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Breaking the Myths:
Lessons from Agricultural Policy Changes in Cuba during the Nineties

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... for the peasants

who lost their control over land, input production and farming knowledge

as part of development process...

ACKNOWLEDGEMENTS

"Revolution is a radical change that ensure everybody get equal right to live with dignity as human being. It includes looking to ourselves and learning from our mistakes to make good present condition and a better future!"
(Wilfrido, urban gardener in the 5th Avenue, Havana City, 19 September 2001)

It was a privilege for me to work on this topic. A mixture of impossibilities and challenges, passion and patience, hope and uncertainty, luxuries and hardwork. This research is not only giving me an understanding about organic agriculture in Cuba, but the most important part is giving me a lot of ideas on how to address the crisis of modern agriculture in a fundamental way. It is a combination of learning something new and reflection of my own experience. In some way, maybe I *did a revolution* in my way of thinking.

It helps me to reformulate my work in ELSPPAT, an NGO that promotes organic agriculture in Indonesia. At least, I feel that we are on the right track and I am sure that this study will contribute a lot for our future work. Especially on our work to influence the policy makers in agriculture sector towards more sustainable agriculture and our collaborative work in the network of organic farming movement.

I would not be able to write this report if at some points in my life there never be the following persons. They helped me in some way, from teaching me Spanish, telling me story about Cuba and organic agriculture, giving me contacts, giving me good books, discussing my topic, criticising my presentations, commenting on my diagrams, mind maps and draft, picking me up in Malecon, cooking for my dinner, translating my questions into the proper Spanish or simply giving me a cup of herbal tea. There are a lot more to be all mentioned here.

I want to express my very special thanks to Eric Ross, Cristóbal Kay, Dennis Meadows, Howard Nicholas, Harry Seldadyo, Peter Rosset, Niurka Pérez, María del Carmen Herrera and Manolo, Cuauhtemoc León, Ben Engelbertink, Miriam García Aguiar, Mitchel Marlet, Egidio Páez Medina, Fernando Funes-Monzote, Luis Sánchez, Fernando Funes, Martha Monzote, Roberto Sánchez, Lucy Martin, Luis García, Andrés Lazo Machado, Gisela Campins, Manuel Bollo Manent, Pablo Marrero, Alfredo González G., Diego Ramilo, David Miyares Noa, Patrick Henn, Nidia, Bazarlaan Consensus members, all the farmers and friends I visited in Cuba, all my friends in the ISS, especially ARDers, ELSPPATers, my family in Duren Sawit and David Sutasurya.

Muchas gracias!

"La Revolución es un cambio radical que le asegura a todos la igualdad de derechos para vivir como seres humanos dignos? Ella incluye mirarnos a nosotros mismos y aprender de nuestros errores para construir un buen presente y un futuro mejor".
(Wilfrido, un trabajador agrícola urbano en la Quinta Avenida, Ciudad de la Habana, 19/09/2001)

Ha sido un privilegio para mi trabajar en este tema. Una mezcla de desafíos y dificultades, pasión y paciencia, esperanza y incertidumbre, lujo y trabajo duro. Esta investigación no solo me ha dado mayor comprensión sobre agricultura orgánica en Cuba, sino que -más importante aún- me brindó muchas ideas sobre como enfocar de forma más profunda la solución a la crisis de la agricultura moderna. Esta investigación me ha permitido combinar el aprendizaje de cosas nuevas con la reflexión sobre mi propia experiencia. De alguna manera, ella *revolucionó* mi manera de pensar.

Este estudio me ayuda a reformular mi trabajo en ELSPPAT, una ONG orientada a promover la agricultura orgánica en Indonesia. Siento que estamos en la senda correcta y estoy segura que esta investigación contribuirá mucho en nuestro trabajo futuro. Especialmente nuestras acciones orientadas a influenciar la gestión de políticas en el sector rural, orientando la intervención hacia una agricultura más sostenible y colaborando con el movimiento de agricultura orgánica.

No hubiera sido posible escribir el presente informe, si en algún momento de mi vida no hubieran estado las siguientes personas. Ellos me ayudaron en muchísimas coas de las cuales solo mencionaré algunas: enseñándome español, contándome la historia de Cuba y sobre la agricultura orgánica, conectándome con gente u ofreciéndome nuevos libros, reflexionando sobre el tema o criticando mis presentaciones, comentando mis diagramas, mapas mentales y borradores, buscándome en Malecon, cocinando mi cena, traduciendo mis preguntas o simplemente sirviéndome un té de yerbas.

Por todo ello quiero agradecer especialmente a Eric Ross, Cristóbal Kay, Dennis Meadows, Howard Nicholas, Harry Seldadyo, Peter Rosset, Niurka Pérez, María del Carmen Herrera and Manolo, Cuauhtemoc León, Ben Engelbertink, Miriam García Aguiar, Mitchel Marlet, Egidio Páez Medina, Fernando Funes-Monzote, Luis Sánchez, Fernando Funes, Martha Monzote, Roberto Sánchez, Lucy Martin, Luis García, Andrés Lazo Machado, Gisela Campins, Manuel Bollo Manent, Pablo Marrero, Alfredo González G., Diego Ramilo, David Miyares Noa, Patrick Henn, Nidia, los miembros de Bazarlaan Consensus, campesinos y amigos que visité en Cuba, todos mis amigos del ISS, especialmente mis compañeros del programa de desarrollo agrícola y rural, miembros de ELSPPAT, mi familia en Duren Sawit y David Sutasurya.

Muchas Gracias!

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List of Abbreviations and Glossaries

ACAO: Cuban Association of Organic Agriculture *(Asociación Cubana de Agricultura Orgánica)*

ACOPIO: State marketing board, responsible e.g. for food distribution and decides the price.

ACTAF: Cuban Association of Agricultural and Forest Technicians (*Asociación Cubana de Tecnicos Agricolas y Forestales*)

ANAP: The National Association of Small Farmers (*Asociación Nacional de Agricultores Pequenos*)

Caballeria: A traditional Spanish land measurement used in Cuba. 1 caballeria ~ 13.5 hectare.

CCS: Credit and Service Cooperative (*Cooperativa de Créditos y Servicios*)

CEAS: Center for Sustainable Agriculture Studies (*Centro de Estudios en Agricultura Sostenible*)

Centavo: one-hundreth of a peso

CIPS: Research Center for Psychology and Sociology (*Centro de Investigaciones Psicológicas y Sociológicas*)

Convertible peso: special currency in peso that has equal value as US$ and only can be used in Cuba.

CPA: Agricultural Production Cooperative (*Cooperativa de producción agropecuaria*)

CREE: Center for Reproduction of Entomophagus and Entomopathogens (*Centros Reproductores de Entomófagos y Entomopatógenos*)

DECAP-CIC: Department for Project Coordination and Assistance of Cuban Council of Church (*Departamento de Coordinación y Asesoria de Proyectos Consejo Iglesias de Cuba*)

FNH: Foundation of Nature and Humanity (*Fundación Antonio Núñez Jiménez de la Naturaleza y el Hombre)*

GMO: Genetically modified organism

GR: Green Revolution

IFOAM: International Federation of Organic Farming Movement

IPA: Polytechnic for Agriculture and Livestock Institute *(Instituto Politécnico Agropecuario*)

IPM: Integrated Pest Management

LEISA: Low External Input Sustainable Agriculture

Libreta: the ration book.

LISA: Low Input Sustainable Agriculture

MINAG: Ministry of Agriculture

MNCs: multinational companies

NGO: Non Governmental Organization

OA: organic agriculture

PCC: The Cuban Communist Party (*Partido Comunista de Cuba*).

SANE: Sustainable Agriculture Networking and Extension

UBPC: Unit Basic Production Cooperative (*Unidad Básica de Producción Cooperative*).

UH: Havana University (*Universidad de La Habana*)

UNAH: Havana Agrarian University (*Universidad Agraria de La Habana*)

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1. INTRODUCTION

1.1 Background

Cuba is the only country in the world that has undertaken a large-scale conversion from highly-mechanized-modern agriculture to organic agriculture (OA)[1]. Its experience is only comparable with the alternative practice of low inputs by the Chinese peasantry during the 70s, which did not represent a large conversion from conventional to OA, during the 70s (Rosset and Benjamin 1994b:34). Cuba's conversion was impelled by the crisis, which ensued with the demise of the Soviet Union in 1989. After that, the United States of America tightened its embargo against Cuba by announcing the Torricelli Act (1992) and the Helms Burton Act (1996), imposing standards of international communities about how to develop economic relation with Cuba, through sanction against citizens of third world countries for doing business with Cuba and by restricting the sales of food and medicine to Cuba[2].

As result, Cuba faced a very serious crisis because of declining of food production and losing its imports of food, oil and agricultural inputs. The previous living standard based on food imports, could not be sustained without the support from the Soviet block which provided around a billion US$ annual subsidy by purchasing Cuban sugar at 5.4 times higher than international market price and selling oil at half price to Cuba. By 1995, the caloric intake declined 40% from 2908 calories/capita/day (1989) and the protein intake declined 40% from 77 grams/capita/day (1989). (Sinclair and Thompson 2001:10; Funes-Monzote 1999:4)

This crisis, known as the *Special Period in Peacetime,* severely influenced the agricultural sector, which was characterized by large-scale state-farms with imported machine and inputs and was dominated by sugar that accounted for 80% of total exports. Compared to the 1989 level, by 1992 imports had declined by 53% for oil, 70% for animal feed, 77% for fertilizer and at least 62.5 % for pesticides. (Rosset and Benjamin 1994a:4).

This crisis led Cuba to rethink its agricultural sector. In the early nineties, a reform was declared by the introduction of an alternative agricultural model based on more local resources and fewer chemical inputs. Usually, based on the US experience, it takes around three to seven years to recover land to the initial level of productivity with less chemical inputs. Unfortunately, Cuba did not have that much time. They had their population to feed, especially in urban areas where 80% of the population depended on the food production from rural areas. (Rosset 1994:3-4)

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[1] For the definition of OA, see chapter 2.

[2] Cuba's Report to the Secretary General of the United Nation Organization on Resolution 55/20 of UN's General Assembly:4-6 and Romero 2000:1-5.

In order to increase the productivity of the new model, this reform was deepened by two major policy shifts in the agricultural sector, i.e. the break-up of the large-scale state-farms into cooperatives in 1993 and the opening of agricultural markets in 1994. (Deere 1997).

After ten years, the level of food production and productivity had increased for all major food crops. The levels of food production in 2000, compared to the 1988 level, were up 767% for corn, 113% for rice, 351% for vegetables and 208% for root crops and plantain[3]. The productivity also increased two times for root crops and plantains, more than four times for vegetables, more than double for corn and has remained relatively stable for rice [4].

Based on those trends, I would argue that, despite all the problems, the reforms in agricultural policy in Cuba during the 90s had influenced the advancement of organic agriculture technology and increased food production.

1.2 Research Questions

1. What have been the policy-changes in Cuban agriculture during the 90s? What were the driving-factors behind these policy changes? What were the responses of the farmers/NGOs/other groups related with the policy? What were the results of the policy changes? What were the emerging problems as consequences of these policy changes? How did these changes relate to the next policy reform?

2. What lessons can we learn from agricultural policy changes in Cuba during the nineties?

1.3 Research Methodology

This research uses the concept of policy as a political process to understand the agricultural policy changes in Cuba during the nineties. It describes how different factors/actors shaped these policy reforms and influenced agricultural productivity, equity and sustainability.

It is investigative and explanatory study and uses both qualitative and quantitative data from previous studies and my three weeks' visit to Cuba in September 2001. The quantitative data are used to illustrate the broader picture. The qualitative data are used to give more detailed pictures of each aspect.

I visited research centers and universities (Department of Sociology, University of Havana; Center of Sustainable Agriculture Studies, Agrarian University of Havana; Faculty of Geography, University of Havana and Research Center for Psychology and Sociology {CIPS}), National Association of Small Farmers (ANAP), Cuban Technical Association of Agriculture and Forestry (ACTAF), NGOs (Department for Project Coordination and Assistance of Cuban Council of Church {DECAP-CIC}; Cuban Association of Organic Agriculture {ACAO}; and Foundation of

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[3] See appendix 1.
[4] See appendix 3.

Nature and Humanity {FNH]}, training center, several agricultural markets in Havana City and various farms; one in Pinar del Rio, two in Havana Province and seven in Havana City Province.

I looked at the degree of implementation of OA principles in those farms and made a rough comparative analysis. The criteria were the farm's biodiversity; application of specific OA techniques, such as multicropping, mulching and composting; and the degree of management. I discussed with the farmers about their strategies for farm management, why they did or did not implement certain techniques, to get information about their OA knowledge and problems in implementing OA principles. The purpose is not to assess how good OA in Cuba is, but to give more understanding about how it works and derive effective lessons from their experiences.

Table 1.1 Summary of Research Methodology

No.	Research questions	Concepts/ analytical tools	Descriptions	Sources of Data
1.	What have been the policy-changes in Cuban agriculture during the 90s? • What were the driving-factors behind these policy changes? • What were the responses of the farmers/NGOs/other groups related with the policy? • What were the results of the policy changes? • What were the emerging problems as consequences of these policy changes? • How did these changes relate to the next policy reform?	Policy as a political Process Sustainable Agriculture Organic Agriculture	Reform from Classical model into alternative model.	Statistical Year Book of Cuba FAO Data Among others: Murphy (1999) Rosset (1993,1994,1997,1998) Rosset and Benjamin (1994a,b) Field work data.
			Reforms in the production system Reforms in the distribution system	Among others: Sinclair and Thompson (2001) Enríquez (1994, 2000) Deere (1993, 1994, 1997) Pérez (1994) Alvarez and Puerta (1994) Field work data.
2.	What lessons can we learn from this experience?	The possibilities and constraints in implementing this model.		Author's reflection from the previous analysis

1.4 Scope and Limitations

This research explores the policy changes in Cuban agriculture during the 90s. Then, some lessons are drawn from the technology, the farmers and the politics of agricultural policy. I hope this research can be used to find some lessons for policy makers, NGO activists and farmer's groups in other countries who want to change agricultural practice towards a more sustainable agriculture.

The limitations of the study are as follows:

1. It can show the connection between certain policies and food production, but it cannot quantify how effectively one policy influenced the food production compared to others.
2. It does not cover some interesting issues, such as its implication for food security for different social groups, regions and gender or the impact on the environment. These issues require further study and a different type of research.
3. Lack of time, space and data, especially in English.

4. Language problem[5].
5. Subjectivity as consequence of the observation and semi-structured interview data gathering technique.

1.5 Organization of the paper

This report is divided into five chapters. Chapter one describes the background of the topic, the problem I want to address, the objectives and the relevance of the research, the concepts, methodology, scope and limitation of the study, and the organization of the chapters. Chapter two elaborates the concepts I use in this paper. Chapter three discusses the policy changes in Cuban agriculture during the nineties, its implementations, problems, outcomes and challenges ahead. Chapter four elaborates the lessons we can learn from the Cuban experience. Chapter five provides the theoretical reflection and summary of the lessons.

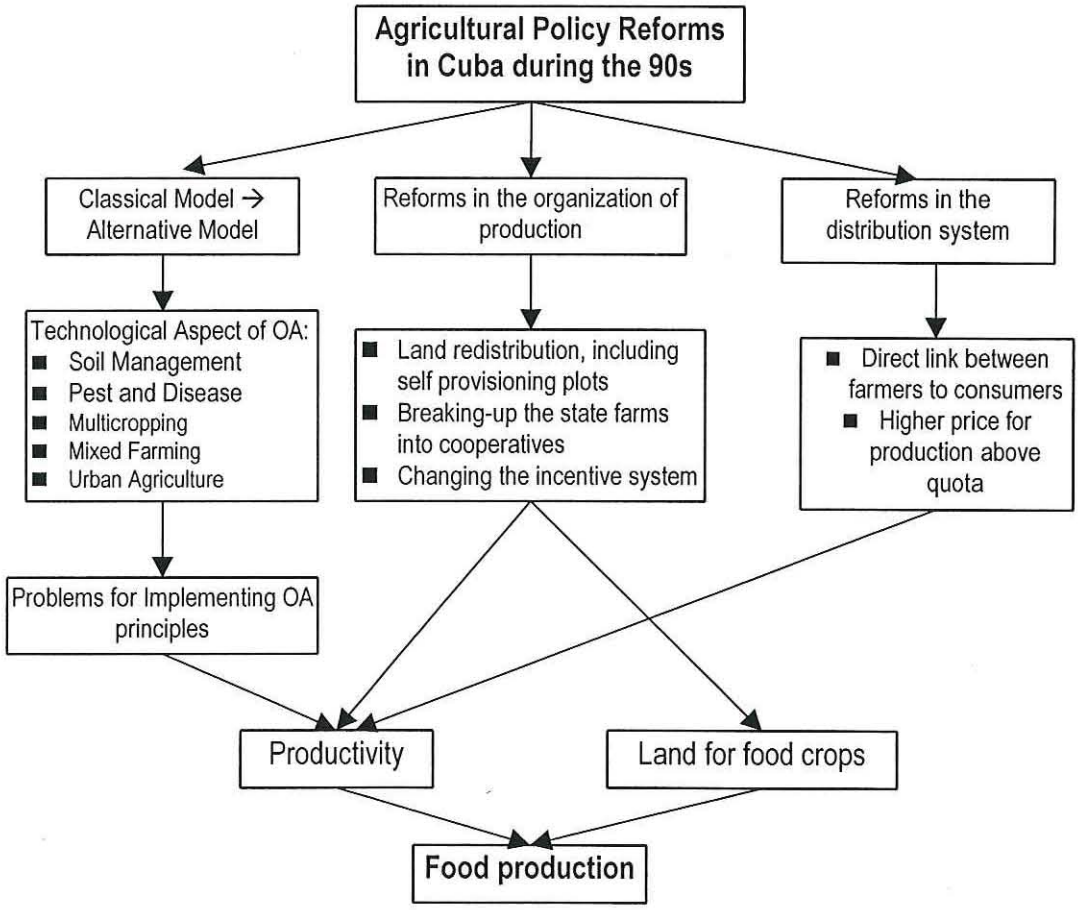

Figure 1.1 Agricultural Policy Changes in Cuba during the 90s and how it influenced food production

[5] I might have lost some important messages because of my poor Spanish. Not every interviewee could speak English. I had a translator, but sometimes I felt he/she did not translate well, because of a lack of knowledge in this field or because of limited English capacity. I did cross check the literature and with other informants that could speak English to make sure that I really understood the main points.

2. CONCEPTUAL FRAMEWORK

2.1 The crisis of modern agriculture[6]

The world agricultural system has been changing fundamentally in the last decade. In many parts of the world, the production system has changed from a subsistence-peasant-economy to a modern-capital-intensive agriculture for profit[7]. This change has two dimensions: the socioeconomic and the ecological.

In the socioeconomic dimension, it enormously increased food production, but also greatly widened social differentiation. While there is over production in some parts of the world, the rest cannot get enough to eat. The production system is transformed into a large-scale unit of production, specialized in monoculture and concentrated into the hands of few people and firms[8]. The distribution of benefits is uneven[9]. In the process, multinational companies (MNCs) get more profit by controlling seeds and chemical inputs, while at the same time squeezing the peasant[10]. This change is made possible by national policies that are not always favorable to the peasant. As result, the peasant lost control over land, inputs (seeds, fertilizers and pesticides) and knowledge or increased their dependence on external inputs produced by MNCs, which are vulnerable to price fluctuation. Moreover, in many societies, the peasant is seen as backward and usually placed in the lowest class of society. There is also an increased differentiation among peasants, including the differentiation by gender[11].

In the ecological dimension, some implications of modern agriculture are water pollution by chemicals, contamination of food by pesticide residues, natural resource depletion by pesticide and chemical fertilizers, health problems for agricultural workers, air pollution, global warming, over use of natural resources, standardization and specialization of modern varieties that are displacing traditional varieties and breeds. (Pretty 1995:4,59-93).

Some initiatives have arisen in response to these problems. One of them is organic agriculture (OA). Through its aim to conserve soil and biodiversity, it poses an alternative model for a more environmentally friendly agriculture, while, at the same time, ensuring healthy food production by implementing chemicals-free techniques. Some of the reasons for implementing OA are responses to special market niches, cultural reasons, survival strategies[12] or increasing environmental awareness. (Scialaba 1998;2000a;2000b)

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[6] See among others Adams (1990), Beus and Dunlap (1990), Magdoff et al. (eds.) (2000) and Atkins and Bowler (2001).
[7] See among others Goodman and Redclift (1991), Bonnano (1994) and Mc.Michael and Raynolds (1997).
[8] See among others Haffernan and Constance (1994) and Haffernan (2000).
[9] See for example Lehman and Krebs (1996), Bandigan (1999) and Mc.Michael (2000).
[10] See part 2.3 for the definition.
[11] See for example Shiva (1988) and Sulistyowati (2000a).
[12] In Indonesia OA is used by poor farmers who could not afford chemical inputs during the crisis.

Until recently, OA has remained a minor practice in the middle of mainstream capital-intensive-modern agriculture. It is implemented as local initiatives in small-scale and the productivity is low compared to conventional agriculture. Although various research had shown the advance of OA in the term of energy efficiency[13] and more environmentally friendly, it is very difficult to change conventional agricultural practice to organic agriculture, especially when the institutional arrangement, market forces, policies and research efforts are biased against it.[14] (Altieri 1995a:146; Pretty 1995:26-57).

The benefit is also distributed unevenly. A small part of society gets the most benefit, e.g. the rich who have money and awareness, the certification bodies, organic traders who get profits from the premium and selling organic inputs[15]. This fact shows that OA within the existing macro economic and political conditions would not solve the problems of poor farmers in the developing countries[16].

Rosset (1997d:10-5) has argued that the crisis of modern agriculture should be solved on both sides, the socio-economic and the ecological. Solving only the ecological part will end up with MNCs selling expensive patented organic inputs and making a profit from them. On the other hand, promoting social equity without changing to a more sustainable production system will end up with inefficient large-scale state-farms destroying the environment[17]. A major challenge therefore, is how to create new policies that reduce the costs of farming and, at the same time, promote social and ecological sustainability. (Altieri 1995a:146).

2.2 Sustainable Agriculture and Organic Agriculture

2.2.1 Criteria for Sustainable Agriculture

Many scholars has been working on the definition and criteria/indicators for sustainable agriculture, such as Bayliss-Smith (1977;1984), Conway and Barbier (1990), Perlas (1995), Pretty (1995) and Scialaba (1998;2000a;2000b). Bayliss-Smith used energy efficiency in his various works. Perlas (1995) defined the seven

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[13] E.g. various work of Bayliss-Smith (1977,1982).

[14] E.g. my experience in promoting OA in Indonesia. It is difficult for a rice peasant in Java to apply OA when the neighboring plots that use the same irrigation system still apply conventional agriculture. Although the quality of OA rice is better, it is difficult for OA farmers to compete with the price of subsidized hybrid rice. It worsened when the peasant lost their access to land because of the industrialization process or got into a debt trap with the middleman.

[15] The business responds quickly to this market. They started producing organic inputs as soon as a lot of criticisms arose about the impact of chemical inputs to the environment. Under TRIPs (Trade Related Intellectual Property Right), they can sell new patented products at a very high price. As a comparison, the price of *methyl paration*, the most famous poisonous pesticides worldwide is US$ 7 per liter, while the effective biological patented pesticides may cost US$ 150 per liter for Javelin® or more than US$ 400 per liter for Avermec®. (Rosset 1997d:13). This new pesticide might be good for environment, but not for the farmers in the third world countries whose income might less than US$ 600 a year, especially with the low and fluctuating price of agricultural products under the existing market system.

[16] For example, the organic farmers in Costa Rica who grow organic bananas under contract. They should face the fact that the company that promised to buy their product sometimes refused to buy at the price they had promised. (Reijntjes 1998:24). See also Allen and Kovach (2000) and Watts (1990).

dimensions of sustainable agriculture as based on integrative and holistic science, supportive of the development of human potentials, cultural sensitivity, founded on the use of appropriate technologies, ecologically sound, socially just and equitable and economically viable.

Conway and Barbier (1990) defined the criteria of sustainable agriculture as sustainability, equity, stability and productivity. Productivity is defined as *"the output of valued product per unit of resource input"* that can be measured by yield (kg/ha) (p.37). Equity is defined as: *"the evenness of distribution of production of the agricultural system among the human beneficiaries* (p.42). Sustainability is defined as *"the persistence or durability of a system's productivity under known possible conditions"* (p.37). It can be measured by looking at the resource and technology used in the agriculture production. Are they renewable or non-renewable, local or dependent on imports? Stability is defined as "*the constancy of productivity in the face of small disturbing forces arising from the normal fluctuations and cycles in the surrounding environment.* (p.42) or long term productivity.

2.2.2 The definition of OA

The term OA refers to sustainable agriculture, but there is no agreement about its definition. There are many types of systems that call themselves sustainable agriculture, such as natural, biological, organic, alternative, ecological, permaculture, low external input sustainable agriculture (LEISA), low input sustainable agriculture (LISA) and biodynamic. So, OA is a kind of sustainable agriculture, but not all types of sustainable agriculture are organic (Pretty 1995:8-9).

The International Federation of Organic Agriculture Movement (IFOAM) defined an international standard for OA. Roughly speaking, OA does not permit the use of any kind of synthetic fertilizers and pesticides. The term 'synthetic' is used to differentiate between natural substances, such as manure, phosphate rock or legumes (*ibid.*:8). Various national standards are also developed in various countries based on this international standard. However, there are a lot of debates still going on to decide whether standardization is needed or not; especially when such a standard is not practicable for poor peasants.[18]

Organic agriculture is not necessarily traditional agriculture with pre-industrial technology. The technique can be tailored differently in different local setting depending on its environmental and socioeconomic setting. It combines the principle of traditional conservation farming with modern technologies. (Pretty 1995:12; Altieri 1995b:179)

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[17] This refers to Cuban experience before 1990, where the agricultural sector dominated by large-scale state-farms with modernized chemical based on single crop.

[18] For discussion about standard, see e.g. Raynolds (2000).

Here, OA is defined as what Altieri called agroecology[19]. The characteristics of agroecological production system are biological diversity in time and space; reducing nutrient losses by effectively containing leaching, run-off, and erosion and improved nutrient recycling; encouraging local production according to natural and economic setting; sustaining desired net output by preserving the natural resources and reduce costs and increasing the efficiency and economic viability of small and medium-sized farms. It minimizes soil degradation, uses legumes, organic manure, compost and other effective recycling mechanism and promotes the diverse agricultural system. (Rosset 1997d:14; Hecht 1995:2 and Guthman 2000:258).

Therefore in principle, OA should address not only the ecological dimension but also the socioeconomic aspect of agriculture. From socioeconomic aspect, it is more sustainable because of the use of local resources and technology. The farmers can produce their own inputs and they do not have to rely on the input production from MNCs. They have variation of products so they are not vulnerable to the price change of a single crop. From ecological aspects, the energy efficiency is better than modern agriculture[20], conserving biodiversity, increasing soil fertility and reducing the vulnerability to pests and diseases.

In between conventional and OA, there are various systems. E.g. LEISA and LISA are used in the transition period. They are mainly characterized by reducing the use of pesticides and chemical fertilizers. The other method applies part of the principles, e.g. by changing the chemical fertilizer to biofertilizer without changing the monoculture system. This method is known as input substitution[21]. (Altieri 1995b:191).

Rosset (1997d;1998b) argued that using input substitution, especially within the existing macro conditions will reduce the possibility of agroecology to show its potential for solving the crisis of modern agriculture. For example, this method legitimates the claims of the MNCs to make a lot of profit from selling organic inputs. It facilitates the use of an organic standard by a developed country as protection mechanism for its own agriculture. This effort does not necessarily address the roots of the global crisis of modern agriculture. From the social aspect, is rooted on the unequal benefit sharing among beneficiaries, and from the ecological aspect, is rooted on the implementation of technology that is against the principle of natural balance. Therefore, it destroys agriculture's stability and increases its vulnerability to pests and diseases.

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[19] For further information see Altieri (1995b:179-99).

[20] See for general, Bayliss-Smith (1977:317-59; 1984:153-72) and for Cuba, Funes-Monzote (1999:10-1).

[21] For comprehensive comparison between Green Revolution and Agroecology, see Altieri (1995:148) and among coventional, input substitution and agroecological agriculture, see Rosset (1997d:16;1998b).

2.3 Policy as a political process[22]

Development policy is a political process. It is the outcome of struggles by different actors, different interest groups, about agenda settings and sharing resources. Therefore, development policy is about tension and bargaining between different interests of political and economic power. Actors are important in shaping every stage of policy development. The agenda setting, policy implementation and outcome are all part of a political process.

This process is seen as interactive and dynamic. To understand policy as a political process, it should be understood within the historical context. History influences the values and the objectives of the policy. The failure or success of implementing one policy shapes the birth of the next policy. It can be said that policy change is shaped by the changing interest or power constellation of the actors related with policy. Policy is the result of interaction among actors, interest and resources.

Development is a long-term process, no quick fix or short cut. Policy plays a significant role in shaping development process. It works within a certain social context. No policy prescription can work in all situations. The process is not linear. All actors and variables influence one another resulting a complex system comprising policy makers, recipients and implementers. The implementation of one policy can give feedback to or become the input for the next policy. The outcome of one policy is also influenced by the implementation of many other policies.

Development policy is about choice. It is about balancing advantages and trade-off. Every country has choices in setting up their policy. When they said they have no choice, the real situation is they do not want to take the risks embedded in the other possible choice. So policy is also about setting up priorities, taking risks and targeting some specific set of problems.

Understanding policy as a political process implies the examination of how public policy and public action response to tensions and crisis within society and, as result, it brings about transformation in society. (Wuyts 1992:280). The framework derived from this model is illustrated in the figure 2.1.

This framework is used to understand the reforms in Cuban agriculture. It identifies how different factors/actors shaped this process. It explains how the changing institutions, incentive systems and public response influenced the outcome and the birth of the next policy.

In this paper, agricultural policies are defined as the major policy changes that influenced the production, organization and distribution system fundamentally during the nineties. The first was the change from an

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[22] Excerpted from Grindle and Thomas (1991:1-17), Wuyts (1992:279-90), White (1992:231-51), Jos Mooij (2000, lecture notes on Analysis of Social Structure, INT 101:session 7) and personal notes on Rural Development Policy and Public Action

agricultural model based on external inputs (classical model of development) into an alternative model of development, which was based on more local resources and fewer chemical-inputs. Second was the reform of the production system, including the break-up of the state farms into cooperatives (1993). Third was the reform in the distribution system, which included the opening of the agricultural markets (1994). This paper discusses the reasons for these policy changes, their implementation and the responses of farmers and how this response influenced the next policy reform.

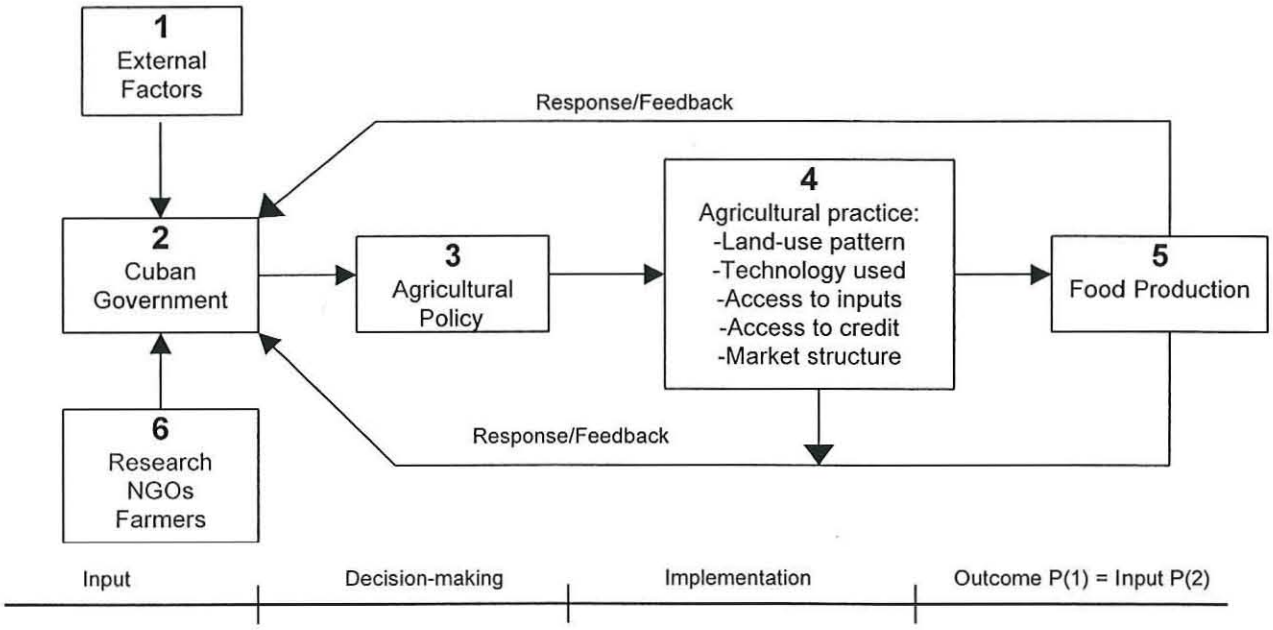

Figure 2.1 Development policy as a political process

Farmers are defined as the people who derived livelihood from crop cultivation. They can be farm workers, cultivate their own land or rent from somebody else. They can be in rural or urban area. The cultivation technique can be very extensive using vast land or very intensive above the roof of a house.

In this report, the farmers are divided into three categories: the state farm workers, cooperative members and the peasant. The term "peasant" refers to individual farmers that are not affiliated with state-farm or production cooperatives. Most of them are members of CCS (Service and Credit Cooperative). The cooperative members refers to the production cooperatives; members of UBPC (Basic Units of Cooperative Production) or CPA (Agricultural Production Cooperative). The state farm workers are the farmers that work in the state farms. In urban area, the term "urban gardener" is sometimes used.

(MAR 220,2001).

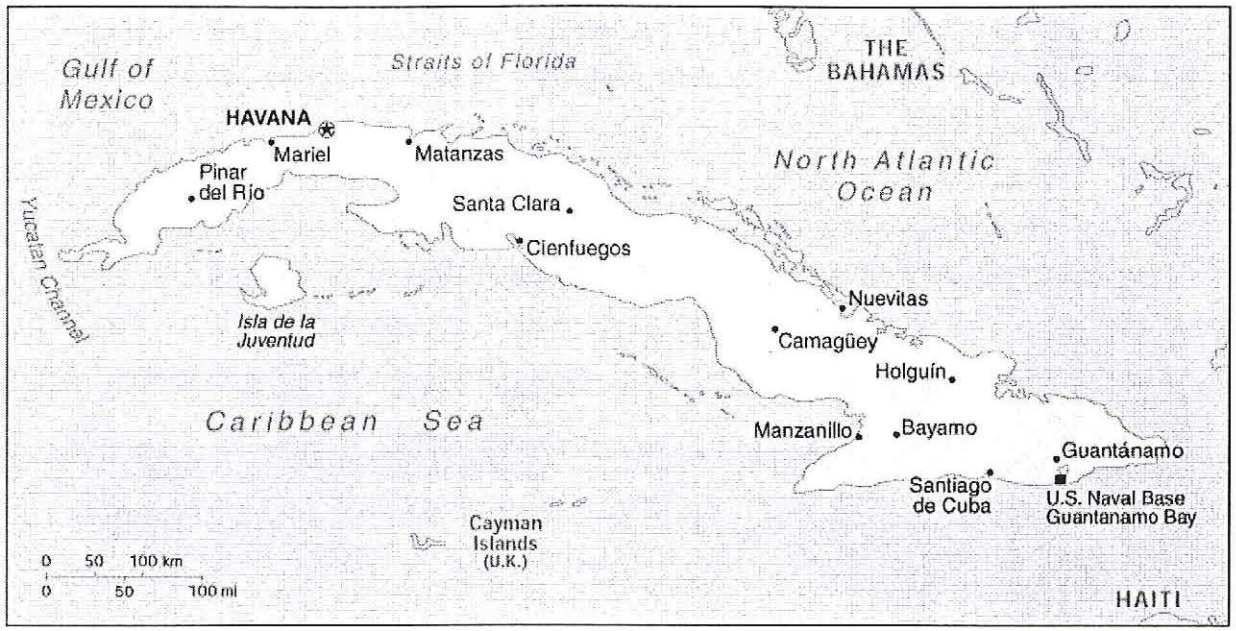

Figure 2.2 The map of Cuba

3. AGRICULTURAL POLICY CHANGES IN CUBA DURING THE 90s

3.1 The classical model of development

Before the crisis in the 90s, Cuba had adopted the so called classical development model, characterized by the high dependence on external supports from the Soviet Union, emphasizing on the modern agricultural sector based on chemical inputs, a large-scale approach and mechanization, and a high degree of urban development and rural out-migration (Enríquez 2000:2; Rosset and Benjamin 1994a,1994b).

In 1989, the agricultural sector employed 25% of the workers and accounted for 9% of the GDP. The organization of the agricultural production system can roughly be divided into three main categories: various types of state farms, cooperatives and private sector. The state farms consisted of state farm workers that received their salary from the state. The cooperative sector consisted of CPAs (Agricultural Production Cooperative). They were united in a production unit and worked together as a group to manage the farm. The private sector consisted of the individual farmers, the peasants who were not affiliated with state farms or production cooperatives. They cultivate the land individually. They were including the members of CCS (Service and Credit Cooperative). The peasant and CPA members are organized under ANAP (National Association of Small Producers) who represent their economic and political interest. (Sinclair and Thompson 2001:18-32,38; Ghai *et al.* 1988:53-86)

The state owned 79% of land while private farmers had only 21%. This was the result of the series of land reforms beginning in 1959, that first limited land ownership to 405 hectares and, after 1963 restricted land ownership to 63 hectares. (Ghai *et al.* 1988:8-14; Deere 2000:139-58; Rosset 1998a:139, Alvarez 2001)

The state controlled agricultural production and distribution directly. It managed large-scale state farms, set the production quotas for farmers, determined food price and controlled food distribution through *Acopio*, the state marketing board, and the rationing system (Benjamin *et al.* 1984; Forster and Handelman 1985:174-189; Enríquez 1994:29-40; Deere 1992).

It also focused on a single export crop, sugar, which accounted for 80% of all exports in 1989. In that year, tobacco and citrus only represented for 2% and 3% respectively (Sinclair and Thompson 2001:38). As consequences, sugar dominated the fertile land, replaced the food crops production and Cuba depended on imported food (Enríquez 2000:3; Forster and Handelman 1985:174-189).

Although there was some improvement in the food production level, it only reduced the level of food imports from 17.3% in 1980 to 12.4% in 1989, compared to 21.2% under the pre-revolutionary Batista regime. In 1989, the

component of caloric import was 44-57% (Enríquez 2000:3). The import component of food consumption was 50% for rice, 99% for beans, 21% for meat, 100% for wheat, 38% for milk and derivatives (Funes-Monzote 1999:4). The non-imported food production was the root and tubers for around 71% of total food production, and vegetables and salad for 29% (Sinclair and Thompson 2001:38,53).

The aim to diversify agricultural production, which was declared since the revolution, never happened as Cuba got a very profitable trade business with the Soviet Union. Before its collapse in 1989, the Soviet Union bought Cuban sugar for five times above the international market price and sold oil to Cuba at half price to be re-exported again (Enríquez 2000:3, Rosset and Benjamin 1994a). It amounted to around one billion US$ in annual subsidies from the Soviet Union and Eastern Europe (Sinclair and Thompson 2001:38,53).

The result of this model was a high standard for health, education, longevity and social equity. The caloric consumption increased from 2500 kcal/capita/day in 1965 to 2898 kcal/capita/day in 1989. Life expectancy was 75 years compared to 55 years in 1965. The ratio between doctors and population was 1 to 190 and the ratio between scientist/professionals and population was 1 to 830. The literacy rate was 92%. (Funes-Monzote 1999:4)

The modernization process led people to migrate to urban areas[23] and, as consequence, there was shortage in the agricultural sector and a need to implement more mechanization. The mainstream paradigm was "large-scale is better", to take advantage of this mechanization. The process aimed to bringing about the socialist transformation of Cuban agriculture, which led to complete "proletarianization" that gave more support to large-scale state farms and ignored the peasant sector. (Enríquez 2000:4; Ghai *et al.* 1988:95-99)

This model was vulnerable in three ways. The first one was its dependence on a single trading partner, the Soviet Union. The second was its reliance on a single main crop, sugar. And finally, there were bad the long-term implications for the environment[24] of the use of chemicals in a monoculture production system. (Rosset and Benjamin 1994b)

3.2 The shift to the alternative model

3.2.1 The reason for the policy shift

The main reason for the shift of agricultural policy from a focus on highly-intensive-chemical based agriculture to OA was the crisis brought about by the collapse of the Soviet Union. The challenge of the crisis was how to

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[23] The increase population in urban area is not always reflected by rural out-migration, but also by reclassification of the former rural area as urban, by the availability of the infrastructure and public service (Ghai *et al.* 1988:96).
[24] See Diáz-Briquets (1999:79-109,249-280).

double food production with less than half of the input. They desired to save the foreign exchange while keeping the high living standards of the people. This period is known as *Special Period in Peacetime.* (Rosset 1994a)

Roughly speaking, the large-scale state farms collapsed. They could not produce without chemical fertilizer, pesticides, oil and spare-parts for their tractors. The only farmers that still produced were the peasants who had implemented OA long ago, because they got less access to chemical inputs from the government. In the crisis, they were the main food producers for the country. This fact led Cuba to rethink its agricultural sector. (Rosset 1998a)

3.2.2 The actors that facilitated the policy shift

Actually, an awareness of the vulnerability of its highly-mechanized-chemical-based agriculture started in the 70s among Cuba's young scientists. Their concern was mainly about the future of agriculture that depended on imported inputs from the Soviet Union. They began to do research to explore the possibility to apply OA, based on their local resources. They were convinced by the experiences of the peasant that Cuba could produce more food with fewer chemical inputs. (Rosset 1994:5)

In the beginning, this initiative did not get any political support from the government and was restricted to the research side[25]. They needed to convince the government and more senior researchers who were in favor of conventional-agriculture and not sure that OA could be a solution for increasing food production. Moreover, a lot of doubt and criticism was expressed by mainstream policy makers, who could not imagine that food could be produced sufficiently without chemical inputs, mechanization and in large scale unit of production. (Rosset 1994:5; 1997b:300-1)

Only when Cuba faced a deep crisis and could not import fertilizers anymore did things began to change. It was ACAO, an NGO network on organic agriculture in Cuba, which initiated the process. It started with a discussion among scientists from different backgrounds who were concerned with the current situation in Cuba and wanted to develop a more sustainable agriculture. They held the first national meeting on organic agriculture in 1993 and repeated it in 1995 and 1997. International delegations from 40 countries also attended this meeting.[26]

3.2.3 The classical model vs. alternative model

After observing this initiative and confronting evidence that peasants could produce more with fewer chemicals, the government started to offer its support. The decision to support OA changed the agricultural policy fundamentally. The Ministry of Agriculture declared the alternative model to be a change from the classical

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[25] Interview with Fernando Funes-Monzote, 17/09/2001.

[26] In 1999 ACAO was closed by the government. It became part of ACTAF and affiliated with the Ministry of Agriculture. In some way, they are still working independently with the permission of the government but without any legal status. The

model. While, the latter relied on the intensive use of chemical fertilizers, pesticides, oil and hybrid seeds, the alternative model depended more on local resources, e.g. animal traction, local and renewable energy, biological inputs and local technology[27].

President Fidel Castro, in his remarks to the 5th Congress of National System of Agricultural and Forestry Technicians in 1991, announced that the country should be able to produce more food without feedstocks, fertilizers and fuels. He stated that, even after the Special Period had ended, animal traction would still be an essential part of Cuban agriculture. (Rosset and Benjamin 1994b:32-3)

The spread of this new model can be accomplished very rapidly for several reasons. First, the individual farmers already had the knowledge to produce with this technology. Secondly, researchers already had some accumulated knowledge in this field which was ready to be implemented when necessary. Thirdly, Cuba had the capacity for successful labor mobilization and a high quality of labor force[28]. The fourth was related to the strong foundation of Cuban society in the *Poder Popular* (People's Power), the smallest organizational unit of Cuban government which facilitated effective collaboration between institutions[29].

After that, a series of reforms were carried out to support this decision. The main idea was to produce food with less external input. More biotechnology centers were established to produce biological control for pest management. Efforts were made to promote the use of oxen, instead of tractors and to provide cheap seeds, organic material and agricultural tools. (Riós and Ponce 2001; Pérez and Vázquez 2001).

3.2.4 The technological aspects of OA in Cuba

3.2.4.1 Soil management

The aim of soil management in the alternative model is to reduce the use of chemical fertilizers. Some new programs were introduced such as minimum tillage, use of animal traction, rational use of fertilizers, use of natural soil amendments, crop rotations and crop covers. (Rosset and Benjamin 1994b:51-65)

Another principle is to employ the minimum tillage to prevent erosion. This method had been used since 1968, but only intensively after the crisis in 1989. Zero-tillage is the best for soil management except for weed control. Cuba has special technology using ox-drawn multi-plow that can cut the weed roots under the soil surface. This technology has been effectively cutting the soil erosion, but on the other hand it needs more labor. (*ibid.*:54)

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reason mentioned by its activist was because ACAO became too strong and influential nationally and internationally. (Interview with Fernando Funes-Monzote, 17/09/2001)

[27] See Rosset and Benjamin (1994b:28-32) for the comparison between characteristics of the classical and alternative model.

[28] See Brundenius 2000.

[29] Interview with Lucy Martin Posada, CIPS, 24/09/2001.

Many kinds of natural soil amendments such as waste from sugar processing, cattle (e.g. cows, pig and sheep) and poultry, food waste and green manure. It also uses compost and *vermicompost* and green manure as biofertilizer. *Vermicompost* is compost made by worm. Cuba has 172 *vermicompost* center that produced 93000 tons in 1992. The use of 4 tons *vermicompost* per hectare is equal with the use of 40 tons of cow manure and can increased yields to 36%. Another biofertilizers are the use of *Bacillus, Azospirillium, Azotobacter, Rhizobium* and *Vesicular Arbuscular Micorrhizae,* VAM, the fungi that can penetrate roots and help the plant to take nutrients from the soil.[30]

3.2.4.2 Pest, disease and weed management

The core of Cuban pest management is biological control. It used *entomophagus*[31] and *entomopathogens*[32] produced by the decentralized biotechnology center, the CREE[33]. The development of CREE started in 1988, but only improved rapidly after the economic crisis. Its number increased rapidly from 82 in 1988 to 227 in 1999 (Pérez and Vázquez 2001:195). It gives services to cooperatives, individual and state farms. A CREE is organized in the form of cooperative, run by local people. It got ten years loan from the bank to buy the equipment and initiate the production process. It is enough to cover the salary, pay back the loan and provide the free biocontrol for the cooperative. (Rosset and Benjamin 1994b:38-42)

Another biological pest-control technology is using ants for sweet potatoes and black plantain. This method is used, for example, to control 99% of potato production in Pinar del Rio. If the problem is very serious, they need special permission from the Ministry of Agriculture to use chemical pesticide. There are two benefits of this method. First, it reduces production cost and, secondly, it increases yields. (*Ibid.*:42-3).

Another effort is research to find plants for *insecticide, fungicide, bactericide* and *herbicide*. Special attention has been given to two species of plants, Melia and neem. Research also had been done on *parasitic nematodes*, but until now has not been implement widely because of high cost and not being very effective. (*Ibid.*:46-7)

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[30] For the detail information about soil management in Cuba, see Rosset and Benjamin 1994b:51-65.

[31] *Entomophagus*: insects that eat or parasitize other insect and therefore can be released as biological control. For example, in Cuba they use *Tricogramma* and *Lixophaga*. (Rosset and Benjamin 94b:38-9)

[32] *Entomopathogens*: disease of insects but not disease of human and therefore can be used as non-toxic pest control. It can be bacteria, fungi or viruses. In Cuba, they use *Bacillus thuringiensis, Beauvaria bassiana, Metarhizium anisopliae* and *Verticillium lecanii*. (Rosset and Benjamin 94b:39-40)

[33] CREE: *Centros Reproductores de Entomófagos y Entomopatógenos*/Center for Reproduction of Entomophagus and Entomopathogens.

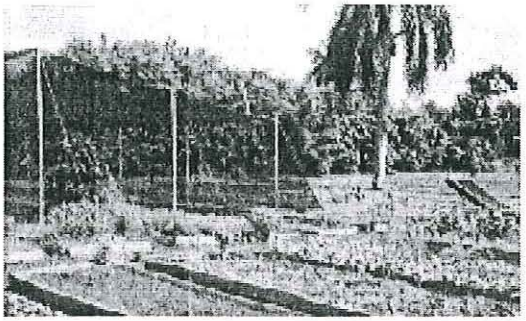

Figure 3.1 Biodiversity of organic urban agriculture in Havana City

3.2.4.3 Multicropping[34] and mixed farming

Multicropping and mixed farming were implemented to increase biodiversity. The research by Leyva and Pohan in 1995 as quoted in Funes-Monzote (1999) showed that not only was the yield from the multricropping soya and sugarcane higher than the monoculture of sugarcane, but the farmers get the additional product of soya. The same trends also happened for several combination of cropping management systems between cassava and beans as studied by Mojena and Bertoli in 1995 as quoted in Funes-Monzote (1999).

Table 3.1 Energy use and production for 75% animal and 25% crop integrated module

Unit	Year 1	Year 2	Year 3
Area (ha)	1	1	1
Total production (tons/ha)	4.4	4.9	5.1
Energy produced (Mcal/ha)	3797	3611	4885
Human labor (Mcal)	596	392	359
Animal labor (Mcal)	16.8	16.8	18.8
Tractor (Mcal)	277	162	138
Energy eficiency (output/input)	4.4	8.8	9.5

Source: partly adopted from http://www.cnr.berkeley.edu/~agroeco3/sane/monograph/CUBA.htm

Mixed farming is an integrated system that combines crops and livestock. It uses a rotational system to maintain soil fertility. The advantage of this system is that it is a more efficient use of resources and the biodiversity increased. For example the biodiversity increased 30-40 fold from a specialized milk production to this new system (*ibid.*:10-1).

Mixed farming is better in the energy efficiency (the amount of energy produced compared to the energy input) compared to conventional agriculture. For example, in a hectare unit mixed-farm with 75% animal and 25% crop integrated module, the energy efficiency doubles in two years, from 4.4 to 8.8 and increases again to 9.5 in the

[34] Multicropping is a system that cultivates various different crops in certain area. The purpose is to balance the nutrients contains of the soil because different varieties of crops have different requirements of nutrients. This system is the opposite of monoculture/ monocropping system, which cultivate single type of crop in certain area. Monoculture has been criticized because increase the vulnerability to pest and disease and destroying the nutrient balance of the soil.

third year. The total energy expenditure is high in the beginning, but reduces sharply in the second year and then again for the next years[35].

3.2.4.4 Urban Agriculture[36]

Before the Special Period, urban agriculture did not exist in Cuba. Havana City even had a law that prohibited its citizens to grow food crops in front of their house because it was associated with poverty and underdevelopment. After the crisis, the government supported this popular movement, and in the 1994, the Ministry of Urban Agriculture Department was formed (Murphy 1999:11; Altieri *et al.* 1999:134).

Urban agriculture in Cuba ranges in size, ownership and types. Popular gardens, the most accessible garden for the public, range in size from a few square-meters to three hectares. Larger plots are divided into smaller individual gardens. Usually such agriculture uses vacant plots in a neighborhood. The gardener can get the land at no cost through *Poder Popular*. The garden can be cultivated individually or collectively by a household, neighborhood organization or horticulture club. Most popular gardens provide food for self-consumption, donation for child-care centers, hospitals, or lower income people in the community and can sell the rest for profit. The most popular type of urban agriculture is *organopónico*, which use raised bed because of the poor soil conditions in urban area. (Altieri *et al.* 1999:132-3 and Murphy 1999:15-24)

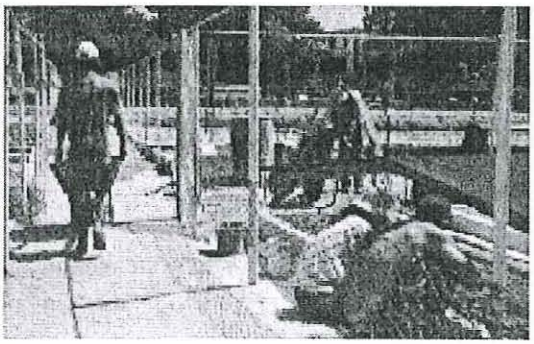

Figure 3.2 State *organopónico* in Havana City

3.2.5 The results and emerging problems

Farmers have shown that the best performance with the alternative model was the peasant who had been implementing OA for long time. They already had the capacity to produce with fewer chemical-inputs. So, when they got support from the government, their production level increased. (Rosset 1997b)

For example, the CCS and CPA farmers have shown their high productivity compared to the state farms even with less input and less support from the government. They became even better when they had access to credit,

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[35] See Funes-Monzote (1999:10-1); Zarb (2001), or http://www.cnr.berkeley.edu/~agroeco3/sane/monograph/CUBA.htm.

opened bank accounts, organized to buy machine to be leased to the members and organized marketing to cut intermediaries and increase their profit. In 1998, ANAP facilitated the program to strengthen the CCS on the business side. In April 2000, around 991 of the 2556 CCS cooperatives were strengthened. (Sinclair and Thompson 2001:22)

In 1990, of around 1305 CPAs with 62.130 members, around 85% are profitable, except the coffee producers who were less successful. Usually they had problems with lack of fertilizers that heavily influenced productivity. This led to difficulties in loan repayments, low salaries for workers and therefore became difficult to keep the workers. As result, they required a bigger loan. Some of the cooperatives had been approved to get debt-reduction if they could show higher productivity. (*Ibid.*; Deere 1997:652)

On state farms, the implementation of the new model was not without problems. The most important one has been labor shortages. This problem had been the major problem in Cuban agriculture for a long time, but it was deepened, as the new model required more labor. Some remedial efforts by government have included two weeks voluntary work in the rural area for urban people and the recruitment of under-employed and unemployed urban workers for two years in the state farms. (Rosset and Benjamin 1994b:66-72; Deere 1997:652)

This labor mobilization cannot be sustained in the long-term basis. Especially when the farming activities needs special skill and care of the crops, while the volunteers did not always have enough skill to do that. On the other hand, the state farm workers did not have enough incentive to produce more. Some of them worked fewer hours than the requirement and changed their jobs to get more money. While small farms and cooperatives showed increased productivity, the productivity of the state farms had continued to decline. (Deere 1997:652)

The more successful effort was distributing land to people who wanted to change their profession to farming. Since 1989, at least 170 thousands hectares had been distributed to individual peasants and cooperatives. As a result, ANAP had reported that their members increased by 35 thousands in the last three years. Many people have changed their profession to farmers. Some of them were young people who really enjoyed working in the countryside, some were graduated from agricultural school, retired people and those with previous farming experience. (Sinclair and Thompson 2001:21-2)

The problem of unproductive state-farms had required Cuba to deepen the reforms in its organization of production in the agricultural sector, i.e. the breaking-up state farms into cooperatives.

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[36] See among others Murphy 1999 and Companioni (1996,1997,2001).

3.3 Reform of the organization of production

3.3.1 The change in organization of production before and after the Special Period

Before the Special Period, the organization of production was dominated by large-scale state-farms. In 1989, these accounted for 78% of land holdings, while cooperatives only represented 10% and private farmers 12%. By 1997, however, state farms accounted for only 24%, while cooperatives were 57% and private 19%. This change was mainly due to the break-up of the state farms into UBPCs (Unit Basic Production Cooperatives) in 1993. (Deere 1997)

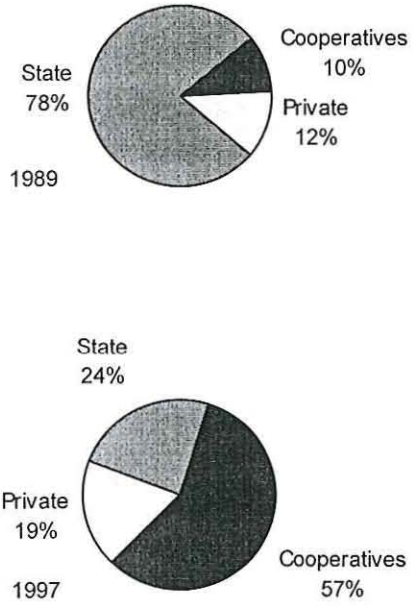

Figure 3.3 The organization of production in Cuban Agriculture before and after the Special Period

Source: *Anuario Estadístico de Cuba*, 1996 and 1997 as quoted in the *Anexo Estadístico, La Economia Cubana: Reformas Estructurales y Desempeno en Los Noventa*, ASDI, UN and CEPAL (1999:83)

This shift in the organization of production does not reflect the system of land tenure. However, after the Special Period, the land use by cooperatives and individuals increased from 22% to 76%, the state still owned 79% of the land. Cooperatives and individuals cultivate state land under *usufruct*, the right to use state land on the long-term basis rent-free. There is no foreign ownership in Cuba. (Sinclair and Thompson 2001:38)

3.3.2 Breaking-up of the state farms

A lot of studies had shown the ineffectiveness of the large state farms compared to small farms[37]. In September 1993, President Castro announced that the large state farms would be broken into smaller cooperative units of management called UBPC. (Rosset and Benjamin 1994a:7)

Farm workers were free to form UBPC or to remain as state-farm workers. If they did, they had the autonomy to choose their leaders, members and open their own bank account. The UBPC owned the farm and equipments, but the state still owned the land. The UBPC could use the land under *usufruct*. They could get a long-term loan at 4% annual interest with three years grace period that could be used for capital investment in irrigation, machinery, livestock and crops. To some degree, the state still controlled the farm management. The state determined the main crop, while the rest was up to their choice. The UBPC negotiated the price and the production plan with the state. They sold the main product to the state at the state-determined price. The UBPCs and the state-farms workers were also allowed to cultivate for self-provisioning as long as this did not disturb the main crops. (Deere 1997:653)

This reform was done together with a change of the incentive system within the UBPC from time-based to productivity-based. With the program called *'vinculando el hombre con el area'*, a small group of workers was linked with specific plots of land and their performance was measured by the productivity of the land. (Enríquez 2000:8-9) This new system was more compatible with the new model that used less external-input and required more labor attention and skills in the production process. With this new organization, it was hoped that the productivity of labor could increase without losing its collective nature. (*Ibid.*; Sinclair and Thompson 2001:19-22)

3.3.3 The farmers responses and the problems

The results of this reform were varied. Some UBPCs were very efficient and profitable, while others were not. The productive UBPCs showed their independence in their decision-making process, a high degree of participation among members and high technical skills. To some degree, they were empowered by a more participatory decision-making process, which was not very common in their previous life. Having the assurance that they would gain benefits from their farm, they were willing to work long hours and take more care of farm equipment. They had more sense of ownership. Their income increased gradually and they got more food from the self-provisioning plots. (Deere 1997)

The UBPCs that were not very productive showed some problems. These included a persisting 'workers mentality'[38], an inheritance of scarce resources from the previous state farms, lack of capacity in a technical

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[37] For detailed explanation, see for example Deere et.al. (1994), Alvarez and Puerta (1994), and Deere (1997).

[38] Worker's mentality refers to no initiatives to produce more as they know that they will not get any benefit from any additional effort.

skills, management problem and farm organization. Many UBPCs, due to lack of labor could not meet the quota of the production. Labor shortages deepened in UBPCs because some of the UBPC members changed profession to become private farmers because the UBPC failed to guarantee food supply from the self-provisioning plots. (Deere 1997:658)

Some of the UBPCs that worked under contract with the state faced difficulties in balancing their interests and those of the state. A report by Deere (1997:658-660) shows that state intervention led to the lower workers' commitment, reduced profitability, lower participation and autonomy. The state authority to determine the main crop has limited the area that could be used for cultivating other crops that were more valuable in the agricultural market. (Sinclair and Thompson 2001:21)

These UBPCs complained that too much state intervention led to discontent and disaffection among members of the cooperatives. They felt that the state farm enterprise still controlled them too much, by the requirement to fill in so many forms, pushing an abrupt change in the agreed crop-plan, and intervening their self-provisioning plots. (Torres and Pérez as quoted in Deere 1997:658)

In reality there was bargaining between the cooperatives' members and the state. Mixed-crop UBPCs often refused to plant the crops that had a very low price or took too much labor. However, it was not clear what would happen if the UBPCs refused to plant sugar. (Deere 1997: 658-660)

After this reform, although there were some improvement in the food production, the food scarcity was still a major problem. A black market emerged and the number of the illegal sales increased. By June 1994, the scale of the black market was out of control and the value of the peso declined very sharply relative to the US$. Food prices in the black market were very high and not everybody could afford them. (Deere 1997;Enríquez 2000:10)

This situation led to increase inequality between people who had access to US$ and those that did not. The degree of inequality was worse than when the agricultural market was opened in the mid 80s[39]. In August, 1994, there was civil unrest in Havana and this required the government to deepen the reform to the next policy change in the food distribution system: the re-opening of the agricultural market. It is hoped that the black market will stop and, that by allowing the UBPCs and others producers to sell output above quota in the free market, they would be stimulated to produce more. (Deere 1997;Enríquez 2000:11).

[39] In 1980 to 1986 Cuba experienced the opening of agricultural market. It was closed in the 1986 because the government thought that the middleman took too much profit from the farmers and increased the inequality among society. (Deere 1997)

3.4 Re-opening of agricultural market

3.4.1 Food distribution before 90s and Re-opening Agricultural Markets

Before the Special Period, farmers only could sell their products to *Acopio*, the state marketing board and distribution agency, at a very low price, to be distributed later to the consumers through the ration system. After the crisis, due to lack of fuel and spare-parts, a lot of problems emerged. *Acopio* often came late, by not only hours, but also days, to pick up the produce, so it was not good anymore. Farmers lost money because they were paid according to the products that were taken by *Acopio* and they bore the risk if some of the harvest was rotten. The other problem was theft. Right after harvest, the products had to be guarded. (Enríquez 2000:9)

In the early 90s, a new system, *tiro directo* (direct throw), was introduced. This system basically created a shorter link between producers and consumers. In practice, certain CPAs were linked to a kind of central market or neighborhood produce center (*Agro*). The farmers get a transportation fee for bringing the product directly to the *Agro*. Two things can be noted: first, this increased the efficiency of the food delivery system and, secondly, it increased farmers' participation in the distribution system. The farmers got the benefit from the transportation fee, the consumers got fresher products and the volume of rotten products could be reduced. (*Ibid*:9-10)

This initiative was mainly in Havana City and Havana Province, but not all the CPAs were included. However, in other parts of the county, similar arrangements took place without the label of *tiro directo*. The state was somehow reluctant to spread this arrangement because it meant reducing control over food distribution. (*Ibid.)*

The more significant change was the opening of agricultural markets in October, 1994. They were mainly in Havana. In 1998, the number increased to 300, with approximately 65 in Havana alone. The purpose of the opening of agricultural markets was to increase food production by giving incentives to farmers that produced above quota. The other purpose was to eradicate the black-market, to provide more goods for consumers, to absorb the currency in circulation in order to control the value of peso and generate tax revenue for the government. (Enríquez 2000:11-2; Deere 1997:660)

3.4.2 Who has access and at what price?

Although these markets were opened for individual farmers, CPAs, UBPCs and state enterprises and other people who want to sell the product from their self-provisioning plots, they were dominated by individual farmers. In September, 1996, they accounted 78%, while UBPCs were only 2% and CPAs were 3% of the total sales value. In the beginning, in order to bring the price down and eradicated black market, the state enterprises also dominated. They organized monthly fairs where they sold the surplus at low prices to undercut the black market price. (Deere 1997:661; Enríquez 2000:11)

The agricultural market sells high quality products, but the price is higher than the state price. It can be ten times

the price offered in the ration card, but compared to the one in the black market, the prices were cheaper. There were some explanations for the high price in the agricultural market. First reason was the underproduction. The evidence was the price declined with the increased volume. The volume of the agricultural products had increased from 2.8 m quintals (1995) to 3.4 m quintals (1996) and the value of sales decreased from 1.1 m peso (1995) to 868.9 thousands peso (1996) (Deere 1997:662). The second reason was blamed on the intermediaries who profited from the bad transportation system. They bought at low prices from the farmers and sold at with high prices to the consumers and the vendors, gaining up to 75% profit, according to Ministry of Agriculture's official figure (Sinclair and Thompson 2001:29).

The government effort to overcome this included selling of the state farms' products at the state market to bring prices down. It also distributed used trucks to cooperatives, so they could sell directly to the market or at least organize a marketing representative (*ibid.*). In Havana, in every few blocks there is a group of cooperatives using empty space in front of a big building to sell their products. To give some illustration on how the price differed for some products, see table 3.2.

Table 3.2 Price in agricultural market in Havana City

Commodity	Black market 06/1994	Ag. Market 01/1995	Ag. Market 01/1996	Ag. Market 01/1997	Ag. Market 09/2001	State Market 09/2001	UBPC/CCS stands 09/2001
Rice	50	7	4	4	5	-	2,4 - 2,5
Black beans	30	13	9	9	7	5	5
Cassava	15	2,5	1	2	1,2 – 2	0,7	1 - 1,2
Onion	-	-	-	-	6	2,0	3,5
Cabbage	-	13	4	6	3	-	-
1 US$	120	40	25	19	-	22	-

Price: in Cuban Peso/pound

Source: Deere 1997:663 for 1994-1997 data and authors random survey in some agricultural market in Havana for 2001: *Agromercado* 3yC and 19yB; state market in 17yK, UBPC El Desafio in Calzada y J and CCS Antonio Maceo; 12/09/2001.

Therefore, the access depended on the income. For example, based on a survey on agricultural market price in Havana in March 2000 and the average salary level in the last two years, a private taxi driver in Havana who earned in US$, they just needed to work for 3.5 hours to afford their monthly food consumption compared to 5.8 days working of daycare worker. In average, the food consumption could be up to 66% of people's salary. (Sinclair and Thompson 2001:28-9)

The agriculture market is not the only source for Cuban food consumption. Indeed, it accounts for only 10% of total food distribution in Cuba. Among the other sources of food are urban agriculture and horticulture clubs. The consumers can go directly to the farms and buy the fresh product directly from the farmers. The price is lower, around half of the agriculture market, but, of course, the volume and variety of the products are limited to what

are available on the farm at that time. This direct trade covers around 50% of the food distribution (*ibid.*).

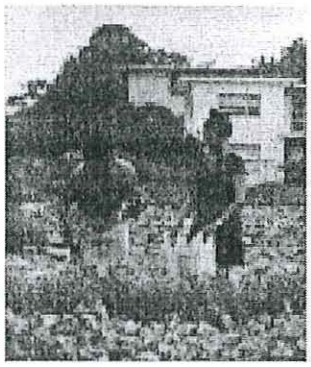

Figure 3.4 Direct link between consumers and producers

The other source of food is the ration card that provides very cheap food for every Cuban family. However, the amount and variety of product guaranteed by the government reduced over time. For example, the amount guaranteed milk declined from one liter milk per day for children under 14 years old before the Special Period to only one liter daily for children under 7 years old recently.

3.4.3 The results and emerging problems

In short, this policy had effectively eradicated the black market, reduced prices and gave around five million pesos to the government from tax revenue in 1999 (Sinclair and Thompson 2001:28).

It is clear that peasants have received the most benefit from the opening of agricultural market and that not all the population could afford the prices in the open agricultural market. The peasants are now among the wealthiest in Cuban society. However, this policy has effectively reduced the higher degree of inequality in food access to the black market. The consumers get more access with the reduced price compared to the level in the black market. (Deere 1997:665-7)

Farmers have some choice in selling their products. They still have to sell them to the government, but if they can fulfill their quota, they can sell the above quota products to the government with higher price or to the agricultural market. For export crops and food crops for tourist industries, they are even paid in the US$, cash or credit that can be used in specific dollar stores. This price incentive together with the opening of agricultural markets has had a positive impact on production (Sinclair and Thompson 2001:31).

The state also got benefits from the sales tax. The performance of state enterprises has also increased. The state subsidy to the agricultural sector was reduced from 1.8 billion pesos (1993) to 6.9 million pesos (1996) (Deere 1997:665). However, the government still had the problem with how to deal with the social differentiation that has increased in the last decade, especially in how to distribute equally the benefits of these reforms to low income people who have less access to the agricultural market.

3.5 Recent condition and further reform

Although agricultural policy in Cuba in the last decade has had a positive impact on OA practice, some major problems still exist. Below we discuss some of them.

3.5.1 Lack of knowledge and the GR mindset

Criticism has come from the ACAO and ANAP that OA principles have not been implemented totally in Cuba. Most farmers are not yet purely OA, but just substitute local production biotechnology for imported chemical inputs. Moreover, monoculture is still widely implemented in many part of the country.

Secondly, the mindset of decision-makers is still that of the GR paradigm, reflected in the research institutions and agendas that are still based on single crops and in inconsistency in policies. One example of the latter is in biotechnology research. Cuban have done some advanced research on genetically modified organisms (GMO), which are very much criticized by environmental movement. However, the government declared that this would be only on the laboratory scale[40].

Related to the issue of local production biotechnology, there were still some problems with CREEs. In 1994, there was a shortage of jars for culture medium, lack of rice chaff as the key substrate and quality control. They were competing with livestock sectors that desperately looked for alternative animal feed. The quality of the products differs due to the diversity in the level of technology, motivation, management and administrative capacity of the employees. Sometimes, because of the low quality, farmers refuse to buy the products. (Rosset 1997b:298)

There are also differences among farmers who use the products. Some farmers overuse the products, due to a lack of knowledge, as mentioned in the previous discussion. They applied biological control just like using chemical pesticides, hoping it would kill all pests at once. This is impossible in OA, which based on the principle of balancing every element of the ecosystem. It therefore allows any pest to live, but to have its population balanced by natural predators, so it would not be harmful to crops. (Rosset 1997b:298)

Some farmers said that they would go back to GR if chemicals were available again. They argued that it was more practical to farm with GR technology. On the other hand, usually peasants who had done OA for a long time said that they would keep OA even if they could get chemical inputs. Besides the lower production cost, they understood that OA would increase soil fertility and the yield in the long-term.[41]

Farmers group, education center, research institute, and NGOs have done a lot of initiatives to build the consciousness of the farmers about a more sustainable agricultural practice. ANAP, a farmer group with one

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[40] Further debates on biotechnology in Cuba see Lehman (2000) and Feinsilver (1995).

million people, and cultivating 1.6 million hectares (22% of agricultural land), has a political will to change the GR mindset of farmers and extension workers to OA. It works at the grass-root level to demonstrate the possibility to produce with OA and in the end, influences policy makers with its concrete experience. ANAP has a mobile school to teach farmers to become independent and to facilitate farmer to farmer exchange learning. They are preparing an international meeting for extension workers in agroecology next March 2002.[42]

A center for sustainable agriculture (CEAS[43]) was developed to create the new generation of agronomist. It offers a Master and Doctoral Program in Agroecology[44]. They also have IPAs the Polytechnics for Agriculture and Livestock Institute, to prepare the technicians who balance agricultural productivity with environmental sustainability. In response to the crisis, IPAs were set up in every province to meet local demand and the curriculum was changed to subjects related to OA, such as Integrated Pest Management, Soil Conservation, Animal Traction, Bio-control and Composting (Carrasco 2001:45).

Local NGOs, such as ACAO, ACTAF, FNH and DECAP-CIC, work to promote sustainable agricultural development, by organizing training and workshops on OA, facilitating farmer to farmer learning, food security and energy conservation programs[45].

They work in collaboration with international NGOs, such as Food First (the US), OXFAM (America and United Kingdom) and Global Exchange, *Agro Accion Alemana* (Germany), HIVOS and NOVIB (the Netherlands), OIKOS (Portugal), MPDL (*el desarme y la Libertad*, Spain), *el movimiento por la Paz* (Spain), GVC (*el Grupo de Voluntariado Civil*, Italy), among others. Their interests vary from promoting urban gardens, community participation, lobbying decision makers towards more sustainable agricultural practice, to campaigns to stop the embargo, especially for food and medicine[46].

Cuba also has a new generation of extension workers, who have changed their approach from a top-down process to a more participatory approach. With this, they can use more holistic approach to solve problems, as well as assessing resource, potentials and limitations (Carrasco 2001:57). However, ten years is not enough time to change the existing paradigm. From the process of the policy changes in Cuban agriculture, we can see that the driving factor for OA is not necessarily environmental awareness. Without a change in mindset of people from policy makers, researcher, and extension workers to farmers, the real OA is still far from reality.

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[41] See Appendix for summary of the interview with several farmers, September 2001.
[42] Interview with Luis Sanchez, ANAP, 24/09/2001.
[43] *Centro de Estudios en Agricultura Sostenible.*
[44] Interview with Dr. Pablo Marrero (CEAS), 24/09/2001.
[45] Excerpted from their brochures and interview in September 2001.
[46] Authors observation and excerpted from various internet sources, such as http://www.oxfamamarica.org/, http://www.foodfirst.org/, and http://www.cosg.supanet.com/, among others.

3.5.2 Continuing dependence on sugar

Dependence on sugar can be traced back to the colonial time, but this policy continued after the revolution, when sugar remained the monopoly export crop of the island, e.g. 80% in 1989. After the crisis, some efforts had been made to allocate more land to food crops and Cuba has tried to diversify its agriculture. However, no other export can contribute 600 million US$ and 400.000 jobs. Tourism is another growing sector in Cuban economy. However, for every dollar invested in this sector, seventy cents go out of the country; while for sugar, seventy cents stay in the country. (Sinclair and Thompson 2001:36)

3.5.3 Lack of water, seed diversity, organic materials and arable soil

Water is the main problem stated by almost all farmers when I visited them. There is competition in water use between urban drinking water and urban agriculture. There have made some initiatives such as using water tanks, electric pumps or micro jet, but, as urban agriculture grows, it will need more water. Moreover, the electricity used for pumps is subsidized by the government and uses fossil fuel as the source of energy. As the use of electric pumps increases, it will need more fuel to generate electricity. And fuel is one of the main problems in Cuba after the Special Period. (Murphy 1999:39)

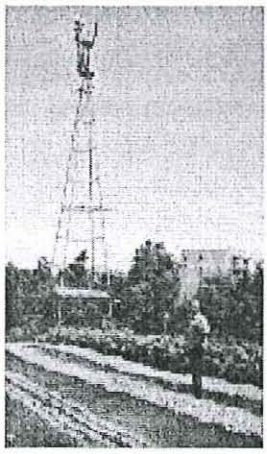

Figure 3.5 Water, the main problem for urban agriculture

Cuba has high ratio of arable land to population, but the quality of the soil is not necessarily productive. From total 30.260 km^2 arable land along the island, only 8% is considered to be highly productive and 26.2% is productive. The rest is considered to be low and very low productivity. Moreover, the fertile soil has been abused by chemical fertilizers and monoculture technique. A 1996 survey classified 60% of Cuban soil is eroded and 25% of them are severely and very severely eroded. More than 3.6 thousand hectares affected by erosion, more than a thousand hectares with high acidity and around three thousand with little organic matter. (Sinclair and Thompson 2001:26)

In urban area, there is not enough open soil spaces and, if there were, most of them are polluted or mixed with

cements or rocks and lack topsoil. The nature of Cuban urban soil is poor with only around 1% of organic matter. Part of the solution has been using 100% compost, such as *vermicompost* or using cover crops and green manure (Murphy 1999:40). However, there is also a problem to supply organic compost and manure in the city. It must be transported from the countryside, but, since transportation is a big problem in Cuba, due to lack of fuel and spare-parts, this is a problem.

The other reason for not implementing all the principles of OA is a lack of organic materials, such as good quality soil, green manure, compost and *vermicompost*. This especially happened in the early 90s, because of the bad transportation system and the collapse of the livestock sector that depended on imported animal feed. Producing *vermicompost* is a slow process and will need some time before it can meets growing demand. An alternative was the use of sugar cane waste, planting the legumes as sources of nitrogen and finding alternative animal feed.

This is a problem that can be traced back to the classical model when farmers, especially the state farm workers, lost their capacity to produce their own inputs and depended on the external inputs as a consequence of the GR paradigm. In this kind of system, OA principles are very difficult to be implemented.

Principles of OA is energy efficiency that can be translated at the practical level for example by using the output of one subsystem as the input for another. It requires farmers to have the capability to produce their own inputs from the output from other aspects of the production process. Examples including using the seeds from the previous harvest, making fertilizer from the waste from the previous harvest or manure from livestock and use of part of the harvest to feed livestock, and so on.

Cuba has lacked seed diversity since the colonial era when the sugar plantations started to dominate Cuban agriculture. Some effort has been made to re-plant local crops, such as *anon*, *chirimoya*, *guanabana* and passion fruits through a national program called *Mi Programa Verde* (My Green Program). Other efforts are the provision of subsidized seedlings in the *Consultario*[47] and seed conservation program initiated by Ministry of Agriculture and Green Team Australia. (Murphy 1999:37-38,41)

3.6 Concluding Remarks

Having examined the policy reforms in Cuban agriculture, how they influenced OA practice, brought good living conditions for peasants and increased food production, we now explore the lessons we can learn from this experience.

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[47] *Consultario* is a shop that sells agricultural inputs and tools, organized by district.

4. WHAT LESSONS WE CAN LEARN FROM THE CUBAN EXPERIENCE?

4.1 The possibility to produce more food with fewer chemical inputs

Nobody knows how big OA is in Cuba. Juan Jose Leon Vega, the director of international relations at the Ministry of Agriculture, has estimated that 1.5 million hectares of non-sugar plantations are organic. (Sullivan 2000 as quoted in Sinclair and Thompson 2001:26). Organic agriculture is widely implemented in Cuban agriculture, in urban and rural areas, to cultivate vegetables, medicinal plants, sugar, fruits, coffee, cacao etc. (Funes 2001:31-3).

In 2000, the level of chemical fertilizer consumption was 25% of the level of 1990. (Figure 4.1). Pérez and Vázquez (2001:192,figure 1) shows that the chemical pesticides import reduced from more than 20 thousand tons (1990) to between 6 and 12 thousand tons (1991-1998). Yet, the food production *increased* during the nineties for all types of main food crops. (Figure 4.2) and the productivity per area also increased. (Figure 4.3). Although we cannot verify what percent of food production in Cuba is organic, we can still conclude that it is possible to increase food production with fewer chemical fertilizers and pesticides.

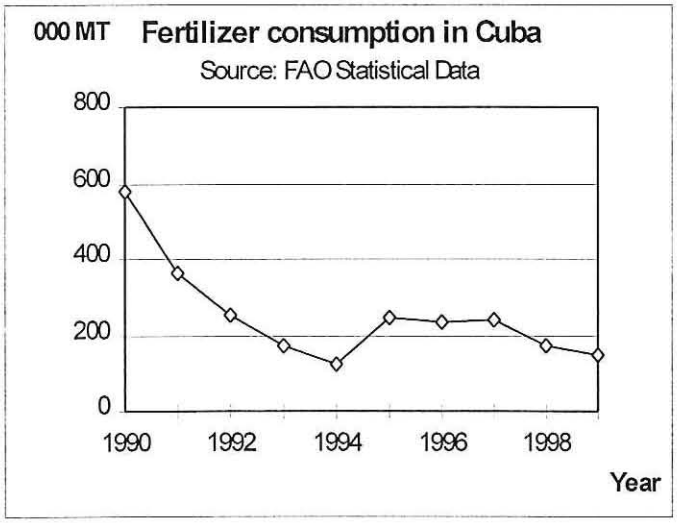

Figure 4.1 Chemical fertilizer consumption in Cuba 1990-1999

Source: FAO Statistical Data (http://apps.fao.org as on 22 October 2001)

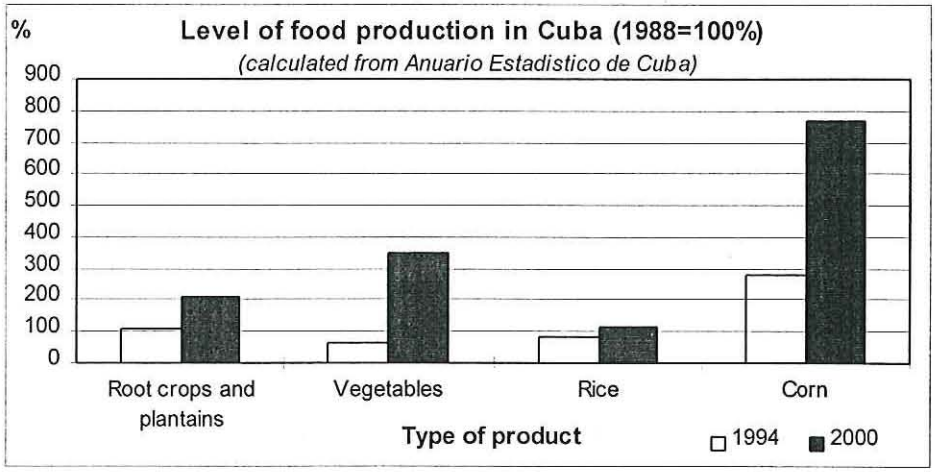

Figure 4.2 Level of food production in Cuba (1988=100%) for different type of crops

Source: *Anuario Estadístico de Cuba* (2001:200) for 1995-2000 and *Anuario Estadístico de Cuba* as quoted in Sinclair and Thompson (2001:52) for 1988 and 1994 figures.

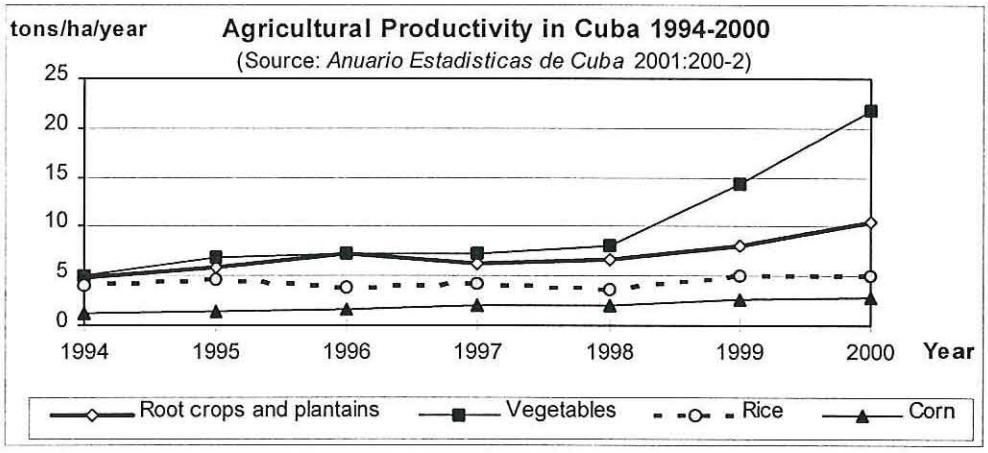

Figure 4.3 Agricultural Productivity for different type of crops 1994-2000

Source: *Anuario Estadístico de Cuba* (2001:200-2)

4.2 Organic product is not more expensive than non-organic product

In the Netherlands, organic products are usually more expensive than non-organic products and therefore their market niche is confined to those who have money and/or environmental awareness. But it is expensive

because it competes with the "artificially cheap" non-organic products that are highly subsidized. Moreover, this differential reflects the high price of organic inputs, the cost of certification fees and lower yields in the early years of the conversion from GR to OA. Some organic products also are imported from developing countries that are far from the Netherlands and sometimes the transportation costs are more than the production cost. In the end, the high price of organic product does not necessarily reflect the higher income for organic farmers.

In Cuba, the price of food is not cheap compare to other products. The government subsidy to agriculture has been reduced during the last decade. However, the price of OA product is not necessarily more expensive than non-organic. In Cuba, producing food with chemical inputs is more expensive than with OA, because the chemicals must be imported. In contrast, OA uses more local resources and local technology, so it is cheaper. Moreover, it creates employment and empowers farmers. So, the beneficiaries are mostly local people, especially the farmers, who are among the wealthiest in the society.

Cuba also uses organic inputs, but the price is not expensive because they are produced locally by a cooperative and supported by the government. In contrast to pharmaceutical companies who want to make profit from OA business, the Cuban government has different interest other than making profit, reflected in their policies. CREEs can make profit from producing bio-control-agent, but not as much as the pharmaceutical companies, so the farmers can afford it.

Cuban experience shows us that biotechnology is not always big business. Despite of all the problems they have, it shows us that it is possible to have biotechnology for agriculture in the cooperative level in rural area. Because it is produced locally and owned by the cooperative, the benefit mostly goes to the cooperatives. It means that the farmers, in the cooperative form, have the capacity to produce their own inputs. By controlling their own input production, the farmers have a greater bargaining position and are not so vulnerable to the higher price of inputs set by the companies that want to make a lot of profits by controlling input production for farmers.

4.3 The possibility to produce food in urban area

There are four things that can be noted from urban agriculture in Cuba. First, it proved that there is possibility for cities to produce food. This experience changed the role of urban areas from food consumers to food suppliers. Secondly, it reveals the possibility for consumers to get relatively cheap and fresh food and at the same time, guarantee a fair price for farmers. The direct link between consumers and farmers can cut down the costs of middlemen, storage and transportation. Thirdly, it created employement and finally, it made the city environment more colorful, especially when it is combined with the reforestation program.

To get an impression about how significant urban agriculture is in Cuba, we can see table in Appendix 9 about urban agriculture production by province in 1999. It also shows the productivity and the contribution for daily vegetables supply per capita. In total, urban agriculture contribute 216.3 grams daily vegetables supply per

capita, 72.1% of the 300 grams FAO standard for daily vegetables consumption per capita. The average yield is 141 tons/hectare/year, but it varied between province from 88.1 tons/hectare/year in Holguin to 343.2 tons/hectare/year in Guantanamo (calculated from Companioni et al. 2001:102, Appendix 9).

In Havana City Province, urban agriculture covers more than 15 thousand hectares, excluding the household gardens. It contributes almost 30% of the FAO standard of vegetable consumption for more than two million Havana citizens in 1999. It varied in size, ownership and types (appendix 10 and 11).

4.4 The scale of management

Cuban experience shows that the success of OA depends on the scale of management. It works with small farmers in Cuba, but not for very large-scale farms. If the scale is too big, it will not be productive. Farmers might not be able to manage all the different details of the farm. On the other hand, if it is too small, it is difficult to create a balanced and self-supporting ecosystem. However, how small/big is the best land size for OA will depend on local environmental conditions. Therefore to get the optimum benefit from OA, requires land redistribution for the farmers. Farmers should have at least the minimum amount of land required to implement the principles of OA. Farmers might not have the land, but they should get a long-term land use right so they can manage the farm in long-term perspective.

Organic agriculture required closer link between farmers and the land. A good example of this is the reform in the state-farm. Its productivity increased when the workers were assigned specific plot of land, which they could maintain for their self-consumption. Knowing that they will be the beneficiaries, they are willing to take care of the land and produce more.

4.5 Land ownership vs. land use right

In Cuba, 79% of the land owned by the state. The rest owned by the farmers organized in cooperatives. The farmers cannot sell their land except to the state, but they can transfer the land to family members when they died. State ownership has been criticized as an inhibiting factor for growth, but it can effectively prevent the land concentration (Sinclair and Thompson 2001:37). Cuban government has the political will to distribute land for the farmers who derive livelihood from it. In contrast with many farmers in many developing countries that lost their land for development process, the Cuban farmers are the main beneficiaries of development process. With the *usufruct* right, they can get the most benefit from the farming activities.

Organic agriculture will not work in the system where farmers have no right over land and therefore should rent the land from a landlord. In that case the farmers will not have any assurance whether they will farm the same plot of land for the next season. In this case, the rational choice will be looking for as much profit as possible in the short term. Any more investment in the long run will not benefit them.

4.6 The possibility to bring back people to agriculture

Cuban experience shows us that OA needs more labor than GR technology. In Cuba, labor shortage in agricultural sector has been a serious problem for a long time. Therefore, they adopted mechanization for their agriculture. With lack of chemical inputs and fuel, they had to face the fact that the new model required more labor than the classical one. There were a lot of efforts for labor mobilization to rural areas, from the voluntary and temporary to the obligatory and permanent. The more long-term labor movement to agricultural sector was mainly due to reform in the incentive system, such as the self-provisioning plots, good price for farmers and land redistribution. Although, the labor shortage is still a problem until now, at least the trend of Cuban agricultural development shows us that there is a possibility to bring people back to the land, agricultural activities, if they can make a good living from this activity.

4.7 Knowledgeable farmers

Organic agriculture requires specific knowledge of farmers about its principles, understanding the characteristic of the local environment, closer relation to the land and sense of belonging.

The most impressive thing I found about Cuban farmers is their education level. This fact can explain why the spreading of technology can be done very rapidly. A very knowledgeable farmer in Havana learn about OA principles from booklets and brochures published by an NGO and it is very interesting to listen to him explaining about his experience implementing all those principles while making some modification based on the condition of his farm. However, sometimes education becomes a problem especially for the technicians that were educated based on GR paradigm. They have a lot of difficulties in changing their paradigm to OA. Right now, ANAP has a special motto, it is better to give right education rather than give the wrong education and then reeducate.

A lot of effort is made to increase the farmers' environmental awareness, e.g. the work by ANAP and several NGOs. They understand that the farmers' main interest is to produce more for their living and not solely for environmental concerns. Therefore, their main approach was to prove that farmers could produce more with OA. After that, they slowly cultivate environmental awareness[48].

4.8 Alliance between farmers and consumers

The second impressive thing I found was the solidarity of Cuban society. How people feel united as Cubans and their responsibility to help others is impressive. For example, in urban agriculture, a large part of the products were for community donation. This donation is voluntary. They are willing to do so because they get the land for

[48] Interview with Luis Sanchez, ANAP, 24/09/2001.

free and do not need to pay rent to the government. So, they feel that the donation is a kind of social obligation in exchange for that. Equity is somehow accepted as the main value of Cuban people.

Farmers are also united in horticulture clubs, community groups or cooperatives that enable them to share their experience in OA, facilitate the farmer to farmer learning process and closer link between farmer and community. The closer link between farmers and the community as consumers helps to spread environmental awareness. In an urban garden I visited last September 2001, from 3 to 5 PM, at least six consumers came to the garden and were involved in the discussion with the farmer about the use of herbal medicine or other specific issue related with OA. In Cuba there is school program for children in the city to go to the farm as part of their curriculum. This can be a kind of environmental education for the younger generation. Plus, when the children know that their lunch packages come from the donation of the farmers in the community, they will appreciate more the farmers' work. The alliance between the farmers and consumers will give mutual benefit for both of them and in the long run this awareness will become a barrier for Cuba to choose the unsustainable agriculture system.

4.9 Balancing productivity, equity and sustainability

Although the Cuban government has been very much concerned with equity and made great efforts to manage the distribution of benefits among its population, social differentiation is still happening. The peasant has been the main beneficiary of the reforms in the 90s. Official figures quoted in Sinclair and Thompson (2001:38) note that the monthly income of private farmers in the year 2000 was 971 pesos, compared to 691 pesos of the UBPC and 205 pesos of cooperative members. This social differentiation was already discernible in 1989, when the monthly income of private farmers was 319 pesos and that of cooperative members was 157 pesos. If we compare the income of individual farmers with cooperative members, the ratio increased from 2.03 times (319 pesos/157 pesos) in 1989 to 4.73 times (971 pesos/205 pesos) in 2000.

This differentiation was mainly caused by the relative capacity to produce more with fewer chemical-inputs. The first reason was that the peasant already had the ability to produce with fewer chemicals for a long time. When they received support from the government, they became the main beneficiaries from the reforms. The second reason was the different organization of production between the peasant, the cooperative members and the state-farm workers. Peasant had less state intervention and more independence to manage their farms. The benefit depended on how well they do the farming. On the contrary, state intervention was higher for the state-farms and UBPCs, although the degree was lower after the Special Period. The third reason was the scale of management. The peasant, who organized a relatively small size of land compared to large-scale state farms before the crisis, was responsible for a specific plot of land and maintained its productivity. On the state farms, the scale of management was sometimes too big for the workers and became worse with the absence of chemical inputs and mechanization, especially when state-farm workers did not have OA skill and knowledge. The reforms by the government, e.g. linking workers with the area or breaking up the state farms into

cooperative, are part of an effort to make the scale of OA manageable within the existing system.

Differentiation also happened in food access. Not every body had equal access to food in the agricultural market, especially the low-income people. Probably in order to keep the equity within society, Cuba should move from direct intervention to more indirect intervention such as tax for producers and consumers. In the food distribution system, they can select specific target groups that received income up to certain level to get food rationing. Then, it can guarantee more food and with better quality for those people.

The sustainability of OA in Cuba is still on going debate. As the main reason for adopting OA was the crisis forced by the demise of Soviet block, many people, including the decision makers argue that as soon as the crisis ended, they would go back to the GR technology. For some other groups, like ACAO and ANAP, the reform in the last ten years is only the first step towards a more sustainable agriculture. The awareness of farmers, scientists, extension workers, policy makers and consumers will be very important to keep this greening revolution going.

5. CONCLUSION AND AFTERTHOUGHT

From a theoretical perspective, policy as a political process can be used for understanding the changes in agricultural policy in Cuba during the 90s. It can show how different actors/factors shaped the policy process. It shows the interaction between state and society, how external factors pushed the government to undertake a reform and then how the response of the farmers led the government to take another reform, and so on. It has shown how the outcome of the previous policy gave birth to the next one.

In this case, the state can be defined as the government and its supporting system and the society can be defined as different groups of farmers, consumers or NGOs. In each policy reform, there are some parts of the society that get benefit more than others; or are more influential in shaping the policy process. Different groups respond differently to the same policy. It depends on their interests and their capacity to negotiate, to lobby or to act in response to the policy. E.g. the state farm workers chose to continue their unproductive performance compared to the peasant when they did not get as much benefit as the peasant did. This can be understood as their capacity as an agency to sabotage the structure, the government policy.

A policy can have intended and unintended outcomes. There are always benefits and trade-offs. The implications differ for different groups. In the Cuban case, this is clearly seen in the agricultural market, which reduced the 'potential inequality' in food consumption level for Cuban population but increased the inequalities among different group of farmers. Plus the experience in adopting OA, these policy changes also can be seen as a process of balancing productivity, equity and sustainability.

The agricultural policy in Cuba during the 90s was characterized by the implementation of agroecology, land redistribution for farmers, fair prices and decentralization of food production (Rosset 1997d). It led to a significant increase in food production, increased farmers' income and some positive influence on OA practice. From this case, there are a lot of more interesting issues to be explored, e.g. the implication of these policy changes by gender and region, but it requires further and different type of research.

A lot of research has shown that OA is more environmentally sustainable than GR. However, there are a lot of constraints for its adoption as a national policy. Despite of all the problems, difficulties and uncertainties of its future, we can and should draw some lessons from Cuban experience, especially about some constraints in adopting this model. The following part provides a summary of the variables that might restrict the implementation of OA as a national policy.

One of the main constraints on the adoption of OA is the belief that GR is the only way to produce more food. Although, in Cuba, there is an abundance of empirical evidence that OA is more efficient in energy use, conserves more biodiversity and confers more benefit on farmers in term of diverse products and lower

production costs, GR mainstream thinking still predominates. It shows us that ten years is not enough to change conventional norms.

The second constraint is the priorities of our development. Cuba has an advantage in the term of arable land per person, so they can still allocate more land for food production. However, most of the land is not very fertile and the best land has already allocated for sugar. This priority has limited the use of the best land for production of diverse food crops with OA. Cuba has tried to diversify, but we can see that it is not easy to change its dependence on sugar, especially when it created significant foreign exchange for the island.

The third constraint is labor availability and quality. In Cuba, labor supply is the main problem in the agricultural sector, but they have a very highly educated labor force. In other developing countries, labor supply might not be a problem. The problem might be the educational level of farmers.

The fourth constraint is dependence on the international development agencies, such as the World Bank and the IMF. Cuba is relatively independent in choosing its own development path. In 1997, its international collaboration was US$ 67 million through bilateral and NGO aid, but no aid came from the World Bank, IMF or American Development Bank (Sinclair and Thompson 2001:38). Many countries are not so free to choose their own development model. Adopting this model might not be so easy, as Eric Swanson, the head of World Bank's Data Group, called the Cuban case an "anti model" in some sense (Lobe 2001)

The fifth constraint is the role of business in our development process. Cuba is relatively free from MNC influence as a consequence of the US embargo. The government also controls all the strategic sectors in the economy. However, if the embargo ends the situation might be different. Romero (2000) provides the list of organization that oppose the embargo of food and medicines to Cuba. It consists of 27 churches/religious organizations, 10 NGOs and 62 businesses/trade associations. Among others, the last group includes American Rice Inc., Cargill, Archer Daniels Midland. These MNCs acquired a reputation for controlling much of the global agrofood system for the last decade.

If these MNCs can provide cheap grains from the highly subsidized US agriculture, Cuban policy might change again. Like the story of sugar before the Special Period, with preferential terms of trade the government might choose, e.g. instead of supporting farmers to grow food, to specialize in more valuable export crops for the international market. However, even if the Cuban government does not support these MNCs, as Cuba became WTO member, these MNCs can impose Cuba to open their market under WTO agreement. As a decision-maker who has the power to allocate resources, the Cuban government will still play a key role in determining how these business can serve the benefit of the population.

The other constraint to adopt OA is the land access for farmers. The previous chapter has discussed the importance of land use right in OA. Cuba might have enough arable land, but only 8% of them are considered as

high potential productivity, 26.2% as high productivity and the rest is low and very low (Rosset and Benjamin 1994b). The government owned most of land and has the political will to redistribute land to the farmers, by *usufruct* right. Therefore, the farmers can make a living from agriculture. For other countries, it might be difficult as the land concentrated in the hand of rich people or companies and they are not always interested to do agriculture, plant food crops and in organic way when they can get more money from doing other things from the land.

The other barrier to the shift to sustainable agriculture is the awareness of the people, including farmers, consumers and policy makers. Cuban experience shows us that although farmers have knowledge that OA is more environmentally sustainable than GR, they still might choose GR because of its practicality or out of short-term interest. It also shows us that it is not easy to change people's diet from meat to more vegetables, even when they understand that vegetables are good for health. It is also difficult for example, to encourage people to buy local products when the media everyday campaigns for cheap imported products with interesting packaging.

In short, the Cuban experience shows us that it is not easy to implement sustainable agriculture consistently. There are advantages and trade-offs. The change to OA is not just simply changing agricultural technique, but requires other fundamental reforms in our way of development.

6. APPENDIX

1. Food production in Cuba 1988-2000

Products	Production (thousands tons)									
	1988	1994	1995	1996	1997	1998	1999	2000	1994/1988 (%)	2000/1988 (%)
Root crops and plantains	998,1	1.071,9	1.246,4	1.560,5	1.356,5	1.383,7	1.662,4	2.075,8	107	208
Vegetables	675,6	433,6	518,4	631,7	601,0	846,5	1.442,5	2.372,7	64	351
Rice	488,9	387,6	396,1	572,9	614,2	441,6	559,0	552,8	79	113
Corn	35,6	98,5	103,8	143,9	202,5	176,6	237,7	273,2	277	767

Source: for 1988 and 1994 figures: from *Anuario Estadístico de Cuba* as quoted in Sinclair & Thompson (2000:52) and for figures 1995-2000: from *Anuario Estadístico de Cuba* (2001:200)

2. Cultivated Area in Cuba 1994-2000

Products	Cultivated area (hectares)						
	1994	1995	1996	1997	1998	1999	2000
Root crops and plantains	218.151,8	211.753,0	217.288,6	215.271,5	206.178,3	204.304,8	198.683,0
Vegetables	85.675,9	76.489,0	86.090,7	82.001,6	105.751,1	100.862,0	108.872,4
Rice	97.258,8	87.034,1	149.999,5	145.527,8	123.136,5	112.824,0	111.102,9
Corn	77.644,1	76.891,3	89.226,9	98.968,5	84.972,8	92.208,8	94.180,2

Source: *Anuario Estadístico de Cuba* (2001:202)

3. Food Productivity in Cuba 1994-2000

Products	Productivity (ton/hectare/year)						
	1994	1995	1996	1997	1998	1999	2000
Root crops and plantains	4,91	5,89	7,18	6,30	6,71	8,14	10,45
Vegetables	5,06	6,78	7,34	7,33	8,00	14,30	21,79
Rice	3,99	4,55	3,82	4,22	3,59	4,95	4,98
Corn	1,27	1,35	1,61	2,05	2,08	2,58	2,90

Source: Author's calculation from appendix 1 and 2.

4. Fertilizer consumption in Cuba 1990-2000

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
000 MT	580,0	365,0	249,5	172,0	124,1	244,0	235,0	239,4	169,3	146,7

Source: FAO Statistical Data (http://apps.fao.org as on 22 October 2001)

5. Land Use Pattern in Cuba 1989, 1994, 1997

Year	State	Cooperatives	Private	Total
1989	3.441,4	449,4	519,6	4.410,4
1994	1.050,2	2.347,6	575,9	3.973,7
1997	902,6	2.111,2	687,6	3.701,4

Source: *Anuario Estadístico de Cuba*, 1996 and 1997 as quoted in the *Anexo Estadístico, La Economia Cubana: Reformas Estructurales y Desempeno en Los Noventa*, ASDI, UN and CEPAL (1999:83)

6. Number of CREEs 1988-1999

Year	1988	1989	1990	1991	1992	1993	1999
CREE	82	103	196	201	218	220	227

Source: Pérez and Vázquez (2001:195)

7. Micro-organism production in CREE in Havana Province

Organism	Units	1986	1991	1992	1993
Trichogramma spp.	1000's	863,6	3.379,7	3.398,8	2.331,0
Beauveria bassaiana	MT	0,9	122,2	203,1	172,3
Bacillus thuringensis	MT	-	190,2	291,1	240,0
Verticillium lecanii	MT	-	18,9	25,0	22,1
Trichoderma spp.	MT	-	0,1	0,1	0,1

Source: Vázquez Vega *et al.* as quoted in Rosset (1997:296)

8. Treated area of biological control

Years	1990	1991	1992	1993	1994	1995
Area (ha)	77.262,3	153.170,5	227.010,7	215.393,6	195.100,0	516.895,0

Source: Funes-Monzote (1999:7)

9. Vegetables production from urban agriculture 1999

Provinces	Population	Area (ha)	Production (MT)	Yield (tons/ha/year)	Gr/day/capita	% from FAO standard
Pinar del Rio	726.929	602	73,0	121,3	275,1	91,7
La Habana	689.364	712	88,9	124,9	353,3	117,8
Ciudad de La Habana	2.197.706	432	70,2	162,5	87,5	29,2
Matanzas	649.994	382	59,2	155,0	249,5	83,2
Villa Clara	830.085	504	65,7	130,4	216,8	72,3
Cienfuegos	389.541	402	63,3	157,5	445,2	148,4
Sancti Spiritus	456.294	457	60,9	133,3	365,7	121,9
Ciego de Avila	400.720	473	58,8	124,3	402,0	134,0
Camaguey	778.772	312	76,6	245,5	269,5	89,8
Las Tunas	521.793	314	36,9	117,5	193,7	64,6
Holguin	1.018.899	662	58,3	88,1	156,8	52,3
Granma	823.481	366	56,1	153,3	186,6	62,2
Santiago de Cuba	1.022.105	398	47,9	120,4	128,4	42,8
Guantanamo	509.210	162	55,6	343,2	299,1	99,7
Isla de la Juventud	78.259	31	4,6	148,4	161,0	53,7
Total	11.093.152	6.213	876	141,0	216,3	72,1

Source: Companioni *et al.* (2001:102) for population, area and production
Author's calculation for yield and gr/day/capita
FAO standard for daily vegetables consumption = 300 grams/capita

10. Types of urban agriculture in Cuba

Type	Description	Ownership
Intensive gardens	Located in areas with high quality of soils, drainage, and adequate water supply. Seeds are planted directly into fertilized soil.	State/Private
Organopónicos	Located in areas with poor soil unsuited for agriculture. Seeds are planted in nursery then transplanted to garden. Cultivation occurs in containers or raised beds filled with organic matter and soil mix.	State/Private
Suburban farms	Located in the periphery of densely populated urban areas. Larger units (exceeding 2 ha.) which have a more highly integrated system of production. Use methods of cultivation that utilize locally produced inputs and minimize synthetic inputs.	State/Private
Popular garden	Cultivated by community gardening organizations. Established in reclaimed dumps and vacant lots in urban and suburban areas. Managed by local individuals or group.	Private garden use state land
Enterprise and factory gardens	Located on or near the property of factories and business. Produce used to promote self-sufficiency by feeding factory workers and their families.	Enterprise/Factory
Hydroponics	Plants cultivated indoors in a nutrient rich solution, which is run through an inert planting medium. Least extensive type of garden due to higher costs.	State
Household gardens	Gardens cultivated by individuals in their own yards with a high variation in size and type of produce.	Private

Source: quoted from Altieri at al. (1999:133) and Murphy (1999:15-24)

11. Urban Agriculture in Havana City

Form of production	Total number of sites	Total area (ha)
Intensive gardens	92 gardens	17
Organopónicos	96 gardens	23,8
Hydroponics and Zeoponics	3 locations	111
Suburban farms	2138 private farms 285 state farms	7.718
Popular gardens	5000 gardens 26.604 gardeners	1854
Business and factory gardens	384 gardens	5368
Household gardens	Unknown	Unknown
Total	7.998 gardens	15.092

Source: after Companioni et al. 1997 as quoted in Altieri et al. 1999:133.

12. Characteristics of several farms in Cuba

Variables	**UBPC Martir 57, Guines**	**UBPC**	**UBPC Mov. de Micro Brigadas, Pinar del Rio**	***Organopónico* Shanghai, Miramar, Playa**
Name	Restituto Alonzo P.	Sergio Serguera	-	Alvaro
Type of farms	UBPC	UBPC, *usufruct*	UBPC	UBPC
Type of technology	Mixed farming, crops and livestocks.	Intensive, mix cropping.	Intensive, *organopónico*, water pump, cannot use water from river.	Very intensive urban agriculture, *organopónico*. Using water pump.
Products	Plantain, banana, potato, corn, vegetables Rabbit, pig and milk. Some for self-consumption.	Fruit crops, vegetables and flowers. Seedlings.	Vegetables, fruits, flowers ~ 20 kg/m^2/year	Vegetables
Number of workers/farmers/members	130 members (including 22 women)	11 persons, 8 full-timers	-	8 persons, including the shop keepers
Land size	29.5 caballeria (~400 ha)		4000 m^2	2500 m^2
Average salary/income	n.a	15000 pesos/month - 5% tax - 12% social security.	-	280 pesos/month + bonus from selling above quota products.
Degree of implementation of OA principles	Intensification using oxen and tractors. Mixed farming and mix-cropping. The absence of chemicals is the main reason for implementing OA. They said that they would use chemical inputs again if they had access to it.	Multicropping with a very good care.	Produce their own seeds and compost. Sometimes buy lumbricompost. Get green manure from cattle farms cheaply. Intensive land use. Biopesticide from CREE.	Intensive and good care. Produce their-own compost but still need to buy other organic material from manure. Crop rotations. Biopesticides from CREE.
Characteristic of the farmers	More participation in: ■ farm management ■ selecting new members He said "participation" is the key of their success.	■ Has wide knowledge about what happened with the farmers in other countries (e.g. the implication of globalization) ■ Very knowledgeable about OA principles and creatively applied them in the farm to maximize productivity. ■ Independent in determining what, how and when to plant.	Very optimistic and open. Knowledgeable about farming system. He said that the land is always available for people who wants to do farming in Cuba.	Knowledgeable, with 6 years farming experiences. Implementing his natural science knowledge in his farm. Retired from University Professor in Physics.
Government intervention	Credit from bank, 4% interest rate, 3 years grace period.		4% interest rate credit, paid in 2 years.	Credit
Notes	Before 1993, it was state farm and lost a lot of money. In UBPC form they started to make profit.	Profitable.		A kiosk in front of the farm. Pay tax 5% of total sales value.
Setting	Group discussion: Miriam, Diego, Mitchel, I and some UBPC members. 11/09/2001.	Group discussion: Diego, William, David, some UBPC members. 10/09/2001.	I visited his family with the head of ACTAF Havana City Province and representative of Provincial Pinar del Rio. 20/09/2001.	Informal interview. 19/09/2001.

Variables	UBPC Vivero Alamar	*Organopónico* Gastronomia, Miramar, Playa	*Organopónico* INRE II
Name	-	Wilfrido	Yamille, Jesus
Type of farms	UBPC	State-farm	State-farm
Type of technology	Mixed farming. Pump from *Agro Accion Alemana.*	Intensive, *organopónico*	Intensive, *organopónico.*
Products	Seeds, seedlings, vegetables, roots and tubers, fruits, flowers etc.	Vegetables and medicinal plants	Vegetables, herbs and spices.
Number of workers/farmers/members	42 members (including 6 agronomist)	5 workers	24 workers, 1 university graduate
Land size	-	4000 m^2	1.5 ha
Average salary/income	Not clear, but one of the very profitable UBPC in Havana City.	200 pesos + sales from above quota production.	225 pesos/worker + bonus for production above quota.
Degree of implementation of OA principles	Mix cropping, intensive. Good care of the farm. Productive. Produce their own compost and *lumbricompost.* Very good care of the crops.	Very good care of the crops. High biodiversity. Mulching, mix cropping etc. are applied well. Produce their own composting. Use bio-control agent from CREE.	Some how limited because the limit knowledge of the farmers and the obligation to fulfill certain quota from the state and practical reason.
Characteristic of the farmers	Smart and knowledgeable	Eager to learn (autodidac from books, booklets etc.). Already manage this farm for 4 years. He was Mathematics teacher in Holguin, a son of peasant family before Revolution. Excellent knowledge about the crops and their use. Speak a little English.	Limited knowledge about OA principles.
Government intervention	Credit from bank: 4 %/year interest, 3 years grace period		Determined what to plant.
Notes	This UBPC has *tienda,* small shop in front of the farm, which sells a lot of products from this farm. It is also used as a training center for OA.	This farm is use as a site for school children in the community to learn about farm, food production and environment; providing food for people with low level income; supply herbal medicine for the sick people.	
Setting	I join a day training program about Soil Conservation arranged by ACTAF. 19/09/2001.	Informal interview during my several visits. 19/09/2001.	Group discussion with Diego, William, David and several state farm workers. 10/09/2001.

Variables	Huertos Particulares, Atabey, Playa	Huertos Particulares, Atabey, Playa.	CCS Farmer, Guines
Name	Rolando Oye Gomez	Olga	Orlando Family
Type of farms	Individual	Individual	Individual
Type of technology	Intensive garden	Intensive garden	mix between crops and livestocks
Products	Vegetables and fruits. Fish and chicken for self-consumption.	vegetables and fruits ~ 20-27 kg/m^2/year.	cattle: cows, oxen, pigs, chicken milk, many kind of fruits, vegetables, viandas, malanga, plantains, banana, corn etc.
Number of workers/farmers/members	-, member of CCS	5 farmers, members of CCS	part of CCS (total 104 members)
Land size	*Usufruct*, -	5000 square meters	1.5 caballeria (~ 20 ha)
Average salary/income	Depend on the sales. Never been calculated, but enough for living.	depend on the sales. Price determined by Consejo Administracion Municipal	107 pesos/month from state + from selling products
Degree of implementation of OA principles	Good care of the crops and livestock. Multicropping and crop rotation.	Very good care of the farm. Do her own composting, but need to buy cattle manure. Use electric pump for watering the plants.	Principles of OA implemented extensively. Lack of labor. Reduce the numbers of cattle because of theft.
Characteristic of the farmers	Diligent and care of his farm. Join the cooperative because can learn how to farm effectively (through training and regular meeting with other farmers) and get support from the government (cheaper inputs and technical assistance). He was technician for helicopter in Cienfuegos, change to become farmer because of the *Special Period.*	Already implement OA for long time. Learning OA from his father + training + regular meeting by ACTAF. Smart and knowledgeable about OA. High environmental awareness. Don't want to move to "chemicals".	Relax. Open. Knowledgeable.
Government intervention			
Notes		She donates some of her products for school lunch in the community. She can get credit from CCS with 5% interest rate/year. She has small *venta* in front of her farm.	
Setting	Informal interview. 20/09/2001.	I visited her several times. Her husband has 2 ha land, also organic. 20/09/2001.	Group discussion: Miriam, Diego, Mitchel, I and Orlando and family. 11/09/2001

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