SAFE-World Project/Initiative Summary

Country: Cuba

Project / Initiative Title: Alternative Agriculture (ACAO)

Scale: Regional Nos. farmers: 200,000 Hectares: 150,000 ha

Agro-Ecological Zone: III

Improvement types

1x	2x	3x	4x	5x	6x	7	8	9

A. Key Impacts

A1 – Productivity

	Before / Without	After / With	% change
Maize / cassava / beans			182
Cassava / tomatoes / maize			117

A2 – Impacts on natural capital

?? 150,000 ha under biopesticide control
?? production increases
?? increased biodiversity
?? improvement in soil quality especially soil organic matter content

A4 – Impacts on households and individuals (human capital)

Before 1991 2600 calorie / day intake
After 1991 fell to 1000
Now up to 2700 calorie / day

A5 – Key changes in farm / regional system

Biopesticide use – from CREEs (Centres for the production of Entomophages and Entomopathogens)
222 local decentralised artisanal labs

B. Types of Sustainable Agriculture Improvements

Type 1: Better use of available renewable natural capital
Type 2: Intensification of single sub-component of farm system
Type 3: Diversify by adding new productive natural capital and regenerative components
Type 4: Better use of non-renewable inputs and technologies
Type 5: Social and participatory processes leading to group action for making better use of natural capital
Type 6: Human capital building through training-learning programmes
Type 7: Access to Finance
Type 8: Add value by processing to reduce losses and increase returns
Type 9: Add value by direct or organised marketing of produce to consumers

	Yes / No	Narrative
Type 1	x	Tree integrations, crop rotations
Type 2	x	Urban gardens
Type 3	x	Polycultures, green manuring
Type 4	x	
Type 5	x	CPAs formed
Type 6	x	
Type 7		
Type 8		
Type 9		

C5 – Scaling-up

Small farmers adopting but not large farmers

D. Contact Point for Project/Initiative

Peter Rossett
Food First
rosset@violet.berkeley.edu

E. Project Narrative

Cuba: national policy for sustainable agriculture

One of the most remarkable coordinated policy efforts on sustainable agriculture has occurred in Cuba. Up to 1990, Cuba's agricultural and food sector was heavily dependent on external support from the soviet bloc. It imported 100% of wheat, 90% of beans, 57% of all calories consumed, 94% of fertilizer, 82% of pesticides and 97% of animal feed. It was also paid three times the world price for its sugar. At this time, Cuba also had the most scientists per head of population in Latin America, the most tractors per hectare, the second highest grain yields, the greatest increase in per capita food production in the 1980s, the lowest infant mortality, the highest number of doctors per head population, the highest secondary school enrolment and lowest teacher: pupil ratios.

But in 1990, trade with the soviet bloc collapsed, leading to severe shortages in all imported goods. Within two years, petroleum imports fell to half of the pre-1990 level, fertilizers to a quarter, pesticides to a third, and food imports to less than half. The government response was to declare an "Alternative Model" as the official policy – an agriculture that focuses on resource-conserving technologies that substitute local knowledge, skills and resources for the imported inputs. It also emphasises the diversification of agriculture; the breeding of oxen to replace tractors; the use of IPM to replace pesticides; the introduction of new practices in science; the need for widespread training; the promotion of better cooperation among farmers both within and between communities; and reversal of the rural exodus by encouraging people to remain in rural areas.

The impact of the new policy has already been remarkable. Some 220 village-based and artisanal Centres for the Reproduction of Entomophages and Entomopathogens have been established for biopesticide manufacture. They produce 1300 t / year of *Bacillus thuriengiensis* sprays (used to control lepidoptera), 780 t / year of *Beaveria* sprays (for controlling beetles), 200 tonnes of *Verticillium* (for whitefly control) and 2800 tonnes of Trichoderma (a natural enemy). Many biological control methods are proving more efficient than pesticides. The use of cut banana stems baited with honey to attract ants, which are then placed in sweet potato fields, has controlled sweet potato weevil. There are 173 vermicompost centres, the annual production of which grew from 3000 to 93,000 tonnes. Crop rotations, green manuring, intercropping and soil conservation have all been incorporated into polyculture farming: cassava-beans-maize, cassava-tomato-maize, and sweet potato-maize have all been shown to be 1.5-2.8 times more productive than the sum of the individual monocultures.
Two important strands to sustainable agriculture in Cuba have emerged:

i) intensive organic gardens in urban areas of three types – self-provisioning gardens in schools and workplaces (*autoconsumos*), raised container-bed gardens (*organoponicos*), and intensive community gardens (*huertos intensivos*);
ii) sustainable agriculture on both large and small farms in rural areas.

Both have made a significant contribution to total food production (urban areas are defined as all farming within municipal boundaries and all agriculture within 3 km of population centres above 2000 people). In 1994, for example, *organoponicos*, *autoconsumos* and *huertos intensivos* were producing some 4200 tonnes of food per year. By 1999, this had grown to 727,000 tonnes. Both the number of gardens and per area productivity has increased. There are now some 7080 gardens (up from 2500 in 1997), and productivity has grown from 1.6 kg / m^2 (1994) to 19.6 kg / m^2. It is difficult to say how many farms are now devoted to sustainable agriculture practices – estimates suggest some 200,000 farms on about 150,000 hectares. For the *organoponicos*, an estimated 26,000 people are involved in direct food production.

One measure of effectiveness of sustainable agriculture to produce the necessary food is the aggregate data on calorific intake. This was 2600 kcal / day in 1990, fell to some 1000-1500 / day soon after the transition (with severe food insecurity), and has risen to an average of 2700 kcal / day by the end of the 1990s.

At the forefront of the transition towards sustainable agriculture has been the Grupo de Agricultura Organica (formerly known as the Asociación Cubanes Agricultural Organica, and formed in 1993). GAO beings together farmers, field managers, field experts, researchers and government officials to help convince farmers that organic-based alternatives can produce sufficient food for Cubans. There remain many difficulties though: i) proving the success of an alternative system to sceptical farmers, scientists and policy-makers; ii) developing new technologies sufficiently quickly to meet emerging problems; iii) coordinating the many actors to work together; iv) the need for continued decentralisation of food production to farmer level, and the appropriate land reform to encourage local investment in natural asset-building; v) encouraging farmers of large scale rice, potato, sugar cane and citrus to reduce their use of pesticides and fertilizers.

Sources: Rosset, 1997, 1998; Murphy, 1999

In Cuba the *Asociation Cubana de Agricultura Organica* (ACAO), an NGO formed by scientists and extension personnel has played a pioneering role in promoting alternative agriculture modules. In 1995 ACAO helped establish three integrated farming systems (called "agroecological lighthouses") in cooperatives (CPAs) in the province of Havana. After the first 6 months all three CPAs had incorporated agroecological innovations (ie tree integration, planned crop rotation, polycultures green manures etc) to varying degrees which with time have led to enhancement of production and biodiversity and improvement in soil quality especially soil organic matter content. Several polycultures such as cassave-beans-maize, cassava-tomato-maize and sweet potato-maize were tested in the CPAs. Productivity evaluation of these polycultures indicates 2.82 2.17 and 1.45 times greater productivity than monocultures respectively. The use of *Crotalaria juncea and Vigna ungiculata* as green manures have ensured a production of squash equivalent to that obtainable applying 175kg / ha of urea. In addition such legumes improved the physical and chemical characteristics of the soil and effectively broke the life-cycles of pests such as the sweet potato weevil.