience	15.8	23.1	29.5	11.10	0.001	30.0
Education	9.0	7.6	8.0	4.329	0.18	7.0
Training	9.6	9.1	6.6	7.396	0.049	12.0
Goals	0.59	0.46	0.59	0.202	0.004	0.7
Aspirations	15.7	15.1	15.7	3.321	0.672	16.0
Manag. Ability	18.7	18.2	18.8	3.180	0.61	18.0
Tech. Ability	25.0	24.0	23.8	4.778	0.264	24.0
Entrep. Ability	10.5	9.5	9.8	2.243	0.05	20.0
Ext. Influence	1.9	2.1	1.8	1.302	0.549	2.0
Farm related:						
No. parcels	1.3	1.5	1.7	0.755	.013	4.0
Land Use	1.5	1.44	1.22	0.779	.093	3.0
Farm Size	1.2	1.63	1.65	0.516	.001	2.0
Capital Base	349.0	1229.0	2410.0	213.8	.001	-----
Labor base	2.02	1.78	1.76	2.4	.305	6.0
Hours/day	6.4	7.6	7.5	1.735	.001	8.0
Risk ability	2.6	2.6	2.4	0.688	.111	3.0
Resource Base	22.05	24.8	27.7	2.746	.001	28.0
Access to Res.	21.4	20.6	20.7	4.809	.573	20.0
Technology Use	8.01	9.67	9.44	2.831	.002	10.0

There was a significant difference ($P < .005$) in mean income. Group 3 had the highest income. Five farmer-related and six farm-related variables had mean scores significantly different ($P < .05$) among the groups.

The pattern of mean response to capital base is similar to income derived on farms. The groups with highest capital base also had the highest income suggesting some sort of dependence of income on the capital base of the farm. The resource base scores response pattern is also similar.

Characteristics of Farmer

Mr. D. M. cultivates vegetables in one known high production area in Trinidad and his yearly income was higher than the mean for group 3. Other characteristics of D. M also correlated with group 3. He was old, very experienced, had high goals and aspirations, and very good technical, managerial and entrepreneurial abilities. Mr. D.M's farm was divided into several parcels, was large in size, high resource base and access to resources, employed several laborers, worked long hours on farm and used a lot of improved practices.

Discussion and Implications

This study was able to establish the existence of important subsystems within the small farm system. This group identification should precede the formulation of policies and programs for development. To treat farm systems as a fairly homogeneous entity would be to miss several important opportunities to better target development interventions. The data show the largest subgroup in the sample were low in most of the farm related variables and operators were also low in human capacity, even though they participated in training more than other groups. The education effort may be of little use because of lack of resources or the training may be simply not relevant. Further investigations may be needed. The group with the highest farm income (Group 3) had lowest training, but was most experienced. This is important and points to the need to probably not waste scarce technical resources on high resource farmers who could probably access their own information, but redirect efforts to those who need it most.

Policy initiatives taken to improve the capital base of farms through credit, soft loans, subsidies on machinery and equipment are more likely to be beneficial to those farmers who already have higher incomes. Such policies, which are almost always the first line of action by governments in developing countries where limited resource farms predominate, would miss the majority of farmers who have low capital base. Clearly, while this policy is good for higher income/higher capital base farm systems to further improve their productive capacity, a different approach is needed for other farmers. A different treatment is required although these farms may be literally next door to each other.

Developing countries simply do not have the resources to serve individual farmers, so the next best step would be to look for groups or subsets of farms whose situations can be transformed through strategic interventions. It is necessary to examine farm systems carefully and seek to pick out "families of trees" in the "forest" as it were. Policies and programs tailored to address the critical development issues of these "families of small farms", which

share important income-determining characteristics, are likely to be more effective than broad-based generalized strategies. It is in this regard that farm typology is useful as a planning tool.

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