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COMMITTEE ON WORLD FOOD SECURITY

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THE APPLICATIONS OF APPROPRIATE
AGRICULTURAL TECHNOLOGY AND
PRACTICES AND THEIR IMPACT ON FOOD
SECURITY AND THE ERADICATION OF
POVERTY:
LESSONS LEARNED FROM SELECTED
COMMUNITY BASED EXPERIENCES

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I. INTRODUCTION

1. The Committee at its 26th Session decided that an in-depth analysis be carried out, for its consideration at this session, on the theme " The Application of Appropriate Agricultural Technology and Practices and their Impact on Food Security and the Eradication of Poverty: Lessons Learned from Selected Community-based Experiences."
2. The Committee decided that the study should investigate impacts of the selected cases on both food security and poverty. Following the Committee's decision the Chairperson of the CFS sent a letter to the CFS member countries' Permanent Representatives to FAO, inviting them to provide to the CFS Secretariat information on relevant case studies from their respective countries. In response to the Chairperson's request case studies were received from India, Thailand, Sweden, and New Zealand.¹ From Mexico a compendium of interesting projects was

received. In addition, the CFS Secretariat had also collected a number of case studies from the various Technical Divisions of the Organization.

3. The six case studies presented in this paper were selected on the basis of the quality of the information each case study contained in terms of showing the impact of the application of agricultural technologies in improving food security and eradicating poverty, as well as the extent to which each case study offered lessons to be learned in terms of "best practices " in approach and in implementation processes.

4. The first case, **Participatory Integrated Watershed Development**, is being implemented by the Government of India as part of its overall programme to eradicate poverty and food security within the context of sustainability of resources. The second case, **Conservation 'No Tillage' Agriculture**, describes a project being implemented by the State Government of Santa Catarina, of the Government of Brazil. The third case, **Small Scale Irrigation Development under the Special Programme for Food Security in Burkina Faso**, is being implemented under the technical support of FAO. The fourth case, **Co-operative Dairy Development Programme in Bangladesh**, was implemented by the Government with the financial and technical assistance of UNDP and FAO, and grants in kind from DANIDA. The fifth case, **Mushroom Production by Disabled People in Thailand**, is being implemented by the Government of Thailand with technical support of FAO. The sixth case, **Community-Based Seed Multiplication and Distribution in Zambia**, was initiated and implemented by CARE as part of its series of food security projects in the country.

5. The basic hypothesis underlying the case studies undertaken by the Secretariat, is that the adoption of improved agricultural technologies and practices can have a direct impact on household food security and alleviation of poverty through the greater productivity and output, provided that such technologies are technically suitable to the farming system conditions of the poor and food insecure communities, and generate a net income growth. The positive impact on food security will not be sustainable unless the adoption of the improved technologies also generates marketable surplus that can be used to obtain the cash required to finance related investment and the purchase of production inputs. In this regard, interventions that use improved technology as an entry point would require that other essential preconditions for success be in place, namely, physical and institutional infrastructure, market opportunities, credit facilities, small-scale agribusiness industries preferably linked to the production to be generated by the technology adopted, favourable policy environment for trade and investment, etc.

II. SYNTHESIS AND LESSONS LEARNED

6. The case studies presented can be classified under two major categories. One set (cases 1, 2, & 3) comprises of integrated watershed management or farming Systems approaches coupled with adoption of improved technologies and farming practices to improve productivity, income and food security and to eradicate poverty. Another set (cases 4, 5, & 6) includes cases which use commodity production enhancement or specific technology or input use as an entry point to improve food security and to eradicate poverty. Each case underlines that, notwithstanding the fact that the application of agricultural technologies and know-how at community level is a key and fundamental factor in enhancing agricultural productivity and rural income, such a factor by itself is not a sufficient condition to make such an increase sustainable and to lead to long-term improvement of food security and eradication of poverty at community and at national levels.

7. The Integrated Watershed Development in Kharaiyanala in central India is a part of the overall strategy of the Government of India to increase food production and food self-sufficiency at national level as well as to address the needs of the poor at the community and at the household level. The Plan of Action for Food Security in India incorporates policies and

programmes aimed at increasing food production, including through Integrated Cereal Development Programmes focussing on the propagation of improved production technology, encouragement of the production of certified High Yielding Varieties (HYV) of seeds, and expansion of irrigation. Another priority action area is improved watershed management. The strategy also embraces policies relating to procurement and storage, public distribution systems and maintenance of buffer stocks and open market sales. The participatory watershed development approach in Kharaiyanala, within the overall Food Strategy of India, reflects a success story in overcoming food insecurity and poverty at community level.

8. The Conservation "No Tillage " Agriculture in Santa Catarina, Brazil, demonstrates a non-conventional approach which focuses on the maintenance of both live and decaying vegetable material on the soil surface. Besides maintaining continuous soil cover and eliminating soil tillage, conservation agriculture involved planning crop sequences over seasons, to minimise the building-up of pests or disease and to optimise plant nutrient use. The approach in a few years led to higher yields in crop production, decline in labour costs, diversification into livestock as well as agro-processing, resulting in improved food security of small farmers.

9. The Special Programme for Food Security (SPFS) in Burkina Faso is an integrated approach focussing on promoting appropriate technologies and farming practices, using improved water use and management systems as an entry point. The SPFS in Burkina Faso has shown significant increases in yields both in irrigated and rainfed rice as well as vegetables in the demonstration areas. The Programme forms part of the national programme for sustainable growth in agriculture and livestock. The SPFS will be instrumental in improving food security and eradicating poverty, provided appropriate macro-economic and sector policies, credit and input supply, as well as marketing facilities are in place to ensure widespread application of improved technologies and increase in productivity.

10. The Co-operative Dairy Development Programme in Bangladesh had been implemented in line with the Government 's long-term objective of raising subsidiary agricultural income of small and poor farmers in relatively remote rural areas. Using milk production, collection, processing and distribution as an entry point, the project provided a comprehensive range of technical support ranging from institutional development for establishing co-operatives and credit schemes at community level to organizing appropriate milk distribution and marketing systems in urban centres. The project not only was successful in improving the food security, nutrition and income of the direct beneficiaries - 40,000 landless and marginal milk producers - but also generated employment and income opportunities for a large number of the urban poor.

11. The project to promote mushroom production by disabled people in Thailand demonstrates that, rather than depending on traditional safety schemes or depending on relatives or resorting to begging, disabled people in rural areas can be self-reliant through the use of suitable technologies to enable them to produce and earn income for their livelihood. Apart from the economic benefits, the importance of the project lies in its potential to restore self-esteem and confidence of the disabled in themselves.

12. The community-based seeds multiplication and distribution systems in Zambia used the supply of early maturing and drought resistant seeds as an entry point to address low productivity and vulnerability to droughts as well as to tackle food insecurity and poverty. The project demonstrated that, once small farmers attain food self-sufficiency through the introduction of improved technologies such as better seeds, and become surplus producers, the need for marketing facilities, credit and other related institutional and physical infrastructures becomes imperative.

13. The case studies, albeit their differences in scope and approaches, provide a number of useful lessons for using community-based methods to promote the adoption of new

technologies.

- Improvement of food security through application of agricultural technologies at community level can lead to people's enhanced local capacity to engage in development activities in other areas as well.
- Direct involvement of beneficiaries in adapting improved technologies suitable to their conditions has a high payoff in terms of the enthusiasm and interest that they bring to project implementation. Also, in ensuring that the technologies address the priority needs that have been identified by the beneficiaries, have a strong chance of having the desired impact.
- Community-based action can be highly cost-effective.
- When productivity improvements generate additional income for the community members, this reinforces their efforts and encourages them to persevere. Village committees can be an effective mechanism for managing community activities of common interest and for establishing revolving funds to generate credit for community members.
- Community-based actions to increase agricultural productivity through adoption of appropriate technologies and practices also ensure sustainable natural resource management objectives.
- Vulnerability to natural disasters can be substantially reduced through adoption of technologies and practices that a) prevent or mitigate the effects of natural disasters, and b) improve productivity, increase cash incomes and create assets that families can fall back on when disasters occur.
- Without a favourable policy environment allowing surpluses generated by productivity improvements to find market outlets, actions to improve food security and reduce poverty through application of new technologies and practices cannot succeed.

Table 1: Type of Technology Introduced and Impacts

Country	Type of Technology or Practice Introduced	Institutional set-up	Number of Households Benefiting		Benefits and Constraints
			Pilot Phase	Expansion Phase	
Bangladesh	Dairy improvement practices	Bangladesh Co-operative Milk Producers' Union - "Milk Vita", comprised of 390 village primary milk co-operative societies	4,300	42,000	<p><u>Benefits</u></p> <ul style="list-style-type: none"> • small farmers' earnings from milk increased ten-fold, lifting household earnings above the poverty line • Income from milk production managed by women, and has a direct impact on household food security and nutrition • Poverty in 40,000

					<p>households alleviated</p> <ul style="list-style-type: none"> • Savings generated from milk income help to cushion households against the devastating effects of floods which occurs often in the country • Generated employment opportunities for 2,200 people • Urban consumers get safe pasteurised milk and milk products <p><u>Constraints</u></p> <p>Initially, the main constraint to the profitability of the cooperative was (a) Government involvement in the day-to-day operation of the cooperative and (b) dumping of imported milk powder in the market. These constraints were subsequently solved (see paras. 34 to 35)</p>
Brazil	Conservation "no-tillage" agriculture	State-managed extension programme	-	81,000	<p><u>Benefits</u></p> <ul style="list-style-type: none"> • Yields increased by 20-50 percent • Year-to-year variability in crop yields reduced • Labour demand stabilised year-round and labour costs declined by 30 percent • Input costs for machinery, energy, and particularly fuel fell by 50-60 percent

					<ul style="list-style-type: none"> • Savings on labour and time gave opportunities for diversification into livestock and production of high value crops <p><u>Constraints</u></p> <ul style="list-style-type: none"> • Fear of risk and initial reluctance by low-income subsistence farmers. This was overcome with incentives and support to such farmers in the interim period.
Burkina Faso	Small-scale irrigation and improved crop and livestock production practices	Participatory farmers' groups	6,800	---	<p><u>Benefits</u></p> <ul style="list-style-type: none"> • Rice yields increased significantly (irrigated rice by 30 %, lowland rice by 53%) • Vegetable yield increased considerably • Production cost declined • Income of farmers increased <p><u>Constraints</u></p> <ul style="list-style-type: none"> • Lack of a well-functioning market • Insufficient storage facilities • Limited access to credit <p>Specific interventions are planned to solve the constraints during the extension phase</p>
India	Conservation of	Village resource	---	3,576	<u>Benefits</u>

	rain water and prevention of soil erosion, followed by introduction of sustainable production practices	management committees			<ul style="list-style-type: none"> • Degraded area brought into cultivation • Water supply increased • irrigated area expanded from 11% to 79 % of cultivated area • Erosion reduced and soil fertility improved • Cropping intensity doubled and yields increased tenfold • Pastures regenerated and firewood availability increased • Household incomes substantially increased • Drudgery of women reduced • Outmigration reduced <p><u>Constraints</u></p> <p>No significant constraints reported.</p>
Thailand	Mushroom production and marketing technologies	Vocational training center for disabled people	73	7,000	<p><u>Benefits</u></p> <ul style="list-style-type: none"> • Improved the self-esteem of disabled farmers and enhanced their position in society • Mushroom production provided additional cash to households of the disabled <p><u>Constraints</u></p> <ul style="list-style-type: none"> • No specific

					constraints identified in the pilot project
Zambia	Multiplication of drought-resistant seeds	Seed groups federated to form Village Management Committees	330	6,800	<u>Benefits</u> <ul style="list-style-type: none"> • Early maturing seed varieties helped farmers to get better harvest even during droughts • Rapid farmer-to-farmer spread of crops and varieties • Increased food availability and diversity • Community empowerment and enhanced capacity to engage in developmental activities <u>Constraints</u> <ul style="list-style-type: none"> • Limited market for surplus production

III. REVIEW OF SELECTED CASE STUDIES

A. CASE STUDY ONE: PARTICIPATORY INTEGRATED WATERSHED DEVELOPMENT TO TACKLE POVERTY AND ENSURE SUSTAINABLE FOOD SECURITY - AN EXPERIENCE IN KHARAIYANALA IN CENTRAL INDIA²

Background and Pre-project situation

14. The Kharaiyanala Watershed has an area of 13,678 ha and consists of 19 villages with a population of 25,094 and 3576 farm households. Of the total area, only 7782 ha or 52 percent was under cultivation before the initiation of the watershed development programme. Less than 16 percent of cropped area was under irrigation. The overall fertiliser nutrient use was about 3kg/ha and cropping intensity was only 69 percent. About 1308 ha was under community grazing, which was highly degraded because of population and livestock pressure. About 952 ha were uncultivated and highly degraded wasteland and 2186 ha was under reserve forest.

15. Farm households practised mixed farming systems of crop production, and animal rearing on crop residues and free grazing. Of the total number of households in the watershed, there were 510 landless families and another group of 1375 households, with little or no economic activity for their livelihood. These households, which constituted 52 percent of the total population in

the watershed, lived with incomes below the poverty line.

Project Approach

16. The work started with a survey of physical, biological, social and economic resources of micro watersheds in the project area. This was followed with the establishment of village level institution, known as "Village Resource Management Committee", to ensure local participation in and ownership of the programme.

17. The watershed management approach was holistic and aimed at optimising the use of land and water resources, preventing soil erosion, improving water availability including through water harvesting and water saving schemes and by so doing avoiding or minimizing natural disasters, which could be caused by droughts or floods. The emphasis was on conservation of rainwater to the maximum extent possible.

18. The approach had two components, namely, (i) soil and water conservation works comprising of bunding, trenching, terracing, harvesting structures such as ponds, water channels stop- dams and (ii) promotion of sustainable production systems including through introduction of improved technologies and practices of conservation farming, forestry, aquaculture, animal husbandry production systems. Specific activities under the above two major components included: (i) putting adequate vegetative cover on the soil during the rainy season; (ii) conserving as much rain water as possible at the place where it falls; (iii) draining out excess water with a safe velocity and directing it to storage ponds; (iv) avoiding gully formation and putting checks at suitable intervals to control soil erosion, and to recharge ground water; (v) maximising productivity and increasing crop intensity; (vi) safe utilisation of marginal lands through alternative land use systems; (vii) ensuring sustainability of the ecosystems; (viii) introducing dynamic crop-livestock-tree production systems; (ix) and reducing risks of natural disasters.

Impact of the Project

19. Land and water resources: With the treatment of the catchments, an area of 888 ha (6.5 percent of the total area), which was earlier degraded and not fit for cultivation, was brought back into cultivation. Water availability in the watershed was also enhanced considerably. The increase in water resource availability led to substantial increase in irrigated area from 11 percent to 79 percent of the total cultivated land. Cropping intensity also rose from 69 to 172 percent.

20. Soil fertility also improved both in arable and non-arable lands. The treatments resulted in reduced soil loss by about 95 percent from hills and wastelands and by 78 percent from arable lands. As a consequence, silt sedimentation in watershed also declined from 36cm to 0.5cm in a period of seven years.

21. Crop productivity: Before the introduction of conservation measures, only one crop was grown either during kharif or rabi season in a year and virtually no double cropping was practised. With water availability and expansion of irrigation, cropping intensity and cropping pattern totally changed with sorghum and pigeon pea crops being replaced by crops like groundnuts, soybean, black gram and green gram in the karif season. In the rabi season wheat, gram, mustard, peas and tomatoes have become the major crops.³ During the summer season considerable amount of vegetables, notably tomatoes are produced. In aggregate average crop yield has increased from 0.46 tons/ha to 5.2 tons/ha.

22. Fish production: In order to augment the income of village communities, fingerlings of fresh water carps were introduced for fish production in ponds and check dams. Village communities

earn an average income of about RS 25,000 to RS 30,000 from fish harvesting.

23. Silvipastures: Community grazing lands of 665 ha in long ridge of 8 km in the hills and hillocks were brought under greening process. With the protection and adoption of appropriate soil and water conservation measures, several types of indigenous trees and shrubs regenerated from left over rootstocks. Many types of trees and plants were also planted.

24. The regeneration of trees and natural grass along with the newly planted trees, shrubs, grasses and legumes augmented forage resources significantly. Total availability of green forage increased from 33 percent to 119 percent of the community requirement in a span of seven years. Firewood availability also increased, replacing and diverting the use of cow dung from use as fuel wood to use as organic manure.

25. Livestock and milk production: With the regeneration of community common lands and increased availability of forage, there was a shift of animal species from cows to buffaloes for milk production. The population of cows declined by about 40 percent while that of female buffaloes increased by 147 percent. Milk yield increased by about 164 percent.

26. Community income generation for common use: All proceeds from sales of grass and firewood from common lands, as well as sales from fish auctions go to the "Village Resource Management Committee" (VRMC) fund. The fund is used for generating credit to the community members at a nominal rate of 1 to 2 percent per annum.

27. Household income and food security: The income of farmers, which initially was only RS 3200 ha/year increased by over 600 percent to RS 20,400 ha/year. Income of landless community members rose from RS 1900 per year to RS 17,600 per year - a nine fold increase in a span of 7 years. The main source of income of this group of the community was the employment generated by the scheme, including on-farm and off-farm activities.

28. As a result of the new employment and income opportunities, the migration of the poor from the watershed to urban areas was also arrested. Another important benefit generated by the watershed development programme was to reduce the drudgery of rural women who, prior to the programme, had to spend long hours in fetching water, fodder and firewood.

29. Overall, the programme resulted in reducing poverty and improving food security. The increase in total food production, including milk production and vegetables, should have also resulted in diversifying food intake and in improving household nutrition although no direct evidence of this has been collected.

30. The total cost of the soil and water conservation work and related activities was RS 23.48 million (US\$ 0.67 million). Currently, total gross income generated annually from all resources is estimated at RS 22.8 million (US\$ 0.65 million). The entire cost which had been incurred on watershed development was fully recovered in the first three years of the programme and an overall benefit-cost ratio of the programme has been calculated to be 1.94.

B. CASE STUDY TWO: CONSERVATION "NO-TILLAGE" AGRICULTURE FOR FOOD SECURITY AND ENVIRONMENT PROTECTION, SANTA CATARINA, BRAZIL⁴

Background and Pre-project situation

31. The state of Santa Catarina, located in the south of Brazil, has a population of 1.3 million, of which more than half a million are small farmers. The need for firewood and timber, pastures for animals and food for family subsistence, forced small farmers to cut extensive areas of

forests, followed by burning the remaining vegetation to allow for sowing crops, and development of pastures. The introduction of disc ploughs and harrows damaged soil properties through the pulverisation of soil aggregates leading to reduced infiltration of water in the soil and increased runoff and erosion. In 1983 and 1984 the incidence of two big floods led the affected population to seek solutions that would minimise the impact of such problems.

Project Approach

32. In July 1991, the State Government of Santa Catarina initiated a programme for the recuperation, conservation and management of natural resources in hydrographic catchment. Since 1998, 81 000 families in 200 municipalities and 520 micro-catchments have benefited from the project. The project centred on conservation agriculture to maintain and improve crop yields and resilience against drought and other hazards, while at the same time protecting and stimulating the biological functioning of the soil.

33. Two essential features of the approach were no-tillage and the maintenance of a cover of live or dead vegetal material on the soil surface. Crops were seeded or planted through this cover with special equipment. Besides maintaining continuous soil cover and eliminating soil tillage, conservation agriculture involved planning crop sequences over several seasons, to minimise the build-up of pests or diseases and to optimise plant nutrient use. The cropland was being used continuously and no burning of residues was allowed. A participatory extension system involving farmers, extension agents and researchers was used in introducing these farming practices.

Impact of the Project

34. With conservation agriculture approach, in few years, yields rose by 20-50 percent compared to those under conventional systems, and became less variable from year to year. Labour costs significantly declined (30%), and labour demand stopped to be seasonal becoming constant throughout the year. Input costs also declined, particularly for machinery, energy, and for plant nutrients. In conditions where mechanical or animal power was used, fuel use fell by 50 to 60%, and only smaller tractors or fewer draft animals were needed for a given area. In areas without these power sources, heavy manual preparatory farm work was drastically reduced. Labour savings provided opportunities for diversification into livestock, various higher value crops and vertical expansion into agro-processing (dairy products, fruit and vegetable processing etc.) resulting in increased incomes and improved food security of small farmers. Also, quality of life improved as labour savings increased the time available to spend with the family or other leisure opportunities.

35. With positive results gained from conservation agriculture, the practices tended to spread spontaneously over large areas (more than 13 million ha. in Southern Brazil). Several conditions were present that made possible the rapid expansion of conservation agriculture practices. These included professional contacts among farmers; local enterprise to manufacture and market necessary tools and equipment; and favourable economic policy environment and institutions to promote investment. In very low-income or subsistence conditions, farmers were provided some initial incentives or support to convert to conservation agriculture.

C. CASE STUDY THREE: SMALL-SCALE IRRIGATION DEVELOPMENT UNDER THE SPECIAL PROGRAMME FOR FOOD SECURITY - BURKINA FASO⁵

36. The overall objective of the Special Programme for Food Security (SPFS) in all LIFDCs is to improve national and household food security - through rapid increases in productivity and food production, and by reducing year-to-year variability in production - on an economically

and environmentally sustainable basis. The SPFS in Burkina Faso forms part of the national programme on sustainable growth in the agriculture and livestock sectors.

Project Approach

37. The programme started in 1995 with an initial focus on areas with high potential for rapid increases in food production. Beginning in 1997 it was extended to other areas and now covers all agro-ecological systems in Burkina Faso, with the involvement of various national, regional and local public institutions, farmer organizations as well as NGOs. The programme works through a participatory farmer group approach, using demonstration farmer and participatory group discussions to introduce new technologies, and identify and resolve constraints.

38. The project used improved water management, including water-conservation, improved methods of irrigation systems (pvc pipes, dug channels, covered canals) and introduction of 72 treadle pumps as an entry point. The force-mode treadle-pumps, which have water-lifting capacity of up to 7 meters, are made from local material including the spare parts. The low price (60,000 FCFA), at which the pumps could be purchased also makes them within easy reach of small farmers. Improved farming practices were also introduced for rice, horticulture, niébé, apiculture, and agroforestry and for ruminant production.

39. A total of 39 sites were in operation by the end of 2000, directly involving around 6800 small scale farmers, of which 25% were women. The activities of the programme included: (i) establishment of partnership with other stakeholders; (ii) enhancing awareness of partners to food security issues; (iii) improving access to water, and (iii) introducing improved technologies for intensification of food production. Women were mainly involved in livestock and horticulture activities.

Impact of the Project

40. The programme has so far recorded the following increases in rice-yields following introduction of the new water management technologies: irrigated rice yields increased by 38% (to 5.20 t/ha), rice yields from low-lying areas increased by 53% (to 3.63 t/ha) and rain-fed rice yields by 53% (to 2.13 t/ha). Vegetable yield also increased considerably. In terms of income, earnings from rice production increased from 91,000 FCFA/ha to 200,000 FCFA/ha for irrigated rice and from 58,000 to 143,000 FCFA/ha for low-lying areas. Also production cost (per kg) fell from 89 FCFA/kg paddy to 72 FCFA/kg paddy for irrigated rice and from 95 FCFA/kg to 70 FCFA/kg paddy for rice grown in low-lying areas.

41. The main constraint to widespread adoption was identified as the lack of a well-functioning market for inputs as well as produce. Furthermore, absence of control over rice husking and insufficient storage capacity also reduced profitability to the farmer. Access to credit was also limited. Despite this, the programme has recorded significant interest among farmers to adopt the improved farming technologies and practices. Specific interventions are planned to be undertaken during the extension phase to solve constraints identified. These include the development of storage and processing facilities and actions to improve access to credit facilities. It is expected that, by enabling farmers to smooth out the flow of rice to markets throughout the year, the access to urban markets can be improved. Also, cash income generated from secondary diversification activities is expected to help ease the credit constraints.

D. CASE STUDY FOUR: CO-OPERATIVE DAIRY DEVELOPMENT PROGRAMME - MILK VITA IN BANGLADESH⁶

Background

42. Because dairy cows are mainly owned by marginal smallholders and are directly linked to family income and nutrition for them, a programme to support dairy development was given high priority by the newly-independent Government of Bangladesh, beginning in 1974. At that time, the Co-operative "Bangladesh Milk Producers Co-operative Union Ltd." (BMPCUL) was initiated by the Government with the financial and technical assistance of UNDP and FAO, and grants in kind from DANIDA. The co-operative is known throughout the country by the brand name of its products 'Milk Vita'.

43. The primary target poverty group for the intervention were rural small-scale farmers, including landless households. The main objectives of the programme were threefold:

- increasing family income of small farmers
- strengthening support services for livestock development and
- ensuring the supply of hygienic milk and dairy products to the urban population.

44. These objectives were in conformity with the Government's longer-term objective of raising agricultural income of small scale farmers in relatively remote rural areas through the organisation of a sustainable co-operative dairy programme.

Project Approach

45. The project approach centred in providing a comprehensive package to improve and expand milk production, collection, processing and distribution. The technical support included (i) organising beneficiaries in rural areas into village milk producer co-operatives; (ii) training of villagers in milk production, productivity enhancement technologies and co-operative management; (iii) establishing self-sustaining livestock support and advisory services and credit schemes; (iv) constructing, running and maintaining five dairy plants, including production management and quality control; (v) organising appropriate milk distribution and marketing systems including urban milk distribution co-operatives; (vi) commercialising the secondary level apex body (the milk union); (vii) planning and organising the co-operative dairy sector, including the preparation of a national co-operative dairy development plan. The above activities were undertaken with UNDP and FAO financial and technical assistance, through a series of three projects during the period 1974 to 1989.

46. The Government was initially involved with the day-to-day operations of the co-operative. Since 1991 Milk Vita is governed by an elected Board of Directors from amongst the 390 village primary milk co-operative societies, who play an active role in protecting producers' interest in setting fair milk price, timely procurement of required support services to enhance milk production, and in business development plan of Milk Vita. During the same year the co-operative started to employ professional management personnel at senior level, which provided a sound and efficient management system leading to improved business and profitability.

Impact of the Project

47. In spite of gradually increased milk collection, extended support services for cattle development and marketing activities, the Co-operative activity was not profitable for a long time. The Co-operative only just broke even on operations, but was losing money when provision for depreciation and loan interest were taken into account. "Milk Vita did not start to make a net profit until the early 1990s when the dumping of imported milk powder declined significantly, as stockpiles in exporting countries declined, and the Government withdrew from day-to-day management. The parallel move to a more commercial business approach at Milk Vita and a higher throughput of local milk also helped profitability."⁷

48. Today, Milk Vita Co-operative has grown, from a modest start that involved 4300 very poor

landless households in remote rural areas, into a successful commercial dairy enterprise involving 40,000 farmers organised into 390 primary co-operatives, with a complete package of milk production enhancing technologies, village level organisational skills and a milk collection processing marketing system. In 1998 producers delivered 30 million litres of milk and received a total of Taka 467.4 million (US\$ 9.3 million).

49. In addition to the direct beneficiaries of the Milk Vita Co-operative, i.e. the 40,000 landless, small and marginal milk producers, other beneficiaries include: (i) an estimated 300,000 family members; (ii) 1,200 employees of the primary co-operatives who collect and transport milk; (iii) 300 city Milkshaw pullers engaged in milk transportation to the retail outlets and shops; (iv) 700 employees of the different dairy plants and Head Office. Having safe pasteurised liquid milk and other milk products at their doorsteps daily also benefits a large number of city dwellers.

50. In monetary terms, regular earnings from milk have increased ten-fold in real terms to Taka 32.5 (65 US cents) a day helping to lift household earnings to well above the poverty line. The returns to farmers from milk production are reliable and are managed and used by women in many households. Poverty alleviation at grassroots level has therefore taken place in an estimated 40,000 households. The resultant increase in milk cow numbers and savings generated also serves as a cushion against the devastating effects of severe flooding that regularly afflict the country.

E. CASE STUDY FIVE: ENABLING DISABLED PEOPLE TO BE ECONOMICALLY SELF-RELIANT - PROJECT TO PROMOTE MUSHROOM PRODUCTION BY DISABLED PEOPLE IN THAILAND⁸

Background

51. Thailand is one of the countries which succeeded in reducing poverty and undernutrition significantly through a poverty alleviation strategy focusing on community action and sustainable rural development programmes.⁹ The progress in reducing poverty and undernutrition was however affected by the economic crisis, which affected Thailand and other East Asian countries in 1996-97. The Government of Thailand, as part of its poverty alleviation strategy, has also designed the "New Theory integrated farming systems" programme with the primary aim of helping small farmers and farm family members who were laid-off from non-farm employment and were returning to rural areas as a result of the economic crisis in question. This programme, funded from special funds of the government and a loan from the Asian Development Bank, started in 1997 as a pilot project covering 8000 farmers in different sub-districts all over Thailand. The project has a good potential to improve food security at community level, but it has not been operating long enough to generate the information required to present the project as a case study.

52. In addition to the above activities, the Government of Thailand, with the technical support of FAO, has initiated a project in 1998 to support people with disabilities in rural areas. This initiative was undertaken to coincide with the Asian and Pacific Decade of Disabled People. The project provided technical assistance to the Department of Public Welfare to establish innovative methodologies in vocational training for the rural disabled people to make them self-reliant and to enhance their self-confidence by making them active members of their families and society. This project has a special significance in view of the fact that it caters for the well-being of a vulnerable group often neglected in many societies.

Project Approach

53. The main objective of the project was to enable rural disabled people to reach economic

self-reliance by creating employment and income generating opportunities for them. Mushroom production was chosen as a core activity for several reasons: it responds to the physical constraints of persons with different disabilities and it has low start-up costs, a short production cycle (2-4 months), and stable local demand. Training facilities for mushroom production were established in an existing training centre Ubon Ratchathani, where other types of vocational training for disabled people were already offered. A mushroom cultivation unit was established with four new permanent buildings and eight semi-permanent buildings with necessary equipment.

54. An initial group of trainees was selected from among approximately 7,000 disabled people in the Ubon Ratchathani region, with preference given to disabled people between the age of 20 and 35. Other selection criteria included level of literacy, location (to ensure diversity), level of family support, and degree of commitment and motivation. A total of 73 disabled farmers were selected for the three batches of training carried out by the pilot project. Training included all activities related to mushroom cultivation from fruiting to drying, processing, packaging and marketing. Entrepreneurial skills were also included in the training. Trainees are entitled to receive an interest-free loan from the Public Welfare Department of the the Government, for setting up the business.

Impact of the Project

55. Preliminary findings from the evaluation of the pilot project indicate that the training has been successful both in terms of improving self-esteem of the disabled farmers and enhancing their position in society. About 70% of the trainees from the first batch had taken up mushroom production and they almost doubled the scale of operation within the first 10 months. Mushroom production provided additional cash to the households of the disabled and was estimated at 30% of total household income. When reaching the expected level of operation (3000 bags), each producer is expected to make double the salary of day laborer, taking into account that the mushroom production requires daily input of half a working day.

56. The evaluation of the project has shown that mushroom production is a disability-friendly production technology. The Department of Public welfare estimates that there are more than 1 million disabled people in Thailand, about 70 percent of whom are in rural areas. Following the pilot phase, the scope for replication has been identified at the national and regional levels, using the training center in Ubon Ratchathani. An important condition for the success and expansion of such a project is the existence of enabling environment including access to appropriate financial services. Successful replication of the approach also depends on the extent of local demand for mushrooms and the competitiveness of disabled farmers vis-à-vis other suppliers. Although data on the magnitude of market demand for mushrooms is not available, it is known that mushrooms are an important part of the local diet.

57. The most important aspect of the project is, however, that it has demonstrated that it is possible to assist a neglected vulnerable group, i.e. disabled rural people, in earning their own living through introduction of technologies that are disability-friendly. The identification of different technologies with similar characteristics to those of mushroom production would further aid the spread of sustainable livelihood strategies within this group.

F. CASE STUDY SIX: COMMUNITY-BASED SEED MULTIPLICATION AND DISTRIBUTION SYSTEM IN ZAMBIA¹⁰

Background and Pre-Project situation

58. High cost associated with new crop varieties and delays between a crop variety release on the one hand and seed multiplication, distribution and adoption, on the other, are major concerns

in Zambia. Another major concern is limited access to quality seeds by poor farmers, especially in remote areas. These problems were exacerbated by structural adjustment process, which led to the abolition of the parastatal institutions, which regulated the subsidy programme for input supply and marketing. This resulted in difficulties in both the supply of agricultural inputs as well as the access to such inputs by the majority of small farmers. The fact that the private sector was not keen to invest in the types of crops preferred by smallholders left uncovered the gap created by the reduced role or abolition of parastatal institutions in providing essential services to small farmers.

59. Following a series of three serious droughts in the mid 1990s and the general trend towards shorter and more erratic rains, especially in the southern part of Zambia, which have resulted in frequent failures of crops traditionally grown in many parts of the region, farmers demand for alternative drought resistant varieties also increased. However, the agricultural seed supply sector was not been able to respond effectively. To respond to the needs of small farmers, CARE initiated a community-based seed multiplication and distribution system as part of a series of project activities collectively referred to as the Livingston Food Security Programme (LFSP).

Project Approach

60. The project originally started as an emergency programme in October 1994 but was being implemented in the drought prone areas of Kazungula and Kalomo Districts in southern Zambia to meet the seed needs of farmers from season to season. The project activities were identified and decided through a series of community participatory rural appraisal (PRA) activities conducted in different farming systems.

61. The series of PRA exercises conducted over several weeks and involving many communities highlighted a number of issues related to household food security.¹¹ Among the issues identified, the farmers ranked seed insecurity and inadequate water supply as highest priorities followed by a need of appropriate extension advice. Farmers asked for seeds of early maturing and drought resistant varieties of their favoured crops, together with extension advice on such crops as well as general advice to help them deal with drought and the changing agricultural situation in their localities. To address the priority concerns of the farmers, CARE formulated a community-based programme incorporating seed multiplication and distribution, local institutional capacity building, and associated farmer-to-farmer extension activities.

62. The programme started with seed distribution on loan basis, and recipient farmers were required to pay back the same quantity of seed in kind after harvest. Using the individual farmer approach, the programme initially involved 330 households each of which received 5 kgs of maize or 4 kgs of sorghum and 2 kgs of coupes.

Impact of the Project

63. The programme evaluation showed that, the season the seeds were distributed happened to be one with mid-season drought and irregular rainfall. Many farmers experienced near complete crop failure with the exception of those who had planted seed of the new early maturing varieties. The latter, despite the drought, harvested enough food for an extra six months compared with the neighbours in the same wealth category. This led to a high demand for the new early maturing varieties.

64. In order to meet the rapid increase in demand, CARE and the community agreed that interested households establish seed groups, along the Grameen Bank model, or using solidarity groups in each participating village. The seed groups in each village were federated to form a Village Management Committee (VMC). For the 1995/96 season, 180 VMCs representing

1208 seed groups or about 6800 farmers were established. Each VMC was made responsible for the management of seed distribution to its members and, after harvest, for collection and the repayment of the loans. VMCs were trained in group management, bookkeeping, crop management, seed handling and storage.

65. Annual impact assessments of the project demonstrates that it has had the following positive results: increased seed supply at low cost; rapid farmer-to-farmer spread of crops and varieties; increased food availability and diversity; community empowerment and enhanced capacity to engage in developmental activities; increased farmer participation and openness; community participation in project management; efficient flows of information; and enhanced capacity for other opportunities.

66. As the farmers produced surpluses, the programme made efforts to facilitate market linkages and flow of market information, having recognized that farmers were unlikely to adopt some of the crops currently being promoted if they could not sell their surplus production.

1 The Case studies received were from:

India - 1. "Greening of Village Common Lands on Participatory Watershed Approach - An Experience of Kharaiyanala from Central India".

2. "Prosperity through Agricultural Development on Watershed Approach - An experience in Tejpura Watershed in India".

Thailand - "A Farming Systems Approach to achieve Food Security and poverty Eradication in Thailand".

Sweden - "The Rangeland Supported Kusa Pilot Project in Nyando District (on the Shore of Nayakach Bay, Lake Victoria) Kenya".

New Zealand - "Review of the Women's Agricultural Extension Service Programme (WAESP) In the Solomon Islands", March 1996.

2 "Greening of Village Common Lands on Participatory Watershed Approach - An Experience of Kharaiyanala from Central India", case study submitted by the Government of India.

3 Kharif refers to monsoon cropping season, and rabi to winter cropping season.

4 FAO Soil Bulletin 77 "Soil Management and Conservation for Small Farms: Strategies and Methods of Introduction, Technologies and Equipment-Experience in the State of Santa Catarina, Brazil"(to be published).

5 FAO, "SPFS in Burkina Faso", January 2001.

6 Milk Vita in Bangladesh (a case study) prepared for the FAO Farming Systems Study for the Revision of the World Bank's Rural Development Strategy and "Vision for Action" (2000 unpublished)

7 Milk Vita in Bangladesh, *ibid*, page 9.

8 FAO, Project: TCP/THA 8821.A: "Mushroom Training for Disabled People - Impact Monitoring and Evaluation cum Strategy and Action Plan", (September 2000).

9 For detailed information, see the FAO, " State of Food Insecurity in the World 2000 ", pp. 23-24.

10 FAO, AGPS, Community-Based Seed Supply Systems - A Case Study from Zambia, (2000 unpublished).