

Towards Sustainable Mixed Farming Systems in Cuban agriculture

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Specialisation, as opposed to diversification, and export orientation have been at the basis of patterns of dependence on external inputs and centralised decision-making in the Cuban agricultural model. Low autonomy in farmers' decision-making (centrally-planned collective farms), scarcity of production inputs and extensive areas of abandoned land on the one hand, and increasing food imports on the other, are threatening sustainable development of the country. However, small farmers and an emergent sector of land tenants under a usufruct system are showing that food for the Cuban population can be produced efficiently and sustainably at home. These small-scale producers, cultivating about 25% of the agricultural land, generate more than 65% of the domestic food production, bringing increasing pressure on the collective sector.

During the last 15 years, agro-biodiversity and food self-sufficiency have been recognized as drivers in productivity increases and autonomy in decision making. The economic crisis that started in 1990 in Cuba had a strong negative impact on agriculture, but at the same time created conditions to advance towards a new model based, among others, on principles of organic agriculture and agroecology. Various alternative systems, aiming at sustainable development, have been developed during that period, but most of these lacked an integrative perspective on farming system development and followed an input substitution scheme in which high-input demanding industrial practices were substituted by low input agroecological ones. Conversion from specialised (monoculture) farming systems into mixed (diversified) farming systems is considered in that model as an effective step towards implementation of sustainable practices in agriculture. Thus, the current research aimed at filling some of the conceptual, practical and methodological gaps that constrain a comprehensive transition from specialised dairy farming systems to mixed crop-livestock systems at farm and regional levels. For that purpose a methodological framework was developed for evaluating, designing, monitoring, analyzing and adapting mixed crop-livestock farming systems in comparison to specialised dairy farming systems to identify an effective strategy for sustainable farming system intensification.

Our results show that in comparing different systems, the issue is not simply one of high or low input, specialisation or diversification, but that farming system-specific characteristics and the way in which inputs and agro-diversity are interrelated and managed also are at stake. We found that even in low external input agriculture, when comparing specialised and mixed farming systems, the latter achieved higher levels of food production and higher energy and protein production, as a result of more efficient use of natural resources available on farm (or locally). The unique position of the Cuban agricultural sector, both, nationally and

internationally, provides a context in which these results are highly relevant. High oil prices, climate change and high prices for food in the international markets, combined with national awareness of the necessity to substitute food imports for nationally grown food, as well as the recent government decision to make all unproductive land available for cultivation, open a wide spectrum of possibilities for adoption of the alternative technologies. Diversification, decentralisation, and movement towards food self-sufficiency are major trends in Cuban agriculture. However, these trends must be translated into systematic and consistent policies to ensure reliable and sustainable production, as well as agriculture's contribution to a viable economy. Changes in Cuban agriculture should be driven therefore by conscientious and scientifically-based policies.

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