

A Results Oriented Framework to Achieve Good Nutrition

Getting Results from Investments in Food Security

There are many reasons why the diets of more than 200 million Africans do not provide the nutrition they need to keep them strong, healthy and productive. The consequences are devastating and the causes complex. Food security, reliable access to sufficient quality and quantity of food, is a necessary building block of good nutrition. Increasing production, widening distribution and offering access to sufficient quantity of food does not guarantee food security and improved nutrition. For a number of reasons people are often malnourished despite access to adequate quantities of food. Getting results from investing in nutrition, assuring hunger no longer poses an impediment to survival, growth and achievement of full human potential involves addressing the many faces of hunger.

Hunger can be acute, chronic or hidden. Roughly 30 million Africans are acutely malnourished.¹ These victims of poverty, emergencies and natural disasters are a desperately vulnerable population at high risk of disease and death. But they represent only a small proportion of the hungry. Perhaps 170 million Africans, suffer chronic malnutrition, caused by constant and recurring food and nutrition insecurity. Although individually at less risk, the scale of devastation, the absolute number of deaths, disease and lost human and productive potential is far greater. It is estimated that while 10% of childhood deaths are attributable to acute malnutrition, chronic malnutrition is linked to more than half of all childhood deaths.² Similarly, hidden hunger, deficiencies in key vitamins and minerals, impact 2/3rd of Africans - most of whom consume sufficient calories and protein. Vitamin and mineral deficiencies result in a number of acute or clinical impacts - birth defects, blindness, child and maternal deaths. However, these represent the tip of an ice-berg. The sub-clinical manifestations such as stunted growth, reduced physical and cognitive development, lower school and work performance represent the bulk of the devastating consequences. While not ignoring the immediate needs of the acutely malnourished, the full returns on investments in nutrition cannot be achieved without addressing the national population-wide threats posed by chronic and hidden hunger. Investments in food and nutrition security must address the moral imperatives as well as achieve concrete returns.

Food Quantity is not Enough

Most African's rely on a monotonous daily diet of inexpensive cereals or tubers. While these starchy foods may satisfy hunger cravings, they provide only a limited range of nutrients and cannot meet a person's full nutritional requirements. Cereals and plants do not contain sufficient levels or ranges of amino acids to build all the proteins necessary for body functions and growth.³ Staple cereals and tubers offer limited levels of key vitamins and minerals.⁴ Maize, wheat and other flours lose most vitamins and minerals during the milling process.⁵ Therefore, diversifying diets to include animal products or more fruits and vegetables is key to meeting basic nutrition requirements. However, most Africans have limited opportunities to diversify their staple-based meals. Animal products are often not affordable. Fruits, vegetables and legumes are underutilized due to low availability or lack of awareness. Data compiled for 6 African countries indicates that more than 50% of urban residents and up to 80% of rural families consumed no fruits, vegetables, fats and oils, or animal products on the previous day. Addressing dietary deficits include:

¹ 15% of 200 Million??? Worldwide 10%>???

² Pelletier

³ For example, maize is deficient in a number of essential amino acids including lysine.

⁴ While, whole grains may contain minerals such as iron and zinc, high levels of phytic acid limits their utilization by the body.

⁵ As a result of milling, riboflavin content in white flour drops from 22 ppm to 4 ppm or iron drops from 44 ppm to 11 ppm.

- Encouraging a wider range of crops, utilizing mixed cropping, reintroducing traditional indigenous foods, and diversifying into small livestock, poultry and fish farming.
- IEC can expand utilization of affordable, locally available and nutritious foods.⁶
- With seasonality a major barrier to regular consumption, drying can extend and diversify the daily supply fruits and vegetables. Home processing such as germination of grains and legumes can increase available iron and folic acid many fold.
- Consumption of commercially produced staple foods, often stripped of key nutrients during processing can be enhanced by fortification.⁷

Providing for Windows of Vulnerability.

Nutrient requirements vary through the life-cycle and include specific windows of acute vulnerability when common foods lack the nutrient density required to achieve proper nutrition. During pregnancy, iron requirements more than triple. Without consuming large quantities of animal products or pharmaceutical supplementation it will be nearly impossible to meet these high needs.⁸ Growth and development of young children demands high levels of nutrients - and small stomachs limit food intake. A young child would have to eat more than 700g of fresh spinach to meet daily vitamin A needs or 75 grams of liver for iron sufficiency. Illness depletes stored nutrients, interferes with utilization of nutrients in food, and often suppress appetite raising nutrient requirements from the diet. For example, people living with HIV require up to 30% more calories and higher levels of many vitamins and minerals. Lack of food, physical hardship and emotional stress suffered by people in emergencies result in severe malnutrition which cannot be addressed through normal foods. Addressing these windows of high nutrient need involves a range of strategies to increase nutrient density of foods.

- Education among caretakers to enhance awareness of special needs, introduce feeding options and support the necessary behavior change.
- Fortified foods can increase the micronutrient density of traditional preparations for the family pot, young children or therapeutic feeding.
- Developing production and demand for nutrient dense “blended foods” such as *Unilito*, *Famix*, or *Likhuni Pali* to provide high levels of nutrients via small portions.
- Assuring utilization of health care, including pharmaceutical supplementation, particularly for pregnant women, young children under five, and people living with HIV.

Food Security is Necessary but Not Sufficient:

NEPAD’s Comprehensive African Agricultural Development Programme proposes a range of initiatives to increase production, quality processing, wider distribution and affordable pricing. However, these investments in food security are necessary but not sufficient for achieving improved nutrition. Even when food secure, many Africans still suffer malnutrition due to infection, contaminated water, uninformed caring and other detrimental personal preferences.

⁶ Beans or chickpeas are rich in essential amino acids and a valuable supplement to maize or wheat flour-based diets. Green leafy vegetables are inexpensive sources of iron and vitamin A.

⁷ While a 100 gram portion of white maize meal (*dona*) provides 2.5 mg iron, a fortified portion provides 6-9 mg or up to two thirds of the Estimated Average Requirement for a woman of reproductive age. While containing no natural vitamin A, fortified sugar, oil or wheat flour can provide 25% or more of daily requirements.

⁸ Estimated Average Requirements for an adult women rise from 13.4 mg/day iron to more than 40 mg/day during the second trimester of pregnancy and higher during the critical final months of pregnancy.

Achieving nutrition security means investing in access to adequate health services, provision of a sanitary environment, and enabling individuals to apply positive caring and food practices. To assure nutrition is not an impediment to survival, growth and achievement of full human potential, both food and nutrition security are essential. While realizing food security involves increasing supply and access as well as improving nutrient quality and increasing dietary diversity, achieving nutrition security means investing in health, environment, education and empowerment. Food security and nutrition security are both key to enjoying the full range of benefits and securing the full returns of investments in nutrition.

Multisectoral Interventions to Address Multifactoral Causes of Malnutrition:

Multifactorial causation is best addressed by interventions that reach across multiple channels, integrating contributions of the public and private sectors, providing a strategic mix of food, health care, education and other “enablers” of good nutrition to reach a range of populations with distinct needs throughout their life-cycle. Vertical nutrition programs may not be appropriate, efficient or effective to address the complex roots of food and nutrition insecurity. Therefore a *Nutrition Lens* is recommended as an investment planning tool to:

- Apply an nutrition perspectives and expertise to review potential nutrition impact of proposed investments;
- Define optimal nutritional inputs from each sector;
- Identify opportunities to integrate nutrition initiatives across multiple sectors;
- Capitalizes on program synergies to deliver products and services in a cost efficient manner and avoids wasteful duplication;
- Provide a multisectoral implementation framework to manage programs and monitor results;
- Create a cycle of reinforcing benefits that can achieve results by addressing a multi dimensional problem with multi dimensional solutions.

As part of the NEPAD investment planning process, a *Nutrition Lens* can enhance the impact of development initiatives within the current policy framework as defined by international agreements and subsequent national plans of action.

Implementing a *Nutrition Lens* requires commitment, leadership and partnership across a range of national institutions and stakeholders in order to advocate for a comprehensive multisectoral investment in nutrition as well as to establish the implementation frameworks and accountability mechanisms. In the end rising to the challenge of malnutrition in Africa means communicating across traditional sectoral interests and widening narrow sectoral perspectives to forge a common national agenda focused on achieving the human, social and economic benefits of improved nutrition.

National and regional level investment reviews using the *Nutrition Lens* process are a practical results-oriented approach to leverage available resources to improve nutrition. Applying a *Nutrition Lens* to the current portfolio of CAADP investment proposals highlights a number of opportunities to leverage improved nutrition from investments in agriculture, health, education, communication and social welfare investments including:

- Building capacity to provide high quality, nutritious and fortified foods to the Home Grown School Feeding Program.
- Integrating fortification with vitamins, minerals and other nutrients into investments to expand food processing including salt, maize meal, wheat and cassava flours, vegetable oil and other foods.

- Ensuring new crops include a range of nutrient rich foods like RPO and Swet potaote
Focusing on nutrient rich foods in range of Including nutrient rich foods Nutrient Dens
- Nutrient Dense
- Delivering nutrients
-
- Building capacity to process nutrient dens, fortified and blended foods to address specials
needs of vulnerable populations.

The following pages provide short concept papers on these proposed initiatives as well as propose pathways to build capacity to apply the Nutrition Lens in the NEPAD investment planning process.

Pan African Food Fortification Initiative: Building of Investments in Agro-Industry to Add Value & Improve Nutrition

Background:

Two-thirds of Africans - most of them consuming sufficient quantity of calories, protein and other macronutrients - lack minute quantities of critical vitamins and minerals. Their diets may not include a healthy range of foods. Or processing has stripped their foods of essential vitamins and minerals. Or infection, disease or other factors may have raised their nutrient requirements. As a consequence of vitamin and mineral deficiencies (VMD), an estimated 1 million Africans suffer preventable deaths every year. Impacts on adult strength and stamina as well as on child growth and development depress current and future productivity by an estimated \$2.5-3 billion annually. Reducing the prevalence VMD offers an opportunity to improve birth outcomes, lower mortality and morbidity, reduce utilization of health services, improve work performance of adults, and improve school performance and future productivity of children. This continuing population wide threat requires sustained national scale intervention.

Strategic Approaches

Food fortification has reduced nationwide prevalence of VMD by more than 50% in both developed and developing countries. As large and medium scale African food industries expand to serve growing urban populations and increasingly penetrate rural markets, food fortification becomes a feasible strategy to deliver significant levels of vitamins and minerals to wide populations. The urban population of Sub Saharan Africa is projected to add 165 million new consumers, usually relying on store-bought processed foods that are stripped of vitamins and minerals. Fortification of staple foods with iron, vitamin A and other key vitamins and minerals is projected to provide African consumers with 1/3rd or more of their daily needs for essential vitamins and minerals. A comprehensive food fortification can reach more than 50% of the continent's population, promising significant reductions in VMD at a 1-3% incremental food cost.

Situation Overview: Fortification in Africa

Food fortification is not new to Africa. Most countries have promulgated regulations for salt iodization and about 2/3rds of all salt for human consumption in Sub Saharan Africa is currently iodized. Recently, Zambia, South Africa, Morocco and Nigeria initiated staple food fortification programs. In these countries, about \$1 million donor grants in capacity building and start-up helped established sustainable programs and leveraged an estimated \$25-50 million in market based financing. Advocacy and resource mobilization is ongoing in more than a dozen additional countries in the region. There is an opportunity to build on the lessons learned, ensure sustainability of ongoing programs, and extend the benefits of food fortification across Africa.

The Way Forward

Modest investment in capacity building for government regulatory institutions, technical assistance and targeted incentives for industry, and public education programs to ensure consumer awareness will enable domestic markets to sustainably absorb the 1-3% incremental cost of fortification. An estimated \$80 million can facilitate a comprehensive program to program to fortify a number of food vehicles produced at large and medium scale facilities throughout Africa. Specific investment opportunities include:

✓ Fortification of Maize Meal with Multiple Vitamins and Minerals

Estimates for supply from large and medium milling enterprises in 23 countries with high maize meal consumption, suggest more than 100 million consumers will benefit from an added 30-40% of daily requirements for key vitamins and minerals. Incremental public and private sector costs

for fortification with eight key vitamins and minerals including vitamin A is approximately \$3.50 per metric ton maize meal – about \$0.17 per person per year. Donor start-up to support maize meal fortification in 23 countries of Southern and Eastern Africa is estimated at \$20 million.

✓ **Fortification at Large-scale Wheat Flour Milling industries:**

In North Africa wheat consumption of more than 130 kg/yr is sufficient to deliver high levels of vitamins and minerals throughout the population. In Sub Saharan Africa, where consumption is relatively narrow but has grown more than 40% in past 10 years, fortified flour products could still deliver significant levels to consumers. In most of African countries, the wheat milling is in large scale facilities where fortification is feasible and cost-efficient. Donor support to achieve virtual universal flour fortification by 2015 is estimated at \$10 million over 5 years.

✓ **Fortification of Large Scale Vegetable Oil:**

Fortification of vegetable oil with vitamin A is one of the most effective and inexpensive approaches to supplementing diets with this critical vitamin. In many African countries oil processing is centralized and produced by only a few companies, enabling easy and inexpensive fortification. Incremental costs are estimated at \$3.80/MT – about 5 cents per average consumer per year. A number of countries are initiating national oil fortification programs and actively seeking donor support. Donor start-up to oil fortification is estimated at \$20 million.

✓ **Fortification of Salt with Iodine:**

After more than a decade of public-private collaboration about 66% of the salt consumed in Africa is adequately iodized. However, those with limited access to iodized salt are disproportionately rural, poor and at risk of IDD. Donor investment of \$31 million for capacity building, IEC and targeted distribution to at-risk populations is projected to build systems that can sustainably extend virtual universal protection. Double fortification with iodine and iron has been tested in several countries and may offer opportunities to reduce anemia as well.

✓ **Fortification of Cassava Flour with Multiple Vitamins and Minerals**

Growing consumption of cassava-based foods, particularly among the urban poor, is expected to increase the market for cassava flour processed at large-scale facilities. However, the poor nutritional profile of cassava indicates need to fortify whenever possible. Cassava fortification with multiple vitamins and minerals is implemented in Indonesia and pilot trials in Nigeria indicate feasibility and consumer acceptance. Product development to develop large scale fortification in Africa is projected at \$750,000.

✓ **Fortification of Sugar with Vitamin A**

Zambia and Nigeria have implemented sugar fortification with vitamin A. An analysis for 12 countries of Southern Africa indicates that sugar could deliver an average 40% of daily needs for vitamin A at incremental costs estimated at \$13 per MT –about 30 cents per person per year. Prior to expansion, product development is needed to match fortification process to the various sugar crystal sizes on the African market. Since sugar is a widely traded commodity, there is also a need to clarify policy and trade issues. Product and policy development is projected at \$500,000.

New Rice for Africa

As CAADP's New Rice for Africa (Nerica) Initiative enhances access to high-yielding seeds, and as rice gains larger shares of the consumer market, increased investment is anticipated in large-scale rice milling and processing facilities. This offers an opportunity to enhance the nutritional impact of Nerica through fortification with iron, vitamin A and other vitamins - including thiamin to counter beriberi, a common condition among rice eating populations. Rice fortification is relatively new and includes several developing technologies including micronutrient coating and

micronutrient infusion by either hot or cold extrusion. Marketing trials and business models are currently being developed in South America and Asia. Initial developing and adapting rice fortification technology and business options for Africa is projected at \$500,000.

✓ **Regional Capacity Building & Trade Development:**

Regional investments in harmonization of standards, regulatory institutions and other trade facilitation activities can build an enabling business environment for sustainable food fortification. In several regions of Africa, WHO and USAID are building regional collaborations of national food and health agencies, research institutions and the private sector to promote a regional cooperation, build regional support institutions, and provide assistance to national programs. Financing for one 3-year regional program has been estimated at \$5 million.

Fortified Foods for the *Home-Grown School Feeding Program* Preserving Best Practices & Building Local Capacity:

Background

Adolescence is a time of learning, growth spurts, and particularly for girls, increased nutrition needs. But at this critical time, school children face a number of nutrition challenges. For example, surveys conducted in several African countries indicate prevalence of iron deficiency anemia more than 40%.⁹ These nutritional deficiencies impair physical activity, mental acuity, learning ability and school performance. Providing better nutrition is one of the soundest investments in education. School feeding programs throughout Africa have demonstrated benefits in school attendance, student achievement, drop-out reduction and gender equity.

Situation Overview: Home-Grown - A New Paradigm for Improving School Nutrition

In addition to providing either in school or take-home meals, school feeding programs protect food and nutrition security in several ways. First, school programs offer channels to range of services such as de-worming, micronutrient supplementation, HIV/AIDS and malaria awareness and prevention; and health, nutrition, and hygiene education. Second, students provide channels to the most vulnerable families carrying messages on improved care and feeding practices for 6-24 month old siblings, pregnant mothers and other high-risk groups who can be served with special foods, health interventions or education. Finally, NEPAD's newly proposed *Home-Grown School Feeding Program*, introduces a pathway to stimulate local agriculture and economic development. By mandating local sourcing of food products, home-grown programs provide a reliable market that helps small farmers and local enterprises increase and diversify their production. In conjunction with WFP the governments of Uganda, Ethiopia, Ghana, Nigeria and nine Sahelian countries are currently developing Home-Grown School Feeding.

Strategic Approaches:

Providing a market for local farmers or food processors has not been one of the main goals of school feeding programs. In fact, the bulk of food has been agricultural surplus from donor countries. This transition must ensure that quality, safety and nutrition of the home-grown supply is equivalent to previous donor supplied programs. Local processing and preparation needs to achieve good phyto-sanitary standards lest food borne illnesses cancel any benefits from the added food. And home-grown products need to offer a comparable nutritional profile. While much of the processed food supplied by donors included added vitamins and minerals, local producers may not have capacity to fortify. It is critical that local tenders for home-grown products specify standards and build capacity for safety and nutritional quality. A home-grown program expands from simply the logistics of supplying food to include technology transfer, training, financing and other activities enabling local farmers and processors to capably supply safe and fortified foods.

In any program reform or improvement it is important to recognize the best practices of the original and new home-grown programs should ensure fortification continues to be an integral part of school feeding. The appropriate strategy to add vitamins and minerals to school meals will vary along with the source of supply. Therefore, a flexible strategy should consider a combination of fortification options based on types of foods produced by local farmers, processing by local enterprises and preparation in local kitchens. Some options which can be considered individually or in combination include:

⁹ Partnership for Child Development, 2001

- ✓ Local tenders should make every effort to provide meals with a diverse range of nutritious foods. This provides an opportunity to encourage local farmers to adopt newly developed nutrient-rich foods or to expand production of traditional nutrient-rich crops. Programs should capitalize on opportunities introduced by CAADP's investments in local agriculture and closely collaborate with local agricultural extension services.
- ✓ Home-grown programs should specify that locally milled products such as maize, wheat, millet, cassava or sorghum be fortified. This will require technical assistance including transferring technology, training in quality control and access to the new supply chains. In addition to supplying school programs, this option develops capacity of rural enterprises to offer value-added nutritious local products through other public channels as well as provides a stimulus to supply fortified products to local markets.
- ✓ When local foods are not appropriate for fortification, or in the short term as capacity of local processors is developed, school meals can be safely, simply and effectively fortified at the point of preparation by adding a vitamin and mineral powdered mix at the end of cooking. This capacity can be easily integrated into investments in equipping local kitchens and training local personnel.
- ✓ Not all products, such as salt or vegetable oil, can be locally produced and will be purchased from provincial or national level firms. If tenders specify fortification, in most cases, these larger enterprises will have both the capacity and the incentive to fill these orders with a minimum of technical assistance.

Incremental Costs of Fortifying School Meals

The fortification strategy will determine the incremental cost as well as the degree of “spin-off benefits” to the local economy. WHAT DOES DIVERSIFYING CROPS COST?? Purchase from an outside supplier or adding micronutrient at the point of preparation are the least expensive, ranging from an incremental \$3-6 per MT of food, but provides less capacity building to local agriculture and processing and fewer links to a wider local market. Building capacity of small scale enterprises to fortify provides the most synergy with over-all CAADP investments in local agricultural and economic development but may add possibly \$10 per MT. WFP estimates costs at \$34 annually per child. Depending on the technology, adding significant levels of vitamins and minerals to 180 meals throughout the school year will add 10 to 54 US cents per child per year, 0.5-1.5% increment to the cost of program

The Way Forward:

Countries developing proposals for *Home Grown School Feeding Programs* should integrate plans for meal specifications and tenders with over-all CAADP investments in agriculture and food processing. National investment planners should include feasibility analysis, capacity building and resources for local production and processing of nutrient rich foods including fortification of locally produced foods. In addition, a minimum nutrition security package including, deworming, micronutrient supplementation and education including nutrition, health and HIV/AIDs and malaria prevention is a key component of achieving improved nutrition.

Reaching Rural & Vulnerable Populations with the Benefits of Fortified Foods

Background:

Fortification of common foods at large scale commercial industries has proven to be the most sustainable and cost effective approach to reducing and even eliminating vitamin and mineral deficiencies. While consumption from large food processors continues to grow throughout Africa, for the foreseeable future, widespread consumption of milled staple cereals and tubers from small-scale mills and processors will continue as the dominant mode of supply for high-risk rural consumers. At least for the near term, these critically vulnerable populations are beyond the reach of classic food fortification strategies. The past decade has seen the development of several fortification approaches that promise to cost-effectively reach Africans beyond the reach of large scale processors and commercial markets with the benefits of fortification.

Strategic Approach: Fortification Point of Preparation

Fortification can be implemented at the point of food preparation of porridges, gruels and other “wet rations” by mixing in a pre-measured tasteless nutrient powder that can contain vitamins, minerals, proteins and other macronutrients. These nutrient powders offer the opportunity to target the most vulnerable groups including children 6-24 months, pregnant and lactating women, HIV positive and people living in emergencies. They are lightweight for easy transportation, distribution and storage and thus offer a cost-effective approach to deliver micronutrients to vulnerable populations.

▪ **In-Home Fortification:**

Individual sachets of nutrients, sometimes called “sprinkles,” have been shown “cure-rates” of 55-90% for anemia when added to complementary foods. In Ghana, in home fortification trials cut anemia in children cut by nearly 60%, proved as effective as pharmaceutical supplementation with iron syrup - the gold standard for anemia treatment in children - while it both was easier to use and better accepted. The single dose sachets are convenient and easy to use and do not require special measuring or literacy of the beneficiaries. At a cost of \$0.015-0.025 per serving this approach is less expensive and more sustainable than most supplementation strategies. While the commercial viability of this approach is being tested by private companies worldwide, the World Food Program endorsed as a cost-effective approach and is currently being used in Darfur.

▪ **Institutional Fortification**

Institutional settings such as schools, feeding centers, hospitals, day care centers and other venues where food is prepared and distributed offer the opportunity to add nutrients for 25-100 clients at once. The powder is stored in 1-2 kg sealed cans and added by the kitchen worker via a pre-measured scoop. In India’s Integrated Child Development Scheme in West Bengal, kitchen workers used scoops of 1.25 grams per each 5 beneficiaries to deliver 1/3rd of daily requirements for iron, folic acid, vitamin A and vitamin C to 7.2 million beneficiaries received at a cost of less than one US cent per 180 day school year.

Strategic Approach: Fortification at the Small Scale Village Mill Level

In Southern Africa, fortification of maize meal at this small scale community level is projected to deliver more than 2/3rd of average daily requirements for vitamins and minerals at incremental costs estimated at roughly \$1 per person per year. While pilot trials in several countries have shown technical feasibility, consumer acceptability and some indications of commercial potential, sustainable business models have not been developed for small-scale community level fortification. Small-scale fortification offers a decentralised model for rural development focusing

value added processing by small independent rural businesses, essentially developing tens of thousands of small rural business across Africa. To date, work has focused on maize meal fortification. However, lessons learned from maize meal fortification can be applied to sorghum, millet, cassava and other staples produced on a small scale.

The Way Forward:

Two Pronged Approach: Integrate POP and SSF into relief and Safety net programs.

Fortification at the point of food preparation can be extended to numerous emergency, relief and social welfare safety-net programs as this strategy that can contribute largely to improving the nutritional quality of food aid and rations. These should be considered as an option in rural community programs such as Home-Grown School Feeding Program and should be utilized in emergency preparedness. WFP along with governments from 9 Sahelian countries have proposed a School Feeding program reaching 5.7 million children at a total investment of \$816.5 million COST??

Build on the infrastructure to develop and test sustainable commercial approaches to SSF and POP.

Diversifying Production, Distribution and Marketing of Locally Grown Nutrient Rich Foods

Background:

Most Africans rely on a nutritionally inadequate diet of staple cereals and roots. Expanded utilization of some new and traditional and new agricultural products can affordably diversify diets and improve nutrition as they create income generating opportunities, particularly for low income rural women. Vitamin A rich red palm oil is traditional crop and currently underutilized product, especially in West Africa. Newly developed crops include protein-rich rice and beta-carotene-rich sweet potato. Trials have confirmed the feasibility of growing, producing and marketing these products to a wide range of vulnerable groups. Capitalizing on these opportunities to address a range of nutritional deficiencies involves defining sustainable strategies for to expand utilization of these crops among farmers, mobilizing resources to expand processing and distribution on a market scale and encouraging consumers to prefer these nutritional products.

Red Palm Oil

One teaspoon of Red Palm Oil (RPO) meets full daily vitamin A requirements for children. Traditionally produced in several parts of Africa where most people prefer non-refined palm oil because of its flavor, RPO consumption has been successfully expanded to new consumers across 5 provinces in Burkina Faso. Production and marketing is through rural women's co-ops who collaborate with health authorities for public education and school systems to providing channels to at-risk children. Preliminary findings indicate the introduction of RPO in school canteens may yield spectacular results, reducing low retinol from 50% to 5% after less than a school-year of twice weekly RPO-fortified meals. Based on successful pilots, the government of Burkina Faso has integrated RPO into the national micronutrient strategy and is proposing expansion of existing production, processing and marketing into areas where RPO is not a traditional product. In Nigeria, the Ministries of Health and Agriculture are proposing to improve and expand RPO production and marketing on a national scale, including it as a component of the National Accelerated Industrial Cash Crop Program. Expanding production, marketing and consumption of RPO throughout West Africa where consumption is traditionally is considered very feasible and as business models are proven, expanding into new markets can be considered.

Beta-Carotene Rich Sweet Potato

Sweet potato are an easy to grow and energy-rich crop grown throughout Southern Africa, often by women, and consumed at an average of nearly 20 kg per person per year. Orange-fleshed sweet potatoes are rich in beta-carotene, a nutrient that the body uses to produce vitamin A. However, in much of Sub-Saharan Africa, however, the most common type of sweet potato is the white-fleshed type, which contains little or no beta-carotene. A newly developed beta-carotene rich sweet potato (BCRSP)¹⁰ has been introduced in Central Africa Republic, Ethiopia, Ghana, Rwanda, Kenya, Madagascar, Mozambique, South Africa, Tanzania, Uganda and Zambia. It has improved household food security and protected nutritional status of children. Just 100 grams delivers 25-33% of daily vitamin A requirements for preschool children and field tests have confirmed that roughly half a cup of BCRSP can eliminate or significantly reduce vitamin A deficiency (as opposed to more than 700 grams of spinach). A recent study indicated that replacing traditional sweet potato varieties with BCRSP will benefit an estimated 50 million at-risk African children under age 5 years of age. BRSCP has been adopted by farmers and accepted by consumers in 10 countries where pilot activities building community based capacity for seed

¹⁰ Beta-carotene rich cassava varieties are also under development

distribution, planting, processing and distribution are ongoing and working to build sustainable business models.

The Way Forward: Developing Investment Opportunities and Business Incentives

RPO and BCRSP are examples of underutilized opportunities to diversify diets and develop more nutritious agricultural products for Africa. These successful pilot projects should be carefully considered for commercial feasibility and expanded to the widest possible scale. Bringing these products to scale involves strengthening capacity of the rural based micro-enterprises and cooperatives implementing production and distribution; conducting supporting social marketing targeting agriculture, public health and medical institutions; and, as products become available on the market, conducting public education and marketing campaigns. As they are integrated into national nutrition plans, lessons learned should be adapted to design business and financing models. In countries where current consumption of traditional varieties is high, national investment plans for agro-industry should consider including further development of RPO and BCRSP in proposals to improve rural agriculture, processing and market infrastructure. Donors should consider current proposals from several countries and encourage development of additional proposals to build business models for the sustainable expansion of ongoing RPO and BCRSP programs

Addressing Populations with Special Needs

Building African Capacity for Nutrient Dense and Blended Foods

Background:

Nutrient dense foods offering high protein and range of vitamins and minerals are recommended by the World Health Organization for a number of at-risk populations including children 6-36 months, people living with HIV/AIDs, pregnant women and populations in emergencies. For a number of reasons, these critically vulnerable groups cannot get the nutrition they need from common everyday foods. Specially formulated nutritionally dense foods offering high nutrition profile (as opposed to bulk) are vital to addressing the needs of these especially vulnerable groups. Providing food and nutrition security for these groups is a key short term goal without which the achievement of long term goals for economic and social development in Africa are not possible.

Situation Analysis: Current Supply of Nutrient Dense Foods in Africa

Over the past decade, technical assistance provided by donors and NGOs have built capacity of range of rural enterprises and cooperatives to produce nutrient dense foods by simple mixing of common agricultural products. For example, women's coops in Namibia and Kenya mix milled millet, maize, cowpeas and pumpkin leaves to produce a low-cost nutrient dense flour. The product is marketed to local NGOs who distribute the product to high risk groups as well as to the general community and members of the cooperative. FAO and other international NGOs continue to work with rural cooperatives to build capacity and develop sustainable business models for what is often referred to as *Nutribusiness*.

The bulk of nutrient dense foods are referred to as "blended foods," cereal based processed foods formulated with added mix of vitamins, minerals, protein, calories and other key nutrients. In 2003, 413,000 metric tons of blended foods such as Corn Soy Blend (CSB) and Wheat Soy Blend (WSB) were shipped to Sub Saharan Africa mainly from donors in Europe and North America, still insufficient to meet the wide need of these vulnerable populations. While WFP is working to procure locally in from suppliers in South Africa, Malawi, Mali, Kenya, Ethiopia, Senegal, Madagascar, and Zambia, only an estimated 10% was produced in Africa.

Building African Capacity Production, Distribution and Marketing Capacity

Supplying special nutrition needs of core vulnerable groups should be founded on African agriculture and production capacity. Building this capacity can simultaneously meet the overwhelming need of at-risk populations, reduce dependency on foreign sources of supply, and capture the direct and "spin-off" economic and social benefits of local production. While efficiencies of scale and capacity building expenses means local production may initially be more expensive, since nearly half the expenditure for donor supplied CSB or WSB is in cost of transport, domestic production should eventually offer substantial savings.

Linking Production Capacity to Public Markets

Investments in production capacity should be closely linked purchases for food security programs, in order to open reliable markets for enterprises producing special nutritional foods. This includes relief and emergency operations, public safety nets and distribution programs, health systems serving the acutely malnourished, programs working HIV positive groups and maternal and child health programs. Support of public programs is critical to short and medium term viability of these new enterprises. In the longer term, these public programs can lay the foundation for developing private commercial markets. Models for low-cost blended food

products already been introduced in the private market include *Famix* in Ethiopia and *Likhuni Phala* in Malawi.

Models for Developing Nutrient Dense and Blended Foods

Investments in African food processing should include specific incentives for the production of nutrient dense and blended foods. Business models will depend on the scale of the processor.

- ✓ Since formulated fortified blended foods are usually produced in large wheat, maize or other large cereal milling facilities, investments in large scale grain processing should include components focusing on special foods for vulnerable groups. Major food processors in many African countries are capable of adapting production processes and responding to market incentives, such as purchases for public distribution programs, without significant assistance.
- ✓ With some investment and technical assistance, medium scale enterprises located in district level commercial centers can respond to government or NGO tenders for blend foods. WFP is working with a number of medium scale facilities in several countries to build capacity to meet WFP supply standards. Once capacity to supply WFP and other public markets is in place, these enterprises may be encouraged to develop sustainable commercial products.
- ✓ Developing small scale local capacity can focus both either the micro-enterprise or rural co-operative model. In either case, this will require significant capacity building and higher start-up costs. Experiences in Africa and other parts of the world indicate an investment of \$100-150,000 over 2-3 years to develop profitable and sustainable blended foods suppliers. In some cases, capacity of existing enterprises involved in lower technology mixing of local foods may be upgraded to produce more highly formulated and fortified blended foods. Small scale production and distribution offers several advantages including: proximity to the consumer, lower distribution costs, and the range of benefits emerging from local participation or community ownership.

The Way Forward

In national investment plans for food processing, countries should consider the scope of national needs for special nutrition dense foods as well as the capacity to supply critically vulnerable populations. This includes: a.) identify volume of blended foods needed by high risk groups; b.) review current consumption, sources of supply and potential domestic production capacity. c.) define optimal mix of investment in large, medium and small-scale enterprises; d.) develop plan to build domestic production, distribution and/or marketing capacity. Donors should provide technical assistance and shoulder developmental costs. In addition, donors countries supply blended foods may review procurement policies for to ensure optimal support and synergy with the development of local production and marketing

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