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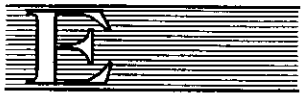

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PRESENTATION: SAMPLE "BEST PRACTICES" IN MANAGEMENT OF NEXUS ISSUES IN AFRICA

BEST PRACTICE #1

PRODUCTION OF INSTANT CEREAL-MILK FLOUR IN CAMEROON

The Problem Solved

Milk is a highly nutritious food and milk production is among the best income generating activities in animal agriculture. Unfortunately, fresh milk is a highly perishable good whose nutritive and organoleptic qualities deteriorate rapidly in the absence of appropriate preservation measures. Tropical environmental conditions are among the key predisposing factors responsible for the severity of the problem. Heavy losses are inevitable under these conditions particularly where production is abundant and needed conservation technology is lacking. Such was the case in the Adamawa province long known for its abundant production of cow milk even during the dry season. To avoid the underlying losses, a technology was developed by the women of the province and improved by the school of agro-industrial sciences of the University of Ngaoundere. The aim of the pioneers (i.e. the women) was to conserve cow milk.

The Process and the Product

The process technology consists in mixing fermented fresh milk with cereal flour, sun dry the paste obtained, and mill the paste to produce a ready-to-eat cereal-milk flour. The traditional form of the process has been improved to eliminate drudgery and to provide for better hygiene. The best results are obtained when ungerminated and malted cereal (sorghum or maize) is used and the paste dried at the temperature of 50 degree 0C.

The product technology is instant and enriched ready-to-eat flour.

The Benefits

1. Milk is conserved and cereal product enriched with good quality proteins (Note: cereals lack many essential amino-acids)

2. Protein content and available lysine increased with increase of milk in the blend

3. Malting of cereals improved the nutritional qualities such as in vitro digestibility of proteins and sugar, availability of lysine, reduction of phytate and added functional properties such solubility of proteins.

4. A ready-to-eat flour of good nutritional and hygienic qualities is obtained

5. Economic losses are substantially reduced

Why was the Reported Practice Selected as Best Practice?

The reported practice was selected as a best practice because it

- substantially improves the nutritional value of cereals in a way that can prevent deficiencies in essential amino-acids where sorghum and maize are main components of staple diets;
- substantially decreases financial losses and thus increase the financial access to food

BEST PRACTICE #2

DEVELOPMENT AND UTILIZATION OF TREADLE PUMP IN ASIA

The Problem Solved

The region of interest includes Eastern India, Nepal Terai and Bangladesh – the heartland of the Ganga-Brahmaputra-Meghana (GBM) basin, and South Asia's so-called "*poverty square*". It contains 400 million of Asia's 900 million poor; it is however endowed with one of the world's most remarkable groundwater resources, which is available at a depth of 1.5-3.5 m.

The population density is over 500/sq km. Well over half of the total farm lands are operated by marginal and small farmers owning an average of 0.8-0.9 ha of farm land compared to the all-India average of 1.55 ha and Punjab's average of 3.61 ha. Marginal and smallholdings in the region have increased in number and have been halving in average size every 15 years since 1960. Moreover, barring Uttar Pradesh where some consolidation of holdings took place during the 1960's, the average parcel size was 0.11 ha in Bihar and West Bengal in mid-1980's. The development of the industrial and service sectors – which could have absorbed some of the growing labor force – is slower than elsewhere in South Asia. After an initial surge in yields and total farm production during the 1980's, agricultural productivity in Eastern India has stagnated or even declined during the 1990's. Overall, the region is stuck in a low-productivity quagmire that perpetuates its rural poverty and agricultural stagnation.

Development of groundwater irrigation has for long been held out as the answer to the region's problem. It was thus recognized that intensive groundwater development could serve as a "powerful trigger" in catalyzing a green revolution-based rural economic upsurge in this region as it was the case in Haryana and Western Uttar Pradesh during the 1960s. In fact, this development had already begun to take place through growing private investment in tube wells and diesel/electric pumps. However, the majority of the poorest i.e. the marginal farmers, were left behind because they could not accumulate enough capital to invest in a diesel or electric pump; even if they could, they would not have made it viable on their very small holdings. About 20 million farmers until recently had either no means of irrigation or were using very primitive means involving more backbreaking labor and delivering only a fraction of the water needed. The treadle pump technology (TP) which provided direct access to ground water at an affordable cost was the answer to the problem.

The Technology

The treadle pump is a foot-operated device that uses a bamboo or PVC or a flexible pipe for a suction/tube-well to pump water from shallow aquifers or surface water bodies. It consists of a sheet metal or cast iron pump-head, a bamboo frame with two treadles and a bamboo or PVC strainer. The pump-head has two cylinders welded together with a single suction inlet at the bottom and two plungers. The diameter of the cylinders varies for different water outputs and water level depths. The cylinders are joined together at the base by a junction box, which connects through check valves to the suction pipe to the pump and is discharged in a pulsating stream following the strokes of the two pistons. The action of the

two cylinders provides a virtually continuous stream of water. This makes the TP more efficient than single cylinder pumps where energy is needed to reaccelerate water column after the longer pause in the change over between strokes.

The Benefits

About the pump itself

TP is simple to install and easy to operate by men, women and children, which allows the entire family to share the workload.

TP can be attached to a flexible hose for lifting water and is useful for lifting water from shallow depths from any source such as ponds, tanks, canals, or catchments basins. It can lift water up to a maximum height of 7 m but gives the best performance of 1-1.21/s at a pumping heard of 3-3.5 m. and is not only ideal for vegetable cultivation but is also used extensively to irrigate small plots of HYV paddy rice.

The cheapest bamboo treadle pump costs around US$12. The more expensive metal and concrete pumps cost between US$25 to $35 dollars, complete with bore and frame.

Poverty reduction

The low-cost pedal pumps drastically reduce rural poverty by giving poor farmers, who cannot afford diesel pumps, access to the region's abundant groundwater resources. This allows them to reap higher yields and grow higher value crops.

Improving incomes

- TP increases income of over 80% and improves the economic well-being of 90 % of those using it.
- The pump helps at least 20% of the poor families that use it earn a net profit of US$ 500-600 more per year – a significant increase given that more than 40% of the people in the region live on less than $1 a day (the World Bank's standard indicator for extreme income poverty).

Meeting the specific irrigation needs of smallholders

- The pump is ideally suited to the needs of poor farmers. It is cheap, easy to install and operate, and well-suited to irrigating small parcels of land.
- Average crop yields on treadle-pump irrigated plots are higher than those obtained by farmers using diesel pumps or other irrigation devices, largely because of more intensive cultivation.

Promoting an entrepreneurial spirit and employment

- Enterprising poor families are using the pump to make the transition from subsistence farming to small-scale commercial farming.
- Less enterprising adopters achieve fuller employment at 'implicit wage rate' that is 1.5-2.5 times the market rate.

- The spread of the pump in a community improves wage rates and employment opportunities for the landless. Families using treadle pumps withdraw from the local labor market to work their own lands.

Sustainable groundwater use and environmental conservation

TP does not lead to groundwater depletion and related problems recorded with the utilization of tube wells and diesel pump. The treadle-pump farmer has more control over the application of water because the output rate is much slower than that obtained when a diesel or electric pump is used.

Treadle pump irrigation encourages high water use efficiency and has the advantage of providing an environmentally 'clean' irrigation.

The treadle pump encourages sustainable, pro-poor use of water resources.

Why was the Reported Practice Selected as Best Practice?

- TP transforms small-holder farming systems in different ways in different sub-regions; in North Bengal and Bangladesh, adopters to cultivation of HYV rice in boro season; elsewhere, adopters turn to vegetable cultivation and marketing;
- TP results in increased land-use intensity as well as 'priority cultivation'; adopters provide crop-saving irrigation in a large part of their holding but practice highly intensive farming in the 'priority plot';
- Average crop yields on priority plots' tend to be much higher than obtained by farmers using diesel pumps or other irrigation devices;
- TP helps achieve the transition from subsistence farming to small scale commercial farming;
- TP fills the need of the marginal farmers;
- TP increases financial access to food;
- TP significantly improves water availability and management practices;
- TP provides environmentally clean irrigation;
- Economic and social benefits are significantly increased;
- TP is cost-effective.

BEST PRACTICE #3

THE MODERNIZATION OF RICE FARMING IN INDONESIA: The Critical Role of the Government

The Problem Solved

In the 1960s, Indonesia was a net importer of rice, its major staple food item. Production estimated at 9.8 million metric tons was far below the quantity needed to feed the country's burgeoning population. The skyrocketing rice import bill which reached an amount of over US$130 million in 1963 became unbearable.

It was then clear to the Government that, without a forceful and well planned intervention, the country's economy would be in shambles and the food shortage exacerbated. A special program designed to achieve self-sufficiency in rice was launched. The focus was on the transfer of an appropriate technological package to farmers located mostly in the well-endowed and irrigated areas of the country.

The Process

The Indonesian Government began to intervene in rice farming in the early 1960s. In those years, it concentrated more on farmers' practices and provided incentives to encourage adoption of new technologies. Among these incentives were the establishment of a high performing extension service, the provision of subsidies on inputs used, the enforcement of price floors on rice and price stabilization schemes, the provision of credits and the establishment of village organizations. The new approach which led to the modernization of rice farming was initiated in 1963 and passed through three major phases: genuine partnership (1963-1965), mass guidance (late 1980s), and facilitation (early 1990s).

a) Genuine Partnership

In 1963, the first initiative started as a new approach to extension in 3 villages of West Java. The extension agents were students from a nearby agricultural college. The students lived in the villages and each worked with a determined small group of farmers on the utilization of new technologies for rice cultivation. The focus was on five aspects: (i) the use of high yielding varieties (HYVs), (ii) the use of mineral fertilizers, (iii) the use of appropriate means to eradicate diseases, (iv) the introduction of improved methods of cultivation, and (v) the use of irrigation.

The students had genuine working relationships with farmers and were highly committed to persuade these farmers to adopt new practices. As a result, the concerned villages achieved yield increases of 40 to 150 percent compared to non-participating villages. The demonstration was so successful that it was expanded to cover 10,000 ha from under 500 ha.

b) Mass Guidance

The success of the genuine partnership between extension agents and farmers led the Government to expand even further the program by moving from a genuine partnership approach to enforcement. The Government sent around 1200 student extensionists to work with farmers. Each student was responsible for 512 farmers. Given the large number of farmers to work with, the student extensionists found it easier to work intensively with village leaders who were then expected to forward the needed message to the farmers. This resulted in an inevitable dilution of the impact and a substantial change in the work ethic.

Because adoption was too slow, farmers were forcefully coerced into the program. The Government provided incentives at the village level in the form of fertilizers, pesticides and cash credit. Despite these efforts, many farmers were reluctant to adopt the HYVs though yields were always 20-80 percent higher than those of local varieties irrespective of the size of the farm and tenurial status.

c) Facilitation

To overcome the reluctance mentioned in the mass guidance stage, the Government improved the system by putting a special emphasis on local institutions. Seeds, fertilizers and pesticides were supplied at guaranteed and subsidized prices and a guaranteed floor price for paddy and local storage facilities were introduced. These incentives were only provided to farmers who had joined the program. Joining the program was also subject to the compulsory acceptance of the new technology, inputs and guidance of extension workers.

The program was improved in the early 1980s with the introduction of the "training and visit" system of extension. In this improved program, the extensionists worked directly with groups of farmers to promote the utilization of HYVs, to teach them how to use pesticide products, to synchronize planting activities and to assist in varietal rotations. The Government, on its part, continued to provide subsidized credit and to support enterprises supplying inputs. The Government also assisted in the establishment of cooperatives for the distribution of inputs and developed appropriate physical infrastructure. Extension agents worked in close collaboration with local authorities that provided leadership on such issues as the content of credit packages and the type of rice varieties to be used.

The Benefits

The project gave a boost to research. Agricultural scientists bred new varieties of rice, which produced high yields of grain at the expense of straw. Among these High-Yielding Varieties (HYVs) were IR64 and Cisadane which were distributed to farmers together with external inputs such as mineral fertilizers, pesticides, machinery, credit and water. Rice production was well over 30 million tons and the country had achieved self-sufficiency in rice in the mid-1980s. In the early 1990s, rice production had increased more than three folds compared to the early 1960s.

Why was the Reported Practice Selected as Best Practice?

The modernization of rice farming in Indonesia is a good illustration of a successful transition from low to high productivity agriculture. It clearly shows how Government

commitment can make a difference. Several other indicators which were used in the selection process are shown below:

- achievement of rice self-sufficiency;
- increased access to roads, marketing infrastructure, transport and inputs;
- increased access and utilization of modern rice varieties by farmers;
- increased production per unit of land;
- effective use of appropriate technology;
- adequate utilization of water;
- increased economic and social benefits;
- community involvement in planning and implementation;
- adoption of innovations at community level;
- Government support and commitment;
- establishment of enabling institutional framework at the local level;
- adoption of appropriate public policy; and
- influence over positive changes.