
**RESEARCH AND EXTENSION NEEDS TO MITIGATE CONSTRAINTS
LIMITING THE PRODUCTIVITY OF SMALL-SCALE
SUGARCANE FARMERS IN MAURITIUS**

By

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Abstract

The issue of low productivity on small farmers' lands is a matter of concern in many sugarcane producing countries. In Mauritius, some 25 000 small-scale farmers are involved in sugarcane cultivation which is a major source of income for 200 000 rural families. Yield differences as high as 40% exist between the small-scale and large commercial farmers and their causes are often taken for granted. This paper presents part of the findings of a project to better understand, with farmers' participation, the functioning of the existing small farming systems and their information-seeking behaviours, a study financed by the French government through the Southern African Development Community (SADC). A survey, based on a formal questionnaire, was carried out among 800 farmers in Mauritius. Analysis of the data collected has enabled the prioritisation of factors and constraints affecting productivity, namely, increasing costs of inputs, availability and costs of labour and transport and access to finance and credit facilities. The conditions limiting adoption of good management practices have been identified to be the small-sized farms, low adoption rate of improved technologies and limited contact with advisory and support services. The elaboration of decision support tools to assist these farmers to increase production levels through sustainable and environment friendly production systems will now be generated. There is a need to pursue specific research on cost-cutting farming operations and new production techniques, adopting extension strategies favouring targeted and grouped extension interventions for some categories of small-scale sugarcane farmers. It is believed that the research and extension interventions will ensure the long-term survival of this producer category and will enhance ability to achieve productivity levels that will render the agricultural activities of the small-farmers economically and environmentally sustainable.

Introduction

In the context of world trade globalisation and the reform of the European Union sugar regime, whereby a reduction of 36% in price is imposed on sugar exported to the European Union by countries of the African-Caribbean-Pacific regions including Mauritius, sugar industries in those countries are compelled to adopt various strategies to improve their competitiveness and sustainability.

Strategies in Mauritius are embodied in the 2006–2015 Multi Annual Adaptation Strategic Plan prepared by the Government of Mauritius in partnership with all the stakeholders of the sugar industry (MAAS, 2006).

The Multi-Annual Adaptation Strategy Plan highlighted the absence of economies of scale in the operations of small-farmers. These coupled with poor financial resources at their level have made the small-farmers vulnerable to the decrease in sugar price if urgent measures are not taken to safeguard their interests.

The sugarcane planting community in Mauritius can be classified into three categories as shown in Table 1.

Table 1—Farmer categories, population and sugarcane area cultivated in Mauritius.

Farmer category	Number	Area cultivated (ha)
Small-planters (< 10 ha)	23 366	18 850
Medium- and Large-planters (> 10 ha)	107	3 970
Corporate (Millers and Non-Millers)	29	43 019
Total	23 502	65 839

Source: Sugar Insurance Fund Board, 2008

From 2005 to 2007, an average of 4.6 million tonnes canes were harvested, with the small-farmers harvesting around 30.1% of the area under cane, but contributing to only 26.0% of total cane harvested. Average yield was approximately 60.4 tonnes per hectare while the larger producers (large and corporate) averaged 71.1 tonnes per hectare. The yield differential for the period 1996 to 2007 is illustrated in Figure 1.

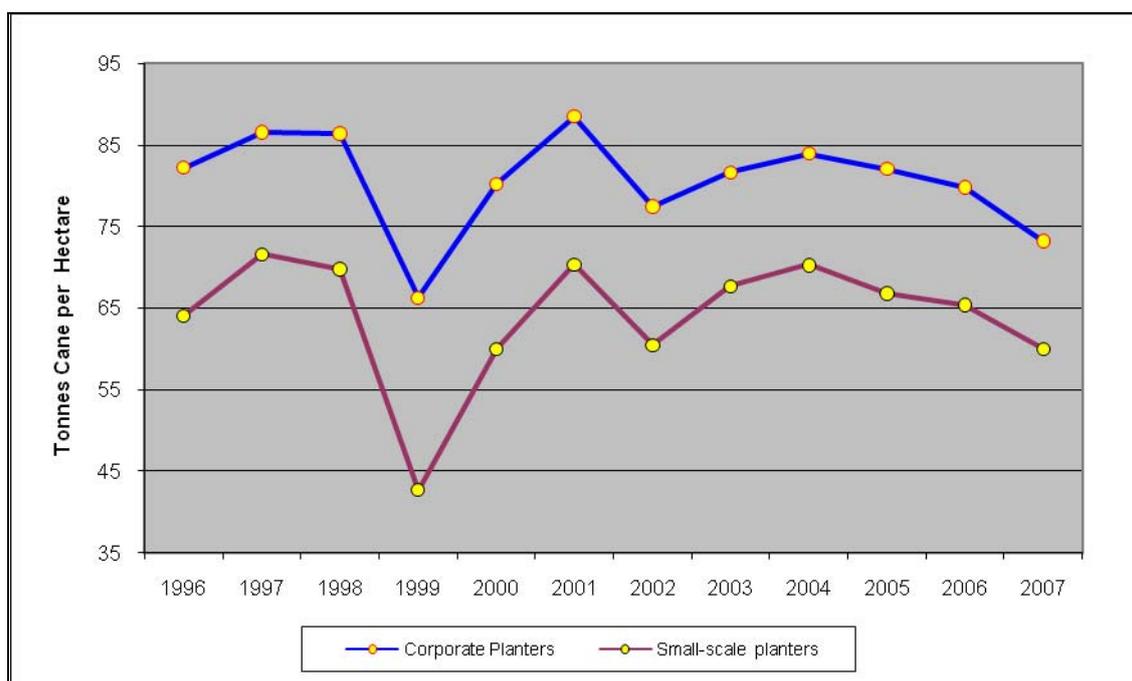


Fig. 1—Yield differential between small planters and miller /corporate planters in Mauritius. Source: Mauritius Chamber of Agriculture (Statistical Bulletin 2007/2008 – Cane Production) Note: Year 1999 was severely affected by drought

Scope for enhancing the productivity of the small-farmers in Mauritius therefore exists and, with the financial support of the French government through the Southern African Development Community (SADC), a participatory study was initiated with the objectives of better understanding the functioning of the existing small farming systems and their information-seeking behaviours. It is anticipated that this improved understanding of farmer needs would enable more effective research to be initiated and enhanced advisory services to be dispensed to this category of sugarcane farmers.

Conditions and factors limiting adoption of improved technologies can be addressed through targeted interventions. The elaboration of decision-making models based on farmers' strategies and factors that restrict their ability to progress are envisaged to enable them to make well-informed decisions. This paper reports the main findings of the study in Mauritius

Methodology

A comprehensive literature review was undertaken to assess different methodologies used in conducting similar studies in other sugarcane growing countries. No evidence was found of small-scale farmer surveys in the sugarcane growing countries around the world. In fact, there was scant evidence of similar studies in the SADC region.

The following methodology was subsequently developed for the study:

Data collection

A combination of quantitative and qualitative methodologies was used for the study. This paper reports only on the quantitative methodology opted for, namely, a formal survey questionnaire. Using the formal questionnaire and the traditional pen and paper approach, the survey was conducted by twenty enumerators among a stratified random sample of 800 small-farmers selected on four criteria; namely farm size, agro-climatic zones, ownership and rainfed / irrigated conditions.

Questionnaire design and information to be collected

Cognisance was taken of outcomes from previous participatory workshops and working sessions where some preliminary key aspects had been identified. Furthermore, the problem tree technique was used to investigate the possible relationships between low productivity and four major aspects, namely, growers' practices, land potential and utilisation issues, availability and utilisation of resources, and research, extension and services.

A 15-page questionnaire with six sections was developed to enable data collection on the following:

- Socio-demographic profile (geographic and personal details)
- General information on the sugarcane farming environment
- Resource base (land, sugarcane fields, land ownership, labour, finance, etc.)
- Sugarcane husbandry and use of technology (choice of planting method, land preparation and planting, fertilisation, choice of variety, weed control, etc.)
- Communication facilities and
- Decision making

Data management

A relational database was designed using Microsoft Access software for data entry. A user-friendly GUI (graphical user interface) with the use of drop down menus was developed to provide first level validation for data entry. This facilitated data capture and minimised errors in the keying of data, which was done only for open-ended questions. Data retrieval and analysis were done either directly through query to the database in Access or by using the Statistical Package for Social Sciences (SPSS).

Results

Socio-demographic profile

Nearly 75% of the respondents were male and married, with the great majority (80.1%) being both the head of the family and the farmer. They formed an ageing population, with 47.8% of them between 41 and 60 and 41% above 60 years old (Figure 2).

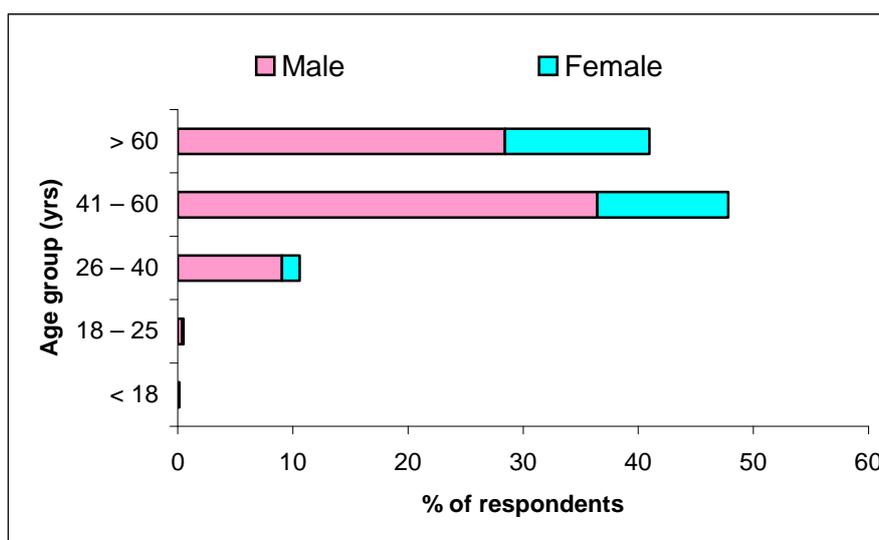


Fig. 2—Distribution of respondents by gender and by age.

Among the 70% of the respondents who had at least a full primary education and could be considered as literate, some 30% had a partial secondary education, 10.5% completed the secondary curriculum with only 6% having studied up to tertiary level.

The majority of the farmers (65%) were cultivating sugarcane on a part-time basis, with only 30% doing it as a full-time activity. Very few (5.5%) of the respondents were simultaneously engaged in other farming activities.

Sugarcane farming system

The great majority of the respondents (83%) had a minimum of ten years experience in sugarcane farming. The main reason for being involved in sugarcane farming was mostly because of tradition or on account of a family business they had inherited, with sugar proceeds representing an important source of income.

Regarding succession planning, 54% mentioned that another family member would take over their sugarcane business, while some 41% of the respondents had no opinion on this issue. However, only one respondent replied that he would sell his land.

Parents or family members were the main source of knowledge in sugarcane farming and production for 81.9% of the respondents and 71.7% of these farmers claimed that it was also self-acquired. Formal education and training in sugarcane farming, found to be most useful, was received by only 6.8% of respondents and was provided mainly by the Farmers Service Corporation (FSC) and the Mauritius Sugar Industry Research Institute (MSIRI). Some 20% of the respondents expressed the need for further knowledge or agricultural training in cultural operations and/or sugarcane agronomy in general.

The majority of the respondents were aware of the existence of advisory services, be it FSC, MSIRI or Agricultural Research and Training Unit (AREU), but their perception of the role/function of the extension officer varied from provision of advice only (30% of the respondents), provision of services only (30%), acting as a facilitator for them with other service providers (13%) to provision of training in sugarcane husbandry (6%). It was worth noting that some 22% of the respondents were of the opinion that extension was doing very little or nothing at all. When asked about their expectations of extension, most of the respondents (69%) replied that provision of advice and services should be more available. Acting as a facilitator and conducting training, meetings and seminars should be the major roles of the extension officer and the remaining 31% had no idea or opinion on what extension should be doing for them. A point worth noting is

that some 66% of the respondents did rely on the assistance and support of extension for their farming operations but they stressed that they themselves made the final decision with regards to those operations.

Sugarcane husbandry practices

Date of planting

An analysis of the responses obtained indicated that short season planting (July to August) was believed to be ideal for over 53% of the respondents in the rainfed regions. For 63% of those in the subhumid (< 1500 mm annual rainfall) to humid (between 1500 to 2500 mm) regions, long to intermediate season planting (from January to May) was favoured (Figure 3).

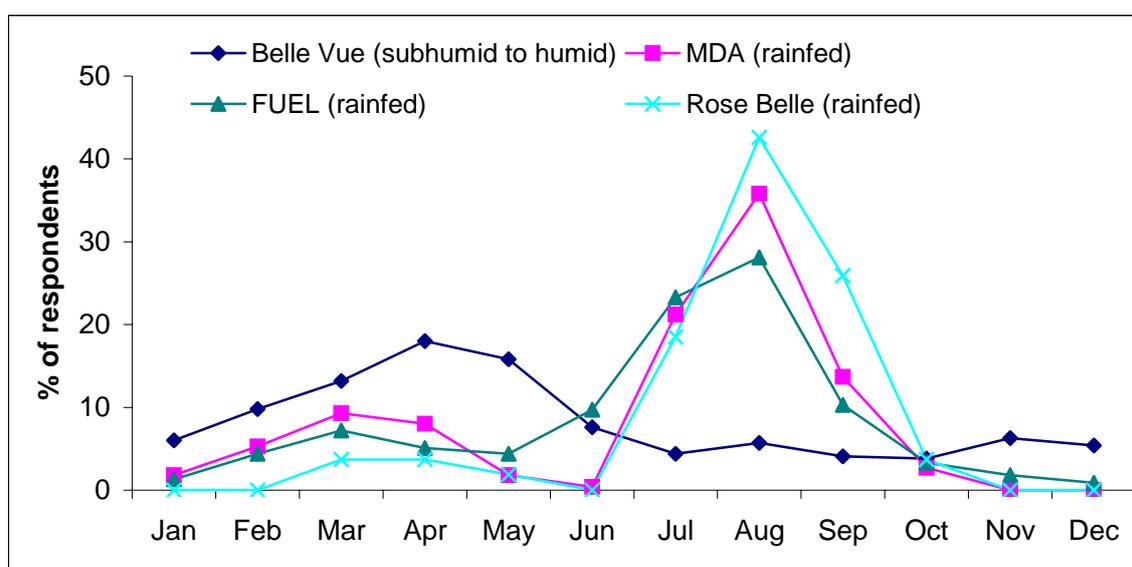


Fig. 3—Ideal months of planting by agro-climatic regions.

As for the months that they usually replant, the responses were more or less similar to those mentioned above, suggesting that a slight majority of the farmers usually replant at the appropriate period. A significant number of the respondents stated that they could not replant their fields in the ideal months mainly due to the unavailability of tractors and planting material and to the dry conditions which prevailed at that moment.

Land preparation and planting

Apart from some who had recently acquired their cane fields, most of the respondents had replanted their fields at least once since acquisition. About 42% of respondents had done so before the 7th ratoon, about 49% after the 8th to 10th ratoons and the remaining 9% after the 10th ratoon. A majority (91%) had adopted the conventional mechanical land preparation (raking, ploughing and furrowing) while the rest practised minimum tillage or manual land preparation.

Crop nutrition

Soil analysis prior to replanting, a service free of charge, was practised by only 25% of the respondents. Of this 25% group, 75% adopted the recommendations for soil amendment and fertilisation which were given to them, based on soil analysis results. For those not doing soil analysis, 80% of them did not use soil amendment and some 75% fertilised their fields on the basis of their past experience or on their neighbour's practice.

The timing of fertilisation is also a matter of concern. It has been found that more than 80% of the respondents still practised split application of fertilisers either in plant cane or ratoons, a practice which is no longer recommended.

Choice of sugarcane variety

Information on sugarcane varieties, influencing the choice of the variety planted, came from Extension officers for 40% of the respondents, from own/self knowledge for 30% of them and from other farmers for the remaining 22%. The majority of the respondents considered good adaptation and performance as the major criteria for their choice of variety.

Weed control

Chemical weed control, sometimes supplemented with manual weeding, was a common practice among 89% of the respondents. They were aware that weeds directly compete with sugarcane and might be responsible for yield losses. Some 32% of these farmers were not satisfied with their weeding practice due to persisting unfavourable climatic conditions and inappropriate herbicide mixtures for problem weeds.

Major constraints to production.

An important component of the study was to obtain from the respondents what they believed to be the major constraints limiting their sugarcane production, ranking them in order of importance and suggesting appropriate methods on how to minimise the effect of these constraints on productivity. The responses obtained are summarised below.

Increasing cost of inputs

Fertilisers and herbicides are the most commonly used inputs in sugarcane cultivation. The cost of these inputs has been constantly on the increase during the past few years. Figure 4 shows the evolution of nutrient prices for the period 2003 to 2008, where increases of up to 700% were noted.

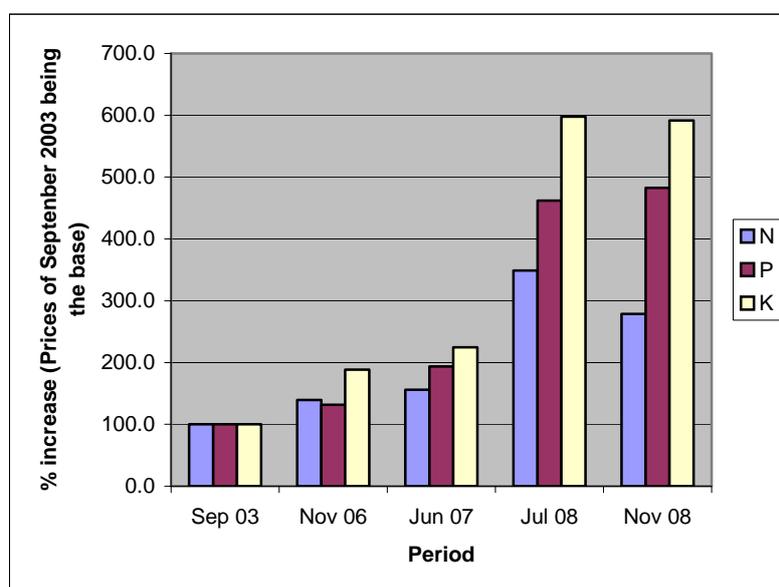


Fig. 4—Evolution of nutrient prices over the period September 03 to November 2008
Source: Mauritius Chemical and Fertiliser Industry and Island Fertiliser Ltd.

It was expected that a large majority of the respondents would highlight increasing cost of inputs, mainly fertilisers and herbicides as the most important constraint limiting production. As to how to minimise the effect of this constraint, most of the respondents were of opinion that the authorities, mainly the central government, should intervene through subsidy.

Availability and costs of labour and transport

The availability and cost of labour and transport were reported as being the second most important constraint to sugarcane production (nearly 30% of respondents answered lack of labour,

19% indicating transport and quota problems and 10% mentioned high cost of labour). This has also been observed in past studies, and the labour and transport survey undertaken in 1990 revealed that more than 70% of the small-planters interviewed were facing labour problems, especially during harvesting operations.

Among the solutions proposed by the respondents to counteract these constraints were grouping smaller units into larger blocks to allow for partial or total mechanisation of farming operations and/or recourse to contractors.

Finance and credit facilities

The third problem in importance was low profitability resulting from high cost of production coupled with lack of finance and credit facilities. Low profitability as a constraint limiting production is perfectly understandable because if profit is constantly decreasing and if finance and credit facilities are lacking, there will be no further investments, and this will affect productivity. It is important to mention that the authorities have put in place a range of measures in terms of government sponsored loans, subsidies or other soft loans offered by commercial banks to assist sugarcane farmers to stay in business. Lack of information on these measures and difficult access to the facilities offered might in fact be the real cause.

Discussions and conclusion

This section highlights the major implications of the above findings for research and extension and eventually the strategies to be developed to meet the needs of the small-scale sugarcane farmers.

Farmer profile

The sugarcane farmers in Mauritius are predominantly male. They form an ageing population, with at least a primary schooling tending toward literate part-time farmers. This understanding has some bearing on extension policy and strategy.

A rethinking of extension is necessary to target and to serve a larger farmer population. In particular, specific strategies should be devised to make extension services more accessible to part-time farmers allowing them to benefit from existing new technologies and improved cultural operations.

It is urgent for the extension officers to be more available even if they have to work at odd hours. The judicious use of new communication and IT facilities for effective exchange and dissemination of information is another avenue to be fully explored. It is worth noting that, in this context, the provision of e-services to the small-sugarcane planters in the form of an online system facilitating requests for certain services; for example, a soil analysis service is being offered by the MSIRI in collaboration with the FSC.

Farming system

In general, the small sugarcane farmer typically cultivates his own field(s) or fields belonging to the family. Monocropping is a most salient feature of the cropping system and the farmers have a tendency to cultivate only one variety. The fields are usually small in size (0.1 to 2.0 ha) and managed on an individual basis by the farmers themselves. Farmers stated that the final decision regarding their husbandry and production aspects remains theirs.

A vast majority of the respondents have acquired a vast experience in sugarcane farming and they have valid reasons to continue their sugarcane business, justifying why research and extension need to continue developing cost-cutting and innovative strategies to keep this vulnerable group of small-farmers in production.

A good majority of the farmers have not received formal training in sugarcane husbandry and many of them would wish to adopt good management practices to improve their production

levels. This is an area where research and extension may develop tailor-made training programs to meet the aspirations of the small-farmers.

The grouping of small-sized farms into larger units, which is already in progress, apart from enabling the small-farmers to benefit from economies of scale, will also provide a good opportunity for extension, through group techniques, to reach a larger number of farmers through more frequent and regular contacts.

Husbandry practices

The major prerequisites for good crop establishment are ideal planting date, elimination of resistant weeds, good land preparation, soil amendment, optimum nutrition, and choice of the most appropriate variety.

If 'off-the-shelf' technologies are already in a position to cater for most of these issues, research is still required to continue to develop and seek cost-cutting farming operations or practices and new production techniques that will maintain the competitiveness of small-scale sugarcane farming.

Consequently, where concern by extension is apparent is that nearly 50% of the respondents are not replanting at the appropriate moment, which in most cases would result in a poor crop establishment. The farmers need to be aware of that consequence. Some 75% are not making use of the free soil analysis service available, representing a lost opportunity as farmers could have been practising optimal/sound nutrition.

Reported constraints

The increasing costs of inputs, mainly fertilisers, herbicides and labour, coupled with low profitability have been reported to be the major constraints limiting sugarcane production. Research is already adapting new cropping systems which have been successful in other sugarcane producing countries such as Australia for the local sugarcane industry. Through more innovative extension strategies, small-farmers need to be kept informed of these new opportunities and must be encouraged to adopt practices that will enable them to increase their cane yields while at the same time reducing or optimising their production costs.

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**ALLÈGEMENT DES CONTRAINTES LIMITANT LA PRODUCTIVITÉ
DES PETITS PLANTEURS CANNIERS DE L'ILE MAURICE
PAR LA RECHERCHE ET LA VULGARISATION**

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**MOTS CLES: Petits Planteurs, Productivité Améliorée,
Compétitivité, Durabilité.**

Resumé

LA FAIBLE productivité chez les petits exploitants canniers préoccupe beaucoup les pays producteurs de sucre. A Maurice, environ 25 000 petits planteurs cultivent la canne à sucre qui est une source de revenu pour quelques 200 000 familles des régions rurales. Des écarts de rendement atteignant 40% existent entre les gros producteurs et les petits planteurs et les causes sont souvent considérées comme admises. Ce papier présente une partie des conclusions d'un projet initié avec la participation des planteurs pour mieux comprendre le fonctionnement des petits systèmes agricoles et de leurs démarches dans la recherche de l'information agricole. Une enquête, basée sur un questionnaire formel, a été réalisée auprès de 800 petits planteurs à Maurice. Cette étude a été financée par le gouvernement français, à travers la 'South African Development Community' (SADC). Une analyse des données recueillies a permis la hiérarchisation des facteurs et des contraintes affectant la productivité, notamment l'augmentation des coûts des intrants, la disponibilité et les coûts de main-d'œuvre, les facilités de transport pendant la récolte et l'accès au financement et au crédit. Les raisons limitant l'adoption des bonnes pratiques de gestion ont été identifiées, à savoir, la petite superficie des exploitations, le faible niveau d'adoption des technologies de pointe et le contact restreint avec les services de vulgarisation et de logistique. Des outils visant à aider les planteurs dans la prise de décisions afin d'accroître leur productivité à travers des systèmes d'exploitations durables et respectueux de l'environnement vont être développés. Une recherche visant à réduire les coûts associés aux opérations culturales et les nouvelles techniques de production et l'adoption de stratégies vulgarisation favorisant des interventions ciblées pour certains groupes de petits exploitants sont nécessaires. Les interventions de la recherche et de la vulgarisation vont, sans nul doute, assurer la survie de cette catégorie de producteurs dans le long terme, tout en améliorant leur capacité d'atteindre des niveaux de productivité qui vont permettre à leur activité d'être économiquement et écologiquement durable.

INVESTIGACIÓN Y USO DE EXTENSIÓN PARA LA MITIGACIÓN DE LAS RESTRICCIONES QUE LIMITAN LA PRODUCTIVIDAD DE LOS PRODUCTORES DE CAÑA A PEQUEÑA ESCALA EN MAURICIO

Por

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PALABRAS CLAVE: Productores a Pequeña Escala, Mejora de la Productividad, Competitividad, Sostenibilidad.

Resumen

EL PROBLEMA de baja productividad de los pequeños agricultores es un tema preocupante en muchos países productores de azúcar. En Mauricio, unos 25 000 productores a pequeña escala están involucrados en el cultivo de la caña de azúcar como la principal fuente de ingresos para unas 200 000 familias rurales. Diferencias en la productividad de hasta el 40% existen entre los productores de pequeña escala y los grandes productores comerciales y las causas muchas veces se toman como algo normal. Este trabajo presenta algunos de los resultados de un proyecto encaminado a entender mejor la forma en que funcionan los pequeños sistemas agrícolas y sus comportamientos de búsqueda de la información, un estudio realizado con la participación de los pequeños productores y financiado por el gobierno francés a través de la Comunidad de Desarrollo Sudafricana (SADC, en inglés). Una encuesta, basada en un cuestionario formal, se realizó entre 800 productores de caña de Mauricio. El análisis de los datos ha permitido la priorización de los factores y limitantes que afectan la productividad, incrementando los costos de producción, la disponibilidad y costos de la mano de obra y transporte y el acceso a financiamiento y crédito. Se identifican las condiciones que limitan la adopción de prácticas adecuadas de manejo tales como el tamaño pequeño de las fincas, el bajo índice de adopción de tecnologías mejoradas y el poco contacto con servicios de asesoría y apoyo. La elaboración de herramientas para la toma de decisiones para ayudar a estos productores a mejorar sus niveles de producción a través de sistemas de producción sostenibles y amigables con el ambiente serán generadas. Existe una necesidad de realizar investigación específica sobre las operaciones que permitan reducir costos en el cultivo y nuevas técnicas de producción, la adopción de estrategias de extensión que favorecerán grupos específicos y tendrán intervenciones conjuntas para algunas categorías de productores de caña a pequeña escala. Se cree que las intervenciones de investigación y extensión asegurarán la sobrevivencia a largo plazo de esta categoría de productores y mejorará la habilidad para alcanzar niveles de productividad que resultarán en sostenibilidad de las actividades agrícolas de los pequeños productores, las cuales serán amigables con el ambiente.