THE CONTRIBUTION OF BANANA CULTIVATION TO SUSTAINABLE DEVELOPMENT: ANALYSIS BY SYSTEM OF ACTIVITY

M. DULCIRE*, P. CATTAN**

CIRAD-TERA, TA 60/15, 73 avenue Jean-François Breton, 34398 Montpellier Cedex 5, France,CIRAD-FLHOR, station Neufchâteau – Guadeloupe, French West Indies*

Abstract

Banana producers in Guadeloupe are currently facing an economic crisis and this is combined with anxiety about the impact of production techniques on the environment felt by society as a whole. The 1999 Law on the Orientation of French Agriculture provides an opportunity to help farmers move towards more sustainable production systems. The incentives offered by the contracts between the state and farmers that the law calls for require both an understanding of the entire context of agricultural production and identification of the different functions fulfilled by agriculture in this region. Although banana speculation predominates, it alone does not explain all the different farming systems identified. The diversification of activities both inside and outside the agricultural sector plays an essential role in the economic viability of the farms and in the management of natural resources. In these conditions, one of the major challenges involved in facilitating the territorial integration of agriculture is the recognition by the public community of the functions fulfilled by the systems of agriculture in this region.

Keywords: French West Indies (Guadeloupe) – Sustainability – System of Activities – Typology

Introduction

Today the face of the countryside in the southern part of Basse Terre island in Guadeloupe is stamped by the presence of the banana. Banana production covers 5000 out of a total of 8300 ha of cultivated land in what is called the 'banana crescent', and agricultural income, investments, the organisation of work, jobs, and production support programmes are mainly focussed in this sector, as are development plans for the production systems in this region. Incidentally, banana exports account for half the total exports from the island.

But banana production in Guadeloupe has been in a state of crisis since the beginning of the nineties. Some analysts (Cnasea,1997; Mallessard,1998; Mossé, 1999; Rouget, 2001) recognise the efforts that have been made particularly in improving fruit quality but are alarmed by the problems facing the profession: a high level of debt, the end of European preferential tariffs and quotas in 2005, insufficient organisation, irregular technical proficiency, the expected arrival of black leaf streak. To these difficulties must be added that the recent mediatization of the pollution of several catching systems in Basse Terre called into question the banana cultivation techniques used, particularly insecticides and nematicides (Grugeaux-Etna, 2000). As it is grown for export, the banana crop requires high investments and large quantities of inputs, and agricultural practices as such do not presently include management of natural resources. In these conditions, the low mean yields of 18 to 20 t/ha do not enable the farmers to ensure the economic viability of their farm unit (CGER, 1998) nor the transferability, which is affected by the burden of debt (Cnasea, 1997); in addition to which they are unable fulfil society's expectations with regard to the environment.

In the face of this crisis, solutions have mostly been sought within the sector but unfortunately without taking the farming system and its specific context into consideration. Although a sectorial approach is necessary, on its own, this line of attack cannot suffice, as it does not provide an adequate response to the demands of society, which are echoed in the LOA, (Law on the Orientation of French Agriculture, Ministère de l'Agriculture, 1999). The two arguments (employment and export) cited to justify support focussed on this sector appear inadequate with regard to the environmental, economic and social functions the LOA acknowledges agriculture should fulfil.

The lack of precise data on the environmental impact of banana cultivation (Balland et al.,1998), the misunderstanding of how the farms function and of farmers' objectives, but also the difficulty in grasping the overall context of agricultural production (the expectations of economic players, product sales, societal and institutional demands), all these impede the elaboration of a package proposal and underline the importance of completing existing sectorial appraisals to enable farmers to see how they stand with respect to the sustainable development endorsed by the French incentives (Cattan & Dulcire, ongoing).

The aim of this paper is to contribute to a «new perception» of banana production called for by the LOA by proposing a different depiction of the diversity of production systems and their territorial integration in the banana production zone, and of the ways in which they can contribute to sustainable development. It also shows that the confrontation of these elements, as well as their perception by social actors, enables us to ask the right questions about the content of the jobs of farmers and thereafter to construct different options for the different types of farming systems.

1. The perou watershed

The results used here are the product of the first year of a research project to determine the environmental, economic and social impact of agriculture in this region with the aim of integrating production units in CTE (Contrats Territoriaux d'Exploitation, Territorial Farm Contracts, the main tool of the LOA) incentives. While pursuing the aim of understanding and supporting adjustments favouring the development of sustainable agriculture (Cattan & Dulcire, 2000), it also has the originality of combining different approaches: (i) a bio-physical, agronomic and economic approach at different interrelated scales: plot, farm, watershed; (ii) a spatial approach, i.e. relating to geographical space that culminates in different zones defined by different social actors (Clouet, 2000); and, (iii) an approach combining a historical as well as a future perspective with the aim of identifying existing dynamics and the factors that explain the existing situation. These approaches enable identification of a number of social and economic conditions that must be respected in the application of techniques.

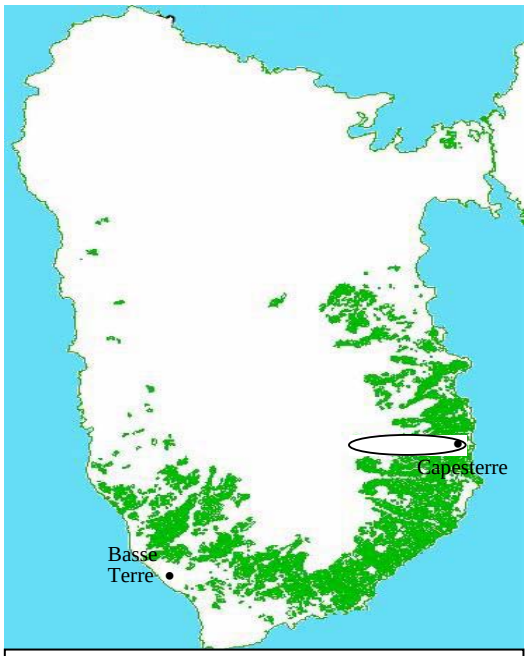

Figure 1: the banana-growing region in Basse Terre Island in Guadeloupe (from Lainé-Baleux, 1997), and the *Perou* watershed *(circled)*

The study was carried out on the cultivated part of the Pérou river watershed located in the commune of Capesterre B/E, which stretches from the municipality of Capesterre in the east to the Guadeloupe National Park in the west (fig. 1).

The agricultural area covers 350 ha out of a total of 600 ha (excluding the municipality of Capesterre and the National Park). The altitude ranges from 25 m on the eastern border to 450 m next to the National Park. The rain gradient reflects the altitude and ranges from 2400 mm at the lowest point to 6000 mm at the highest (Morel, 1994). This gradient is also reflected in the differences in soils of volcanic origin, which are halloysite-rich nitisol at the bottom and allophanic andosol at the top. 45 farmers manage the agricultural area. The few inhabitants live in the lowest part of the area close to the town of Capesterre.
Enquiries were carried out to complete data provided by existing data bases. These enquiries were led on a comprehensive mode and covered the functioning of the farms (Amoravain, 2000; 35 enquiries), the perception of the territorial stakes involved by stakeholders of the territory (understood both as a natural and social space), farmers and institutions (Julien, 2000; 22 enquiries), and the ways of agricultural diversification (Premsing, 2000; 10 enquiries).

2. A typology of family farming systems

In this watershed, banana production and other farm activities do not account for all the strategies implemented by farmers. Not only the concept of the farming system but also the system of activities (Paul *et al*., 1994) are required to explain the complex functioning of the farms: a system of activities is understood both as On-farm and Off-farm activities implemented by the family. Here the family economic units are made up of three different parts: bananas grown for export, other farming activities, and outside income (fig. 2).

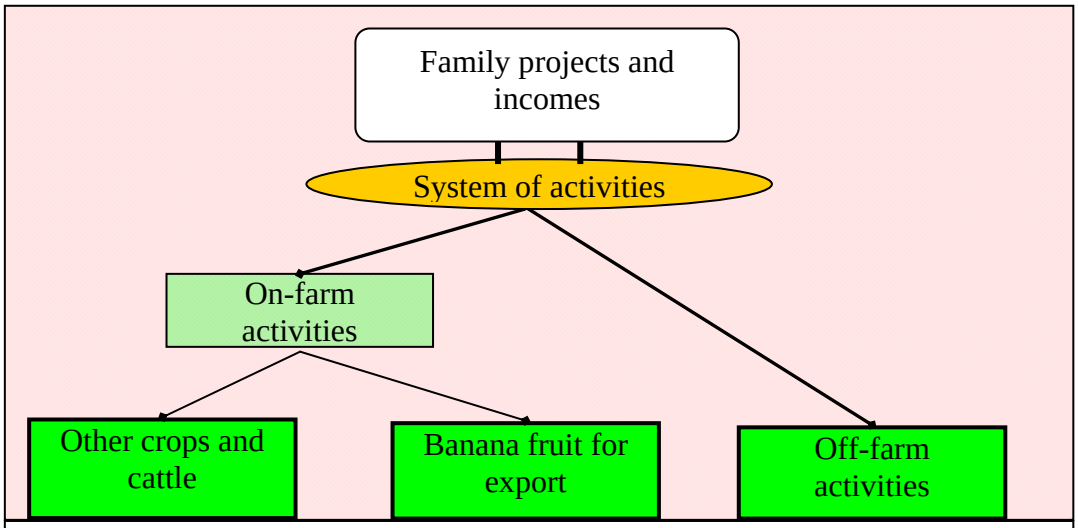

Figure 2: the three components of the « system of activities » in the area.

The relative proportion of these three components in the family income determines the types of system and consequently the strategies implemented, which have their roots in the history of banana cultivation in this region. At the beginning of the nineteenth century, alongside the establishment of large farming estates, small land ownerships were created on the basis of a «forest grant» policy promoted by the French Administration. These units, which correspond to 20% of the samples, are of the “mixed crop-livestock» type (fig. 3), and have changed little up to the present day: they are still mainly characterised by diversity and limited use of inputs. The primary objective of this mixed farming system, which is intensive from the point of view of land occupation, is to satisfy the needs of the family; sales of the limited farm surplus on the local market do not provide sufficient income and all these farmers pursue off-farm activities. This type of agriculture is relatively insensitive to risk factors.

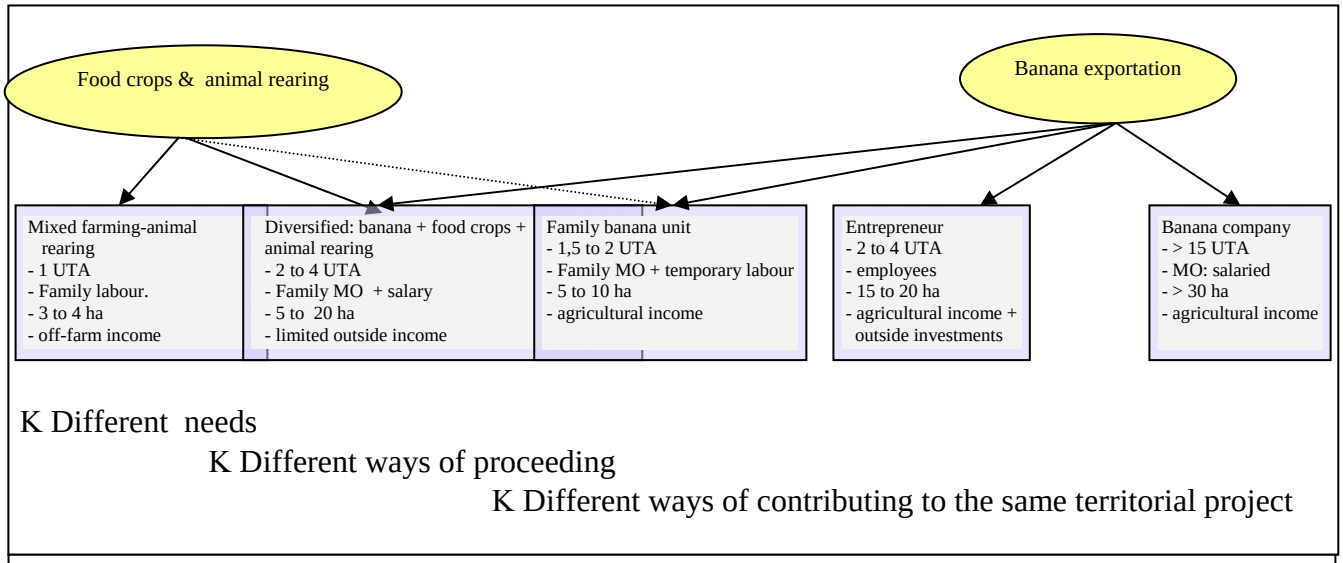

Figure 3: contrasting systems of activities within the same watershed. A preliminary typology (Cattan and Dulcire, ongoing)

The sugar crisis in the nineteen sixties resulted in the disappearance of the big sugarcane plantations, many of which were transformed into 'Banana Companies' (Amoravain, 2000), which had not been surveyed at this stage of the study.

The economic situation in the seventies and eighties, which was favourable for the export of bananas, resulted in the development of three different types of banana production. The "entrepreneurial type" (23%) appeared for opportunistic reasons and benefited from production factors (land, labour and capital). The aim was the accumulation of capital. The fact that plots were scattered, as a result of a desire to increase the size of the farm, increased management problems. Although the farmers were of rural origin, they diversified their off-farm activities, and moved into other sectors, such as real estate, which had the effect of reducing the sensitivity of the family unit to risk factors.

The second group of farming systems comprises small owners, often neo rural, who climbed onto the banana bandwagon in the hope that the expected increase in income would improve their social status and their financial independence. The support system set up for this sector and easy access to credit enabled them to achieve their purpose; however, the resulting production systems were almost exclusively dedicated to the banana. This "family banana unit" type (40 %) is characterised by limited access to production factors (size and land quality) and lack of cash flow. The family income is mainly the result of agricultural activities.

The third type of production unit is «*diversified*» (17%) i.e. farmers who, over the course of time, added banana production to existing farming activities. The fact that their plots are dispersed enables them to profit from varying climatic and soil characteristics but increases their work load, all the more since these farmers are directly involved in selling their products. On the other hand, the resulting diversity provides stability in the face of risk factors. The family income is to a large extent the result of agricultural activities.

3. Characteristics of the systems of agriculture in the region.
The farmer and the planter: what image do the farmers and institutions have of this activity?

Banana production accounts for 80% of crop acreage in the watershed. The fact the sector is highly structured led to the development of a favourable context for this crop, which receives support specifically aimed at development as well as a number of subsidies (tab. 1). The farmers interviewed also considered that growing bananas for export was a way to achieve better social status as a «planter – entrepreneur». This context has a negative effect locally on diversity, even though the diversification is generally considered (Larrère et Vermersch, 2000) to be a symbol for anti-risk strategies including environmental risks.

	% of usable farm area	% of final agricultural value	% of total production subsidies
Banana	11	24	70
Sugar cane	25	17	27

Table 1: Relative proportion of usable farm area, final agricultural value, and public subsidies in the production of the 2 export crops (1999 figures, excluding one-off subsidies, according to DAF).

The objective of home-consumption pursued by certain producers has resulted in a high rate of «agricultural diversification» that increases with a decrease in the total area of the farm. It led to the introduction of mixed cropping and (occasionally) animal rearing. However as a strategy, it is not truly integrated in agricultural practices. On closer analysis, «mixed cropping-animal rearing» turns out to be the juxtaposition of plots under banana as a monocrop and «other» plots. In this instance «diversification» does not result in improved management of the environment, and paradoxically maintains the agronomic disadvantages of monocropping.
For the administration as well as for the farmer «plantation» agriculture and agricultural «diversification» call to mind two distinct worlds (tab. 2). And the image of the two sectors is hard to reconcile. For the farmers, «diversification» implies a parallel world: a vision of «resistance agriculture» (cf. Amin -1973, in the context of neo-colonial dependence, or Mérion -2000 in Guadeloupe), which is not openly expressed, but is now claimed by some agricultural trade unions in the name of cultural identity and self-sufficiency in food production in Guadeloupe.

	Export agriculture	"Resistance agriculture"
Administration	▸ Territorial value. ▸ Exportation. ▸ Jobs. ▸ Modern agriculture.	▸ Socio-economic moderator. ▸ Non-professional. ▸ «Peasant».
Farmers	▸ Alienation, producing for others. ▸ Social recognition. ▸ Economic security. (opportunities, production aid).	▸ Autonomy, producing for oneself. ▸ Value of Identity. ▸ Social links. ▸ Non guaranteed market.

Table 2: Banana production and diversification: contrasting and ambiguous representations.

In the institutions interviewed, multi-activity is often thought to be an «obstacle to the professionalization of farmers». Agriculture is frequently equated with the two sectors: sugar and banana, which evoke an image of professionalization, jobs and export. In reality, diversification plays an essential role in the securement of family income and in social cohesion, and contrary to what is commonly believed, farmers practising multi-activities are strongly attached to land ownership, which allows them to achieve a certain social status. The difficulty institutions have in accepting the logic of action strategies employed by farmers who do not comply with the «banana planter entrepreneur» model is an obstacle to their integration in agricultural aid policies, and thus to the sustainable development of diversified or multi-activities production units.

An unsatisfactory information and communication system

There is flagrant inequality in the access to information. The sources of information to which the farmer has access are piecemeal (family, peers, salestaff, advisors, and technical documents like the «planters handbook») and are never in the form of tools adapted to the farmer's specific needs.
The frequent lack of knowledge concerning the aids to which they are entitled, their failure to recognise the impact of the products they use on the environment and on themselves (cf. *infra*), the lack of agreement between different points of view, and the difficulty producers have to render account of their development projects all reflect the inadequacy of the communication system. For example the mismatch between (i) the administration's expectations concerning the subsided vitro plants (variety, protection against nematodes) , (ii) the farmers' attitude (ease of plantation, subsidised cost) and (iii) the field practices observed (lack of control of reservoirs and vectors of viruses, replacement of missing plants by offshoots contaminated with nematodes, etc).

Results and practices may vary, but cash flow is the deciding factor in technical success

Intentional crop management sequences vary little and all are based on the «model» provided by the planter's handbook. Any adaptation of its component parts to specific conditions is exceptional. In practice, cultivation techniques are highly variable given that it is impossible to respect the proposed course of action (cash flow) : for example, as far as the last cycle, fertilisation varied from 100 to 500 kg/ha of nitrogen, 300 to 1500 kg/ha of potassium) and soil applications of pesticides varied from 0 to 4 times/year (Amoravain et al., 2000). This variability has an effect both on yields - due to the quality of protection at planting - and on the environment (cf. *infra*). In the three groups in the banana production region studied by the CGER (1998), mean banana production costs vary from 3.3 to 3.6 French francs per kilo, which is in no way related to either yields or profit margins. It is the interest paid on the debt that explains the differences in income.
But, as much as any speculation on high operating costs, cash flow is also an important obstacle preventing farmers from respecting the action plans they draw up for banana production (Cnasea, 1997, CGER, 1998, Amoravain, 2000). Mean debt was 18 000 €/ha in 1997 (CGER,1998) compared to 4 000 €/ha for the same year for French fruit cultivation as a whole. Such a high level of debt is partially responsible for this no-respect, but the farmers interviewed also blame the delay in payment after delivery, fluctuations in the banana market price, and more generally, unforeseeable delays in access to production subsidies.
In this respect, two different categories of families can be distinguished in the watershed: family production units in which at least one family member has an off-farm source of income (generally a salary), irrespective of whether the person concerned is the head of the

farm or not, and families whose entire income is from agriculture. In the latter category, the implementation of the intended technical action plan is often upset by cash flow problems. The first category of families did not mention any specific problems in this connection, although some admit that they are only able to continue «running the farm» thanks to an off-farm salary.

Crop management techniques and environmental impact

Farmers' awareness of potential pollution by agrochemical products varies widely. They find it difficult to estimate the ecological impact of crop management techniques (residues, drainage, erosion, etc), of protective covers for the bunches or plant protection product packaging that are frequently left lying around, as well as dumping the fruit treatment waters. Nevertheless, when confronted with the demands of neighbours concerned with water quality, farmers say they are willing to change their practices «if conditions permit».
Up to now the concept of quality conveyed by extension services only referred to the standards applied to fruit destined for export and not to the way of producing ; this approach is out of phase with society's demands and also with the incentives contained in the LOA, which considers production and environmental management to be of equal importance.

4. Discussion and propositions

Challenges and outlook with respect to the type of farm

The context of banana production briefly reviewed here raises the question of the sustainability of existing systems and of their ability to adapt to new economic conditions, in particular the announcement of a reduction in aids for banana production. The identification of the different ways farms have reacted to changes in their socio-economic environment in the past gives us the tools we need to evaluate different possible courses of action (fig. 4).

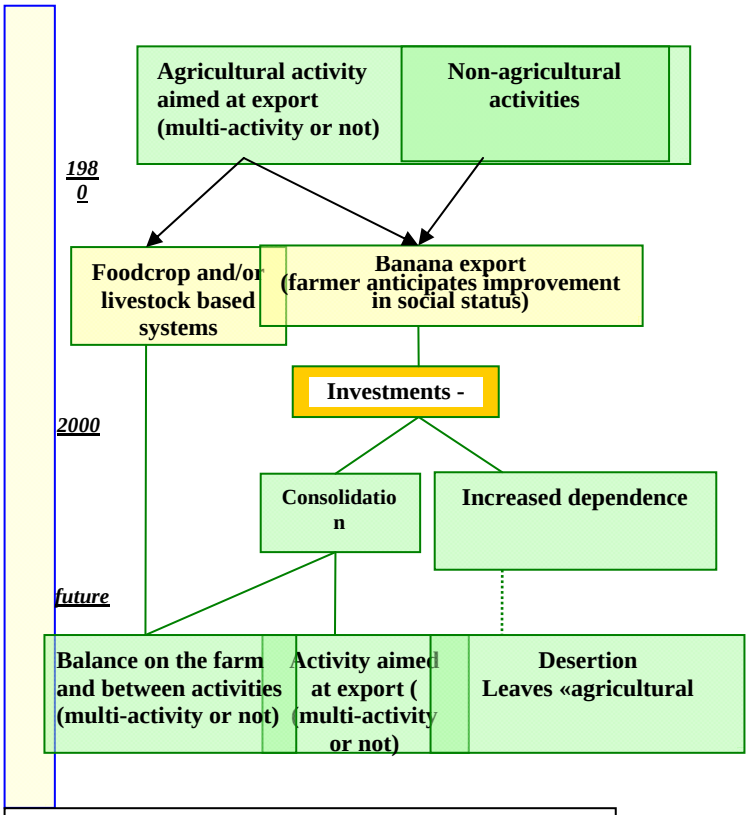

Figure 4: dynamics of changes in systems of activities in the banana region (Cattan & Dulcire, ongoing)

The «*mixed crop-livestock*» type, whose transfer occurs over a long period of time, is considered to be more respectful of the environment (low level of inputs, bio-diversity), less sensitive to risk factors, and autonomous. In the given context, even though this type of farm can only provide complementary income, it does contribute to the viability of the family unit and to the durability of the territory as a whole. Recognition of this type of farming system

and of what is required to protect it against the intensive cropping systems that surround it are major concerns.
The «*diversified*» type is also relatively insensitive to risk factors and is autonomous. Its structural capacity to produce other speculative crops than the banana is an advantage. This type of unit has high labour requirements. Cultivation techniques used for the banana and management of animal waste can affect the environment. The challenge here is to integrate cropping and animal-rearing systems in such a way as to reduce this impact (crop rotation, fertility transfer). Finally subsidies for both crop production and processing and distribution of crops other than the banana are a further priority, together with help in recruiting temporary labour.
The «*banana entrepreneur*» is characterised by easy transmissibility, average sensitivity to risk factors, and a relatively high level of autonomy, but with difficult reproducibility in the context of the intensification of banana production. The challenge here is to introduce crop rotation (with sugar cane or other) on mechanizable soils, to stabilise income, and to limit the impact on the environment. Special efforts need to be made concerning product labelling rather than simply satisfying standard quality requirements, which should allow the product to remain competitive on the market.
The «*family banana unit*» is the most sensitive. These units are deeply in debt, sensitive to risk factors and are not autonomous. They have only limited access to information and distribution networks. They may apply one of two distinct strategies, apparently depending on whether or not the farmer has an agricultural background: disengagement (reduction of inputs, labour, land under banana and a search for other sources of income); or intensification (investments) and an increase in acreage through renting land. Both options reduce the possibility of transmitting the farm; the main risk is bankruptcy followed by leaving the agricultural sector altogether (fig. 4). Since they are particularly sensitive to fluctuations in the price of the banana, this type of unit requires help in restructuring. Improving and stabilising quality standards are also a requirement in order to prevent exclusion from the market; and in this connection income diversification (whether agricultural or not) may be a way of reducing market dependence.

Which agricultural system should be supported?

Faced with these contrasting situations, the community as a whole is justified in wondering how it can help agriculture to become economically and ecologically efficient. Three possible ways merit consideration:
i. Non-export production represents 60% of final agricultural value (tab.1), and is thus an essential component of sustainable development of the island. At the farm scale it increases diversity and consequently its autonomy (home consumption, control of market risk) and allows the integration of agricultural practices that are more respectful of the environment (bio-diversity, reduction of pressure by parasites linked to mono-cropping, landscape, etc). We may consider that farmers have a natural tendency to adapt to a new economic situation by diversifying their activities: in some cases this has resulted in the introduction of pig farming, flower cultivation, or the introduction of crop rotation with sugar cane (Duféal, 2001). Obstacles to these changes may be internal or external to the farm. Internal obstacles are the present difficulties in reorganising production tools while procedures to allow financing of a farming project are just being set up (in particular CTE); external problems may be due to the fact that available sectorial aid aimed at diversifying market outlets is still in its infancy. Consequently, the future development of this type of agriculture depends on the ability of institutions to comprehend the diversity of activities inherent in agriculture and their potential combination with a view to differentiating subsidies and to support a farming development project instead of a specific production; and in addition, on improving the

organisation of producers. The associations set up by pineapple and yam producers provide a useful example in this respect.
ii. One of the most important questions still to be answered is the capacity of sectorial aid policies to support sustainability, and to reply to the needs of these different types of farms as well as to society's demands. The means to evaluate these needs do not exist at the present time. In these circumstances, the way in which subsidies are allocated may be counter-productive because, by not solving farmers' cash flow problems - their main problem in these regions (cf. supra) - it encourages farmers to take loans (Mossé, 1999) and potential lenders to supply them, at high rates of interest (CGER, 1998).
iii. If the group analysis carried out by CGER (id.) gives credit to the notion that «the banana provides increased incomes», it also shows that cultivation of this crop results in deterioration of the system (debt, cash flow, transmissibility). Official discourse confuses certain biotechnical performance indicators (such as yield or banana quality) with comprehensive indicators related to the functioning of the farm, and this could lead to equating the future of the farms and of the whole agricultural region with that of banana production.

Conclusion: the territorial integration of agriculture

Finally this study, though only exploratory, leads us to question the pertinence of the contractualisation of practices or of cropping systems that do not take into account the scale of the production system (Cattan & Dulcire, ongoing). Separate management of banana production for export and the «other» form of agriculture by institutions (Rouget, 2001) and by farmers is the main obstacle to the integration of agriculture in this region in a local programme for sustainable development; and this is one of the conclusions that should be respected when drawing up future CTEs.
The sectorial approach has been the preferred approach of French agricultural policy and subsequently of European agricultural policy, with subsidies for production, for the sector or for farmers, based on tried and tested sectorial analysis. The LOA has amended this approach; however, the territorial approach it proposes - taking diversity into account in the management of the environment - is a methodological and cultural revolution that cannot be accomplished from one day to the next.
In the banana region of Basse Terre, reducing agriculture to a single function, i.e. producing for export, is to take a formal stand against the sustainability demanded by society and encouraged by the LOA. Agricultural activity can no longer be excluded from the «new social contract» (Léger, 2000) called for by the LOA, and new ways will have to be invented so that it can contribute to and be integrated in sustainable territorial development.
The CTE measure concerning a «high altitude perennial banana» illustrates the forms recognition of the multifonctionality of agriculture could take. In the framework of a territorial farm contract, the drawing up of some contract specifications to make optimum use of specific production conditions provides support for the introduction of a well thought out crop management strategy that is more respectful of the environment.

In order to proceed in a way that encourages sustainable development as well as increasing the efficiency of public aid, the community should:
- **Evaluate** the overall economic and environmental impact of agricultural activity: identify farm typology, analyse production costs, determine what interactions exist between agricultural and non-agricultural activities, and identify reliable indicators of the impact on the environment of agricultural activities.
- **Encourage** more varied means of production, that are more respectful of the environment, and that allow producers to find solutions other than those suggested by the planter's

handbook: improved assessment of fertilisation and plant protection strategies; management of plant parasites through the introduction of rotation, etc.

- **Draw up projects for farming development** that better reflect the diversity of modes of production and farmer's objectives. Helping farmers to design their own projects, particularly through analysis of their farming methods, is a prerequisite.
- **Finance** the above projects as well as changes in the farm' organisation: the CTE represents a complementary legal tool to the existing range of sectorial aids for agricultural activity. In this way the "farm project" will ensure the coherence and efficiency of the different types of aid requested.

Government support measures for agricultural development should respect these criteria in order to simultaneously satisfy society's expectations with regard to the environment.

References

AMIN S. 1973. *Le développement inégal. Essai sur les formations sociales du capitalisme périphérique*. Editions de minuit, Paris, 384 p.

AMORAVAIN V. 2000. *Analyse du système agraire sur un bassin versant bananier en Guadeloupe*. Mémoire d'ingénieur ISARA-CNEARC, Montpellier, 88 p. + annexes.

AMORAVAIN V., CATTAN P., DULCIRE M., JULIEN D. 2000. *Contribution à la durabilité des systèmes de production agricoles des territoires bananiers*. CIRAD, juillet 2000, 38 p.

BALLAND P., MESTRES R., FAGOT M. 1998. *Evaluation des risques liés à l'utilisation de produits phytosanitaires en Guadeloupe et Martinique*. Rapport, MATE et MAP, Paris, 96 p.

CATTAN P., DULCIRE M. 2000. *Contribution à la durabilité des systèmes de production agricoles des territoires bananiers : présentation d'une démarche*. Communication au « Forum Agriculture Durable », Lycée Agricole de Moudong, Juin 2000, 18 p.

CATTAN P., DULCIRE M. (on going). Monoculture d'exportation et développement agricole durable : cas de la banane en Guadeloupe (article soumis).

CGER Guadeloupe. 1998. *Analyse de groupe banane 1997*. CGER Basse-Terre, 57 p.

CLOUET Y. 2000. Le zonage à dires d'acteurs. Méthode et perspectives. *Bois et Forêts des tropiques*, n° 265 (3), 45-59.

CNASEA. 1997. *Les producteurs de bananes en difficulté (département de la Guadeloupe)*. Rapport de la mission Banadif, CNASEA – MAP, 28 p. + annexes.

DUFEAL D. 2001. *Diagnostic territorial en zone bananière. Etude d'une petite région rurale : la section de l'Habituée*. ENITACF, 40p. + annexes

GRUGEAUX-ETNA M.-F. 2000. Pollution de l'eau : 4 années de silence. *Sept-Magazine*, n° 1089, mai 2000, 11-13.

JULIEN D. 2000. *Agriculture de résistance en Guadeloupe : éléments d'une dialectique de la dépendance*. DEA ESSOR, ENSAT et Université le Mirail.

LARRÈRE R., VERMERSCH D. 2000. Agriculture et environnement : l'économie rurale revisitée. *Economie rurale*, n° 255-256, 104-113.

LEGER F. 2000. Les CTE, une approche contractuelle fondée sur la reconnaissance de la localité. In Bonnal P., Dulcire M. (coord.)

MALLESSARD R. 1998. *Pré-diagnostic de la filière de production banane de Guadeloupe*. Rapport de mission, CIRAD-FLHOR, Montpellier, 71 p. + annexes.

MERION J. 2000. Dépendance et résistance, le visage de la Guadeloupe. *Volcans*, n39, 14-16.

MINISTERE DE L'AGRICULTURE. 1999. *Mise en œuvre des contrats territoriaux d'exploitation*. Circulaire DEPSE/SCEA, MAP, Paris, 65 p. + annexes.

MOSSE E. 1999. *Quel développement économique pour les départements d'Outre-mer ?* Rapport au gouvernement, Paris, 70 p. + annexes

PAUL J.-L., BORY A., BELLANDE A., GARGANTA E., FABRI A. 1994. Quel système de référence pour la prise en compte de la rationalité de l'agriculteur : du système de production agricole au système d'activité. *In* : Actes du symposium Recherches-système en agriculture et développement rural, éd. Cirad, Montpellier, 46-52.

PREMSING C. 2000. *Quel avenir pour les agriculteurs du bassin versant de l'îlet Pérou ?* Rapport de stage BTSA II, LEGTA Convenance et CIRAD-TERA, 17 p. + annexes.

ROUGET P. 2001. Les travailleurs de la banane au régime sec. *Volcans*, n° 44, 27-29.