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Nutrition and National Development

Fitzroy Henry^a

ood nutrition of population is central to national development not only as a social good but also from an economic standpoint. The costs of undernutrition and obesity are vast even though costeffective interventions available to improve nutrition and health of the Caribbean people. Coordinated sectoral actions are required to best address the nutrition-related problems. This issue of Cajanus calls attention to two important agriculture sectors education and concludes with a presentation of the priorities and strategic approaches required to improve nutrition, health and national development.

The paper on agriculture proposes several lines of action for bridging the gap between nutrition and agriculture that has historically characterized Caribbean agriculture:

 Policy – establishing nutrition goals as a key determinant for food and agriculture policy decisions.

- Technical identifying the nutritious foods that will be given priority support in agricultural production, marketing and promotion.
- Technological ensuring appropriate technological innovations are applied to enhance and preserve the nutritional quality of priority foods.
- Education emphasizing education and integrated training among professionals in the various sectors related to the three points above.

The paper on education presents key policy measures required for an effective nutrition programme in schools. The components are:

- The diet and physical education curriculum;
- The promotional activities;
- The supportive school environment and;
- The supportive actions from the home and community.

^aDr. Fitzroy Henry is the Director, CFNI.

EDITORIAL

Equally important, the paper outlines a step-by-step approach on how to implement such a school policy.

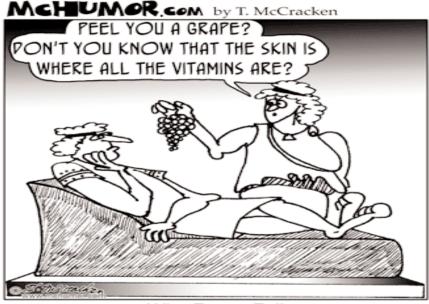
The final paper emphasizes why nutrition is essential to Caribbean development and importantly examines the main reasons why nutrition is neglected. It points to what must be done and outlines the strategic approaches to address the three main nutrition challenges in the region:

- Food Security and Safety;
- Nutritional Deficiency Conditions; and

Obesity and its Co-morbidities.

Six specific lines of action are presented with their rationale and strategies to be accomplished in the period 2010-2015.

These papers show that nutrition interventions go beyond the attainment of good health. With the appropriate investments in nutrition the related targets of the millennium development goals will not only be met but the economic spinoffs to agriculture and education sectors, among others, will be huge.



Why Rome Fell.



The Potential of Food and Agriculture Research to Impact on Nutrition and Development in the Caribbean

Fitzroy Henry^a

INTRODUCTION

Agriculture is fundamental to achieving nutrition goals through the production of food energy and other nutrients essential for human health and well-being. History has shown, particularly through the Green Revolution, how gains in food production have played a key role in reducing hunger and malnutrition. But these advances have not succeeded in freeing the world of hunger nor have they prevented the emergence of other food-related diseases.

The purpose of this paper is to advocate and advance an interest in agricultural research that is in tandem with the imperatives for improving nutritional status in the Caribbean. In particular, this paper proposes several lines of action for bridging the gap between nutrition and agriculture that has historically characterized Caribbean agriculture. Additionally, an expected outcome of this paper is to successfully promote effective dialogues and

collaborations between agricultural researchers and technical persons in nutrition, thus making nutritional well-being an attainable and mutual goal.

POLICY FRAMEWORK FOR AGRICULTURE AND NUTRITION

Since the mid-20th century, agricultural policy has dominated by a paradigm centered on the supply-side to maximize production with active involvement of nation states through subsidies and state sponsored market and research institutions. With increasing involvement of international financial institutions such as the International Monetary Fund in the economic affairs of countries in the mid-1970s, there has been an increasing tendency to rely on the market mechanism as a policy option. This is more recently evident in the frameworks created by institutions such as the General Agreement on Tariffs and Trade (GATT), cum World Trade

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Organization (WTO). Since GATT/ WTO, regional and bilateral trade agreements give little or consideration to food and nutrition but almost exclusively to establishing macroeconomic fundamentals as the main policy driver. Indeed, the "trickle down" dimension of this approach to development assumed that increased production and growth would lead reduction in malnutrition and better health. Even the negotiations agreements on agriculture policy give insufficient attention to nutrition and health. Writing about the USA recently, a leading scholar there poignantly noted "As a nation, we must understand that farm policy is public health policy" and further "We need to transition from a cheap calorie farm policy to one that nourishes our children's health. It's going to take steps across the health system and at every level of government to not only bend the curve on the obesity epidemic, but to reverse (Wallinga, 2009).

The spectre of agricultural growth in the absence of nutritional considerations continues to stare at the Caribbean people. The picture is frightening and costly because with the significant increase in food availability over the last few decades the people of this region have concomitantly experienced a massive increase in obesity and comorbidities, the consequences of

which overwhelm our health budgets and more importantly undermine our economic growth. The need to link agriculture and nutrition represents a disciplinary challenge of no small magnitude and therefore requires a multi-disciplinary approach to find a solution. So what can agriculture and nutrition contribute collectively towards this solution? And how can these fields intersect with others to benefit the Caribbean society?

These questions beg for a conceptualization of agriculture policy that combines food access and availability with nutritional and health considerations, and for forging links among agriculture, health and nutrition, trade and other sectors. These multi-sectoral interactions remain to be fully appreciated and exploited regional policy makers. This is an urgent task in light of globalization process expected to take deeper root after the current economic downturn is reversed.

INTEGRATING AGRICULTURE AND NUTRITION

Bridging the gap between nutrition needs and agriculture policy will be approached in this paper through the following four lines of action:

 Policy issues - Establishing nutrition goals as a key

determinant for food and agriculture policy decisions.

- Technical issues Identifying the nutritious foods that will be given priority support in agriculture production, marketing and promotion.
- Technological issues Ensuring appropriate technological innovations are applied to enhance and preserve the nutritional quality of priority foods.
- Education/Training issues Emphasizing education and integrated training among professionals in the various sectors related to the above.

Within each of these lines of action several research issues arise. Advancing a culture of research on these areas will help address the third binding constraint of the Jagdeo Initiative "Inadequate Research and Development".

Policy Issues

Policy makers on agriculture in the Caribbean continue to focus primarily on increasing production and productivity. This is understandable. The Jagdeo Initiative is a framework for enabling regional competitiveness in agriculture towards attaining sustainable economic, social and environmental development. This Initiative lists 10 binding constraints to the development of agriculture in this region. The litany of other

constraints to production and distribution that farmers face in the region at times appears to be insurmountable. Additionally, the uncertainty of food commodities from foreign sources and the massive food price inflation culminating in 2008 has strengthened the call for reducing food import dependency, reducing the food deficit, increasing food production and improving competitiveness and quality of produce.

While it is understandable that we steadfastly attempt to address the supply side (production and productivity) of the agriculture policy, new concerns in the region have emerged that make it imperative for our policy makers to reassess the role of agriculture and its relationship with other sectors in the economy. Nutrition-related non-communicable diseases such as diabetes, heart disease, hypertension and cancer have emerged as the major causes of death in the region. These diseases emerge largely from the consumption of nutritionally unbalanced diets.

This nutritional transition is characterized by a shift away from diets based on locally grown indigenous staples (grains, starchy roots), locally grown fruits, vegetables, legumes, and limited foods from animal origin, to diets that are more varied and energy-dense, consisting of foods that are more processed (including

processed beverages), more of animal origin, more added sugars and fats, and often more alcohol. These nutritional and epidemiological transitions provide strong arguments for an indispensible link between agriculture and nutrition.

Much more emphasis now needs to be placed on the demand side to improve access to, and distribution of, adequate healthful food through efficient marketing channels and through availability of income. The current disproportionate focus by regional policy makers on the supply side of the food security equation must be corrected not only in light of the prevalence and negative impact of nutrition-related chronic diseases but also in terms of quality of life and loss of labor productivity in the region.

The close interaction between agriculture policy (supply and demand) and nutritional status remains to be fully appreciated and exploited through research. The burgeoning nutrition-related health problems mentioned above compel urgency in analyzing our national domestic food production and import policies in relation to health. This research is particularly urgent for small island developing states in our region in light of the globalization process that transforming currently world economic relationships, which makes nations and regions an

integral part of a common unifying global system.

This research will allow CARICOM countries to establish key nutritional goals so that national agriculture and food systems can deliver adequate and nutritionally appropriate quantities of food, especially to low-income and vulnerable groups. Implicit in establishing these nutrition goals is the need to identify research priorities that will advance the process to meet the targets.

How these can national nutrition goals be established? Nutritionists recommend that 55-65 percent of dietary energy should come from complex carbohydrates (food from plant origin except sugar and oil), and sugar be limited to less that 10 percent of energy, protein about 10 percent and fat less than 25 percent (Sinha, 1995; Henry et al. 1997). At the aggregate level, food balance sheet data show that for the Caribbean region, energy from fats and sugars has exceeded recommended the population goals from as early as 1960sand has increased consistently up to the 1980s. The data also show that imports of both fats and sugar have been increasing vears. While contribution of fruits and vegetables has been increasing since the 1960s, consumption remains well below the recommended population goals. In contribution addition. the

These regional trend data demonstrate clearly a major element of food insecurity in the region, namely the failure of the food system to meet the nutritional and health requirements of the population. It is for this reason that national nutritional goals must be established so that the agricultural and food systems can serve the population, especially the poor and marginalized groups in countries. In this regard, Caribbean countries can learn from the experiences of the now developed countries such as USA where ironically food and nutrition programmes - which are an integral part of their agriculture policy - are needed to fix problems that other aspects of the US Agriculture policy have created (Mallinga et al. 2009).

Another area of research should focus on targeting. The achievement of food security is not an automatic process but depends on conscious, deliberate and focused national policies designed specifically to the task. The information needed to conduct this kind of intervention are not trivial and entail knowing who are food insecure, who are the most

vulnerable groups, where they are located, the nature and causes of the food insecurity problem.

At the household level, income inequality and poverty are major factors that impact negatively on food security. Although substantial advances have been made in economic and social development in the region over the years, poverty is still pervasive in several countries. This has been made worse in recent years following economic reforms and globalization.

Food balance sheets for the Caribbean from the Food and Agriculture Organization (FAO, 2002), indicate that food availability meets and even surpasses recommended levels. However, this is not a cause for complacency; instead it should point to research topics to be explored such as how household food insecurity can exist side by side with ample availability of food. Second, scholars who have compared actual household and individual food intake data with food balance sheet data, estimate that the latter over-estimate food availability by 20-27 percent over actual consumption levels (Popkin, Horton, and Kim 2001). Third, food balance sheet data do not measure food distribution across geographic regions, communities or even among members of the same households. Finally, trade liberalization and its attendant

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reduction of trade barriers, accent on competitiveness, removal of preferential quotas - all with possible negative impacts Caribbean agriculture poses major policy concern to throughout the region. As these and changes productivity, efficiency and prices will become increasingly important issues likely to impact on food security. So although national food insecurity has declined, the threat of its resurgence is still lurking in the background and may erupt as a serious problem under these fragile economic systems. In this sense the region is insecure for food, and other consumables as well.

Food economics is another critical area of research that can forge greater understanding and interventions in agriculture and nutrition. The global economic recession which started in 2008 has particular importance for small CARICOM states with particular regard to food and nutrition. As real incomes fall, and relatively cheaper imported foods that are high in fats and calories but low in complex carbohydrates become more available, traditional diets (high in complex carbohydrates) are likely to be supplanted by diets that are high in fats and sugars and red meats, predisposing consumers in the region to further increases in obesity and its related diseases. This hypothesis motivates the need for comprehensive studies on productivity and competitiveness ultimately the rational demands products consumer whose prices compare well with close substitutes, whether domestic or imported. In other words, people consume less-healthy foods because of cost and availability (i.e. they make economically rational, nutritionally detrimental decision to consume foods). Hence, poor diet is as much a food economics issue as it is a healtheducation one.

Since 1971, the Caribbean region has been a net food importer, and currently spends well over US\$4 billion annually on food imports to close the gap between consumption and domestic food production. This includes most of the energy and protein requirements. Some countries import over 70 percent of dietary energy and almost 60 percent of protein. Since the late 1980s, with the trends towards trade liberalization, the food import indices for most regional economies have increased significantly (FAO 2002). The pros and cons of the WTO agreements in relation to food have been published some time ago (FAO 2001). Caribbean countries. while expressing concerns about being constrained by WTO rules, have not fully explored to what extent within the WTO agreements can incentives and subsidies be used for local

Technical Issues

In the Caribbean, the quality of food consumed is as much a public health concern as the quantity of food consumed. Many people are consuming too many calories, without meeting the recommended goals for intake of some nutrients. This vital issue must unquestionably be addressed at the upstream locus of action relating to food availability - i.e. that of local production, imports and competitiveness - as well as at the downstream locus of action which will attempt dietary behavior change and hence avoid "swimming against the tide." The rapid rise in food-related problems should impel regional agriculture and food experts to ensure the availability and accessibility of those foods that satisfy the nutrition and health goals of Caribbean populations (Henry 2007) It is feared that in the face of limited availability of and accessibility (especially due to limited financial resources) to appropriate foods, the region may experience a regression in its current nutrition and health status – which has seen significant improvements, especially in micronutrient sufficiency and maternal and child nutrition and health.

The Council for Trade and Economic Development (COTED) of CARICOM have agreed on a set of priority commodities that best satisfy the factors related to the Initiative framework. Factors used in selecting these commodities include commonality of the food items, production potential, market niche and competitiveness. The glaring gap among those criteria relates to nutritional considerations. Prioritization of food commodities to be supported for national food security must include nutritional criteria. Research is needed to produce a ranked list of prioritized commodities that can genuinely food and nutrition enhance security within the Caribbean region and at the national level.

The table below details the criteria that can be used to assess how well food commodities satisfy nutrition and health requirements. Recommendations are based on proven and probable associations between the nutrients and diseases of major public health concern. Commodities that satisfy these criteria are considered favourable to nutrient intake and health goals.

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Table 1:Nutritional Criteria For Ranking Food Commodities

Criteria for Grading	Associations with Major Diseases in the Caribbean
High in Complex Carbohydrates	 Greater glycaemic control due to lower glycaemic index, reducing risk of impaired glucose tolerance (precursor to diabetes). More satiety with fewer calories, allowing for better weight management.
High in Dietary Fibre	 Reduces plasma total and low density lipoprotein (LDL) choles-lesterol levels, reducing risk of cardiovascular disease. Reduces transit time through gut, possibly lowering absorption of carcinogens.
High in Protein	 Provides a balance in the daily diet Reduces the risk of protein-energy malnutrition in HIV/AIDS Facilitates optimal metabolization of key dietary nutrients.
Low in Saturated Fats	 Reduces risk of elevated total and LDL cholesterol levels Reduces risk of fat-induced impaired glucose tolerance and insulin sensitivity. Reduces risk of obesity and co-morbidities.
Low in Trans Fats	Reduces risk of elevated LDL and lowered high density lipoprotein (HDL) cholesterol levels.
High in Monoun- saturated Fats	Reduces risk of impaired glucose tolerance.
High in Iron	 Reduces risk of iron-deficiency anaemia. Reduces the risk of impaired cognitive function.
Low in Sodium	Reduces risk of elevated blood pressure and CHD.
High in Potassium	Reduces risk of elevated blood pressure and CHD.
High in Calcium	Reduces risk of osteopenia and osteoporosis.
High in Vitamin A	 Reduces the risk of blindness and ocular injury. Facilitates iron utilization. Reduces the risk of impaired growth and development and of impaired immunocompetence.
High in Vitamin C	Facilitates iron absorption.
	Possibly lowers risk of cancer and CVDs.
High in Thiamine	Reduces the risk of neurodegeneration.
High in Niacin	Possibly reduces risk of impaired glucose tolerance.

Technologies Issues

With foods being used more frequently for biofuels the danger exists that more remunerative crops, such as cereals, will replace less remunerative crops such as pulses and ground provisions. Research on the latter commodities should be accelerated to ensure that these crops benefit from new technologies to the same extent as cereals. Sweet potato, for example, is a prized food item for the Caribbean and CARDI had commendably assessed the performance of sweet potato in various ecological settings; the shelf life of different varieties; and their ability to resist insect pests. But more funding will assist our agriculture research institutions to have the capacity to join the global agriresearch programmes culture which seek to breed nutritionally superior quality produce from ground provisions and other foods. addition, answers following may be forthcoming:

 Can our varieties respond to cheaper fertilizer inputs and maintain high yields and desirable nutrition quality? What are the key factors in commonly consumed Caribbean foods that can lead to better nutrient content – is it the genetic make up, the soil, the use of fertilizer, weather conditions, maturity at harvest,

ARTICLES

packing, storing or which combination will produce the optimal nutritional product? The performance assessment of our corn hybrids and the germplasm research conducted by CARDI are critical steps forward. But can the amino acid content of our cereals be improved without adversely affecting yields, and taste?

- The whole area of biofortification should be pursued by our regional agriculture institutions possibly in collaboration with the International Center for Tropical Agriculture (CIAT). Biofortification seeks to bridge the agricultural and nutrition services to address the perennial problem micronutrient deficiency (Graham et al. 2001). This can be conducted on a wide range of Caribbean food crops such as rice, cassava, peas, yams, plantains among others (Bovis 2000).
- few agricultural commodities become food without processing of some sort. Processing is mainly intended to extend product lines and variety but do our methods in the region compromise nutritional quality? For example, it is known that heat causes the proteins in fish to coagulate. During salting, water is drawn out from the muscle and some protein and amino acids are lost in the

brine. Water soluble vitamins are also lost during salting, while fat and fat soluble vitamins are conserved. Sun drying causes rancidity in fish causing fat to become unavailable. Sun drying of fruits and vegetables affects both macro and micro nutrients. Hot water blanching causes loss of vitamin C and B. Also loss of carotene and ascorbic acid can considerable through oxidation. This type of research information is vital to optimize the nutritional quality of processed products.

- The Trinidad and Tobago Agribusiness Association has significantly advanced efforts to preserve Caribbean foods. They have successfully frozen and dried cassava, sweet potato, plantains, pawpaw, fruits, vegetables and rabbit meat, among others. The Rural Agriculture Development Authority and the Scientific Research Council in Jamaica and UWI, among others, have sporadically developed preserved food items. But much more expansion and consistency are required for this type research and product development of our commonly consumed Caribbean foods.
- Research questions should center around – which processing techniques using heat,

- oxygen, pH or light adversely affect the nutrient content of specific Caribbean foods? And which combination synergistic or antagonistic to each other? While food processing techniques mainly extend shelf-life, the preservation techniques need much more research so that nutritious foods can be made available affordable vear-round across all locations.
- Will we be able to move towards cassava replacing wheat in our baked products in the Caribbean? Are baking and taste factors major barriers to this? Not enough research is done on the cooking quality of food and the keeping quality of the cooked products of cereals, particularly roti. Complaints are often heard about the lower palatability of some of the new products - is this based on prejudice or reality?
- Constant interaction among breeders, post harvest technologists, nutritionists, and extension specialists integrate necessary to the developments in disciplines and evolve a system approach that will result in raised production levels and optimum utilization without sacrifice nutritional of sensory qualities. Coordination among the areas of agriculture,

food technology and nutrition needs to be reflected in practice not just in policy. Such interaction has a very crucial role to play in the food system.

Education/Training Issues

The previous sections emphasize that central to the link between agriculture and health is nutrition. But there are other important factors that must be researched, understood and applied. For example, households' accessibility to nutritious food is a function of income, prices, marketing, distribution, among others. Second, good nutrition depends on the quality of diets, food preparation practices, education levels, among others. Little research has been done to allow for intervention-related understanding of the inter-relationship between agriculture, nutrition and health in the Caribbean.

Consequently, training cadres of workers along this chain has been vertical which further fragments the integrated policy formulation programme and implementation in these sectors. Research efforts with a nutrition focus are needed to disentangle these inter-linkages so that specific recommendations can be applied individually for national foodhealth policies. In doing appropriate capacity building programmes can be developed for the various cadres of professionals

involved in the sub-sectors. In redressing this imbalance between food availability and good nutrition the education component must not be neglected. There is need to impart education at various levels and it is equally important to realize that the kind of communication media used and the content of what is to be taught to each target group will be different. There is thus a great and urgent need to carry out research on education methodology and to evolve and develop appropriate material for mass communication.

The formulation and implementation of integrated education programmes require the participation of scientists in various disciplines, namely, nutrition, agriculture, home science, food technology among others. Our Caribbean universities and agriculture research institutions should aim to direct the attention of students and faculty on these issues.

CONCLUSION

The Regional Transformation Programme on Agriculture and the follow-up Jagdeo Initiative are important documents that provide a framework for action to advance the supply side of the food equation. The Caribbean Ministers of Agriculture have recently declared the need and commitment to forge links between Agriculture and Health. (CFNI 2007).

This paper contends that the long-term solution to food and nutrition problems in the Caribbean requires a sound understanding of the interface aspects, in which agriculture science, food technologists, nutritionists and others concerned would constantly interact with each other to ensure a multi-disciplinary attack and work as an interdisciplinary team in a concerted manner. Such research information should transcend the policies in agriculture and in so doing improve health and enhance economic development in this region.

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Investing in a Nutrition Policy for Caribbean Schools

Kimberly Ashby-Mitchell, Beverly Lawrence, Laura D. Richards and Christine Bocage^a

INTRODUCTION

Healthy eating and physical activity in childhood and adole-scence promote optimal childhood health, growth, and intellectual development; prevent immediate health problems, such as iron deficiency anemia, obesity, eating disorders, and dental caries; and may prevent long-term health problems, such as coronary heart disease, cancer, and stroke. Good health and good nutrition at school age have long been recognized as essential for good educational outcomes.

For school-aged children, eating a variety of foods from the six Caribbean food groups along with engaging in different types of physical activity on a regular basis has a positive impact on cognitive and educational achievement. Since most of a child's waking hours are spent at school, it is imperative that learning institutions be used to conduct health and nutrition activities and that

they provide supportive environments for the adoption of key target behaviours.

Traditionally, school health programmes have been planned against the background where schools were seen as passive and captive recipients of health related interventions. While this approach has contributed to improving nutritional status among certain vulnerable groups, changing trends in nutritional problems, ongoing research into behaviour change and health promotion strategies, and reviews of current practice, reveal that different approaches are required in the promotion of school health in general and school feeding programmes in particular. School health programmes should help children and adolescents attain full educational potential and good health by providing them with the skills, social support, and environmental reinforcement they need to adopt long-term, healthy eating

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behaviours. Studies have also shown that school-based programmes when properly planned and implemented can play an important role in promoting healthy eating behaviour throughout the life cycle.

The Rationale for School-Based Nutrition Education

Schools are ideal settings for nutrition education for several reasons:

- Schools can reach almost all children and adolescents.
- Schools provide opportunities to practice healthy eating.
- Schools can teach students how to resist social pressures. Eating is a socially learned behavior that is influenced by social pressures. School-based programmes can directly address peer pressure that discourages healthy eating and harness the power of peer pressure to reinforce healthy eating habits.
- Skilled personnel are available. After appropriate training, teachers can use their instructional skills and food service personnel can contribute their expertise to nutrition education programmes.
- Evaluations in the United States and other countries suggest that school-based nutrition education can improve the eating behaviours of young persons.

- School-based nutrition education is particularly important because today's children and adolescents frequently decide what to eat with little adult supervision.
- The increase in one-parent families or families having two working parents and the availability of convenience foods and fast-food restaurants inhibit parents' monitoring of their children's eating habits.
- While schools are a critical part of the social environment that shapes young persons' eating behaviors and can therefore play a large role in helping improve their diet, schools cannot achieve this goal on their own. The cultural milieu has a big influence on food-related beliefs, values, and practices. Families, food stores, restaurants, the food industry, religious institutions, community centers, government programmes, and the mass media must also support the principles of the appropriate dietary guidelines.

Promoting Healthy Eating Through a Comprehensive School Nutrition Programme

In the school environment, classroom lessons alone might not be enough to effect lasting changes in students' eating behaviors students also need access to healthy food and the support of

persons around them. influence of school goes beyond the classroom and includes supportive messages from peers and adults regarding foods and eating patterns. Students are more likely to receive a strong, consistent message when healthy eating is promoted through a comprehensive school health programme. Some strategies that can be used in schools to encourage healthy lifestyle choices include:

- Schools providing appealing, low-fat, low-sodium foods in vending machines and at school meetings and events;
- School counselors and nurses providing guidance on health and, if necessary, referrals for nutritional problems;
- Community organizations providing counseling or nutrition education campaigns;
- Physical education instructors helping students understand the relationship between nutrition and physical activity;
- School food service personnel serving healthy, well-balanced meals in the cafeteria; and
- School personnel acting as role models for healthy eating.

Recommendations For School Health Programmes Promoting Healthy Eating

Based on the available scientific literature, national nutrition policy

documents, and current practice, these guidelines provide seven recommendations for ensuring a quality nutrition programme within a comprehensive school health programme. These recommendations address school policy on nutrition, a curriculum coordinated includes physical activity, appropriate and motivating instruction for students, integration of school food service and nutrition education, staff training, family and community involvement, and programme evaluation.

National school systems need to assess the nutrition needs and issues particular to their circumstances, and they need to work with key school- and community-based constituents, including students, to develop the most effective and relevant nutrition education plans for their communities.

Seven key strategies have been identified in undertaking this approach:

- Adoption of a policy that promotes healthy eating through classroom lessons and a supportive school environment.
- 2. Development of appropriate nutrition education curriculum. Implement nutrition education from preschool through secondary school as part of a sequential, comprehensive school health education curriculum designed to help students adopt healthy eating behaviours.

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- Instruction for students. Provide nutrition education through developmentally appropriate, culturally relevant, and participatory activities that involve social learning strategies.
- 4. Integration of school food service and nutrition education. Coordinate school food service with nutrition education and with other components of the comprehensive school health programme to reinforce messages on healthy eating.
- 5. Training for school staff. Provide staff involved in nutrition education with adequate pre-service and ongoing in-service training that focuses on teaching strategies for behavioural change.
- Family and community involvement. Involve family members and the community in supporting and reinforcing nutrition education.
- 7. Programme evaluation to regularly evaluate the effectiveness of the programme in promoting

Lessons should be identified where relevant nutrition and physical activity concepts can be infused into the curricula of selected subjects and be taught to reinforce the key diet and physical activity behaviours.

healthy eating and to make appropriate changes. In this regard, school feeding programmes can be integrated into nutrition surveillance systems, thus providing information for both programme planning as well as for monitoring and evaluation.

A NUTRITION POLICY FOR CARIBBEAN SCHOOLS

Based on lifestyle intervention project experiences among adolescents in high schools that have been conducted by CFNI, four key components have been identified:

Diet and Physical Activity Behavioral Curriculum:

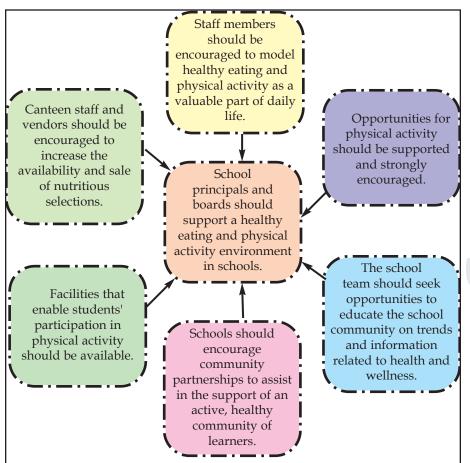
The overall objective of the behavioural curriculum is to ensure that all students are exposed to the elements of a behavioural curriculum fundamental to the knowledge and skills base required to consciously practice targeted behaviours in their school, home and community environments.

Both straight and the infused lessons should emphasise self-assessment and monitoring, goal setting and the development of the relevant cognitive, affective and behavioural skills required for the voluntary adoption of the targeted behaviours.

Teacher training activities are necessary in order to facilitate a behavioural change orientation in delivery of lessons, and in the development of assignments and activities.

School-wide Promotional Activities

Building supportive environments in schools involves providing support to the school environment through working with canteens, vendors and other teachers to make changes in the food choices available to the students. This plan should make effective use of school and community resources and equitably serve the needs and interests of all students and staff, taking into consideration differences in cultural norm and physical limitations.



Supportive School Environment

School nutrition programmes provide opportunities for children to learn real-life strategies for evaluating food options and making healthy choices. Many such programmes have developed creative ideas for giving children the skills and information they need in order to build healthy and nutritious eating habits.

Physical activity can have an enormous impact on improving a child's physical and emotional well-being. Research has shown that increased exercise and sports participation can simultaneously help children maintain a healthy body weight, enhance their self-confidence, and offer "opportunities for social contact, nurturing, and maturational guidance."

This component focuses on nutrition and physical activity programmes though promotional and extracurricular activities such as special days, after-school clubs and other events related to the target behaviours and the concepts being taught in the classroom.

Promotional Days

There are several important health related days/events recognized across the region and internationally which will provide an opportunity for schools to participate by showcasing and highlighting good nutrition and physical activity to the school community. These include:

- o World Diabetes Day
- o Caribbean Nutrition Day
- o Caribbean Wellness Day
- o Sports Day

Supportive Homes and Communities

Parents and family play an all important role in sending the right messages to foster the development of healthy eating and lifestyle behaviors. Parents control most food choices available at home, so changing parents' eating behaviours may be one of the most effective ways to influence their children's eating behaviours.

In this component, building of supportive environments in the home should be carried out through family support education programmes. Activities could be designed to inform parents about the goal and objectives of the intervention and also to involve them in activities not only through take assignments, home through talks and involvement in promotional days at the school. Parents could be encouraged to work with children on take home activities and to seek out the school team for advice and referral on healthy lifestyle-related issues. Summer/maintenance activities should also be included.

To involve parents and other family members in promoting healthy eating, individuals responsible for community and family involvement and school councils can:

- Work with parent teacher associations to create and implement nutrition and healthy eating policies.
- Use nutrition education materials for literacy projects for community members.
- Offer nutrition screening services to parents and other community members.
- Offer nutrition education services that students can share with their families.

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- Encourage parents and students to work together to pack healthy lunches.
- Encourage parent and child activities on nutrition and physical activity.
- Plan parent and child exercise challenges, relays, races and games.
- Encourage students and family members to set exercise goals for the week.
- Plan parent and child healthy eating cooking sessions and organize fruit and vegetable events.



Lessons Learnt from the CFNI Multiple Component Approach

- There must be strong buy-in and commitment at the ministerial and stakeholder level.
- There are some challenges in getting teachers to move away from didactic learning techniques.
- Teachers and students must develop a sense of ownership regrading the project intervention.
- Parental and community wide support is necessary in order for a supportive environment to be fostered.
- Teacher training must be carried out so that clear, consistent and accurate messages are delivered to all students.
- The development of clubs and creative student activities must be incorporated in the intervention to ensure that the key target behaviours are reinforced.

Starting a School Policy

In order for policy to be developed in a timely way and to be enacted requires careful thought and planning. While it is impossible to develop a universal school health policy, governments are encouraged to follow the following steps in order to begin the process of developing a successful school health policy:

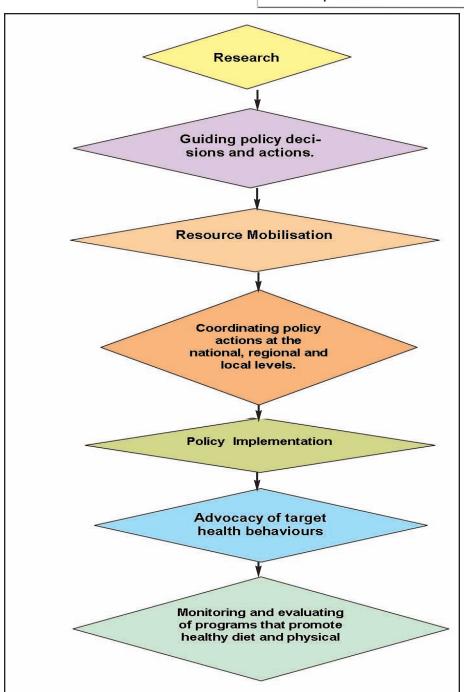
(a) Set up a Coordinating Team

It is important to bring together all stakeholders to ensure that healthy eating and physical activity are promoted in schools. The actions of a collaborative team ensure that interventions will be more effective and sustainable when they are undertaken.

The coordinating team should consist of representatives from governmental bodies, schools, retailers and health professionals and their roles should be determined at the country level. A list of some possible roles for the coordinating team includes:

(b) Conduct a Situation Analysis

Development of a situation analysis is imperative for the development of school health policy.



Conducting a Situation Analysis Should Give Some Indication Of:

- Student health status including information regarding physical activity levels, fruit and vegetable consumption, school attendance and prevalence of overweight students, obesity, diabetes etc.
- Student attitude and perceptions concerning diet and physical activity.
- Existing policies (if any) that govern diet and physical activity at schools.
- Review of the school curricula as it relates to diet and physical activity content.
- Review of how food, nutrition and health are integrated into the whole school environment and wider community.
- Review of how supportive the school and community environment are as it relates to healthy diet and physical activity.
- Analysis of existing government programmes, as well as programmes organized by other stakeholders, that address promotion of healthy eating and physical activity in schools.
- Available resources and current capacity in-country to promote healthy eating and physical activity in schools.

This involves collecting baseline information of diet and physical activity practices in schools and provides the coordinating team with much needed information that allows for understanding the needs, resources and conditions that must be taken into account when planning diet and physical activity interventions in schools.

This method of assessment allows stakeholders to properly target their interventions as findings will identify the main target groups, their needs and allow for more focused purposedriven programmes.

(c) Develop a Workplan and Monitoring System

It is important for the coordinating team to bear in mind that:

"the underlying aim of a school food and nutrition policy is to ensure that messages throughout the school system are consistent and mutually reinforcing. Schools need to teach healthy living and assist pupils in implementing their knowledge by creating an environment where healthy choices are feasible. (WHO, 2000).

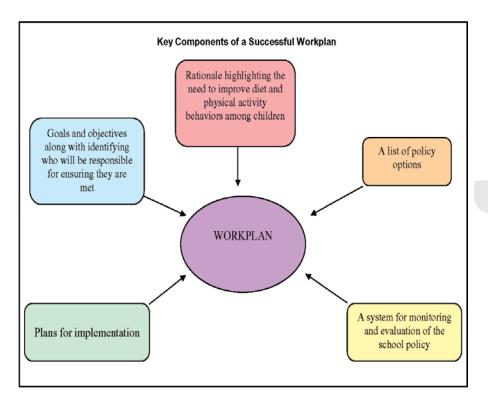
The development of school policies is a dynamic process and requires routine monitoring and evaluation. The evaluation process analyses all aspects of the intervention programme including use of resources, training needs, community and family support and the development of a supportive school environment. For each intervention, specific and appropriate indicators have to be developed. For

example, infused lessons can be evaluated using teacher self-reporting and classroom observations while a supportive school environment can be evaluated based on response to promotional activities.

At the end of the evaluation process, the intervention programme may have to be revised based on the feedback received.

(d) Set Goals and Objectives

Goals and objectives are necessary to determine if the intervention outcomes have been realized.



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Goals can be defined as broad statements which describe the overall desired improvements related to healthy eating and physical activity in schools. Some examples of goals are:

- To prevent chronic diseases through a schools-based behavioural intervention.
- To reduce the incidence of anaemia among school-aged children.

Clear objectives relating to goals also must be set. These objectives must be specific, measureable, achievable, relevant, and have a specific timeframe within which they must be achieved (SMART).

Objectives can be further broken down into process and outcome objectives. An example of a process objective may be:

 To have 100 schools with sustainable lifestyle intervention programmes within three years.

Outcome objectives on the other hand are more quantitative. An example of an outcome objective is:

 To increase the percentage of students who take part in extra curricula activities at school from 40% to 75% in three years.

(e) Dissemination

The school policy must be widely disseminated in order for it to have maximum impact. This can be accommodated through both formal and informal channels.

Dissemination can also be facilitated by highlighting key messages and having these be distributed through various channels e.g. print media, advertisements, electronic media, spokespersons and regional or local events.

Before a policy is ready to be disseminated, however, policy options need to be selected (this is further expanded upon below).

Policy Options

CFNI has identified policy options, strategies and actions which member countries can consider in promoting healthy diet and physical activity patterns in schools. These options are holistic and are meant to produce a comprehensive school health strategy.

It may be more feasible to start with small changes that are possible rather than address all problems simultaneously as resources become available.

The suggested policy options are presented in the following categories:

(i) School Recognition

Recognition of schools that have created healthier school environments through promotion of nutrition and physical activity is important and countries should consider highlighting the accomplishments of those that meet the standards set out in the school health policy.

(ii) School Curriculum

School-wide messages must be consistent, mutually reinforcing and reflected throughout the curriculum (WHO, 2006).

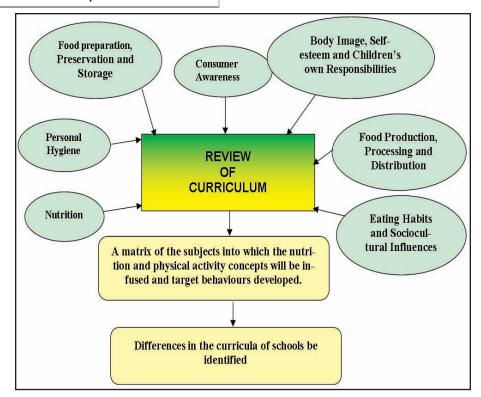
This is necessary to agree on which subjects the broad nutrition and physical activity concepts could be incorporated/infused into and to reinforce the target behaviours that are being promoted. This review should preferably done in collaboration with all key stakeholders so that all schools have the same systematic, deliberate and synchronized approach to promoting healthy eating and physical activity.

During the review, details should be worked out concerning:

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 Award school a special status when goals are achieved.

 Offer incentives e.g. provide equipment/facilities and technical and/or financial support to schools.



Suggestions be given for materials that would facilitate the application of infusion of nutrition and physical activity concepts (use of media, technology, food charts, thematic events, provision of adequate facilities, teacher training).

- The behaviours and core concepts to be incorporated into the school curriculum;
- The process of infusion;
- Fitting concepts into subjects specifying the subject, topic, strand/unit;
- Preparation of a frame for infusion (matrix).

See Table 1: The Curriculum Development Process in Appendix.

(iii) Food Services and Physical Activity Environments

The Food Service Environment

Healthy school meals eaten in a friendly atmosphere can give children:

- an opportunity to learn how to enjoy food and eating;
- an opportunity to practice healthy eating behaviour and experiment with new foods;
 and
- an opportunity to practice social skills (WHO, 2006).

STEP 1

Assess the foods available to students at school (including the type and quality of cooked meals available).

- Use of food availability checklists.
- Records of type and quality of cooked meals available to students.
- Where students purchase their meals.
- Details of the menu items served, the foods and food groups present and cooking methods employed.

STEP 2

Assess the Foodservice Operations at the school

- Each foodservice operation accessed by students.
- Use of a checklist can be employed.
- Checklist must make note of a written menu, nutrient standards, meal and service standards, time meals are made available etc.

STEP 3

Assess students' sources of food

- Record all breaks/recesses that are allotted during the school day.
- Record if there is a school feeding programme in existence.
- Record if there is a cafeteria/canteen, tuck shop and vendors.
- Record if there are any fruit trees or a vegetable garden on the school compound and whether students have access to these.

(See in Appendix: Sample of Food Availability Checklist, Sample of Foodservice Operations Checklist and Sample of form used to Assess Students Sources of Food).

The Physical Activity Environment

An assessment of the supportive environment for physical activity must be conducted. This assessment must take into consideration the role of physical activity in the school curriculum, facilities and equipment available for physical activity as well as safety and security (see Sample Assessment form in Appendix).

(iv) Health Promotion for School Staff

The teaching of the lessons on the core concepts selected for each behaviour is pivotal. The class/ subject teachers are expected to provide key information to share thoughts, feelings, opinions (through group/panel discussion, personal journal, worksheets) and develop critical thinking (by using case studies, real life scenarios,

individual or group interview/ research, personal contracts, role play/simulations) e.g. bulletin boards, displays, diagrams, individual and group presentations, media - film, CD, DVD and to creative, dramatic encourage presentation. As such, health promotion for school staff becomes important to ensure that correct information is disseminated to students and that a supportive school environment is supported.

(v) School Health Services

School health services are a key resource that must be utilised in determining student health status and meeting the needs of the target group.

In the Caribbean, due to financial limitations, all schools may not be equipped with all the personnel needed to assess student health status at the school facility. However, community health facilities can be called upon. Arrangements can be made for student health and nutritional assessments to be done when the school nurse and other members of the health team visit at the beginning of the term or students can be taken to nearby health facilities to have:

- Measurement and recording of body weight and height.
- Nutritional screening.
 - Referrals to other school services and community health services based on results of the screening.
- Promoting the benefits of a healthy diet and physical activity via counselling and advocacy.

Suggestions for health promotion for school staff include:

- Training sessions
- Development of/ participation in physical activity clubs.
- Involvement in project promotional activities.

Food and Nutrition Priorities in the Caribbean (2010-2015)^a

PART I - JUSTIFICATION AND **RATIONALE**

This paper presents a new framework, rationale and strategy deliver effective technical cooperation in food and nutrition Caribbean countries. The concept and proposed collective actions are central achievement of the CARICOM Single Market and **Economy** (CSME). This paper is timely in view of several recent profound changes - each of which has a direct bearing on the nutrition, health and development Caribbean people.

These recent changes are the:

- CARICOM decision to decommission CFNI and absorb some functions into Caribbean Public Health Agency (CARPHA).
- Global and regional trade agreements that challenge food security, safety and nutrition.
- **CARICOM Heads of Government** resolutions stressing that nutrition should be a critical factor in the fight against obesity and noncommunicable diseases (NCDs).

- Devastating impact of the Food-Fuel-Financial crisis on nutrition in vulnerable communities and erosion of gains towards the MDGs.
- Compelling scientific evidence about cost-effective nutrition interventions.
- CARICOM approval of Caribbean Cooperation (where food Health nutrition is a priority area).

These technical, administrative and political changes present major challenges and opportunities for Caribbean countries that are highly vulnerable to food prices, global recession, climate change and other social and environmental shocks. The absence of carefully implemented priority nutrition programmes will present a real danger to regional development through intergenerational effects consequences to early childhood development, adolescent and adult health, particularly the additional risks to obesity and the costly noncommunicable diseases (Gorstein 1994, Barceló 2003).

NCDs are currently the main public health problem in the region

^aThe CFNI Staff.

but they exist in tandem with pockets of persistent under nutrition and micronutrient deficiency. While some progress has been made in addressing these nutritional issues, the region cannot be complacent since these problems aggravated by adverse domestic and international ecoconditions. nomic persistent poverty and income inequalities. In turn, chronic diseases in particular have severe macroeconomic consequences (Hudson Institute, 2009) which curtail the regional advances towards CSME. In light of these observations, development partners must focus on the inseparable link and interrelationship among agriculture, food, nutrition and health as an indispensable platform to guide food and nutrition policies and action.

In developing this document consideration was given to the capacity of CFNI/PAHO, CARPHA and other entities to deliver the appropriate food and nutrition products and services collectively and individually to Caribbean countries.

WHY IS NUTRITION ESSENTIAL TO CARIBBEAN DEVELOPMENT?

The recent history of the Caribbean has shown some spectacular gains in health and the improvement of nutritional status was critical to that achievement (Henry 2001). Every year, compelling scientific evidence shows the growing importance of nutrition to both wellness and illness in our lives. More recently, however, major challenges exist which threaten to erode past gains in nutritional improvement and the protection of human capital. These threats call for immediate action to stem the reversals in health and nutritional improvement (PAHO, 2006).

Globalization has not turned out to be the force that benefits all countries as envisioned at the start. In fact, the Small Island Developing States (SIDS) such as those in the Caribbean have encountered major setbacks. The effects are noted at the national level and also in specific populations within countries. Caribbean poverty traditionally centered in rural areas, however the rural - urban drift in population has caused many urban communities to be hit hard by the current economic crisis. City dwellers, who tend to rely more on market forces for food, now face the challenge of food quality (malnutrition) as much as they do about quantity (undernutrition). The vulnerability to obesity, diabetes and other chronic conditions therefore looms large. When money is tight the first things that are sacrificed in the diet are healthy foods such as fruits, vegetables and lean meats which

2004c). The call for greater investments in nutrition is not new but has assumed an increased urgency because of the potential impact on health and development especially resulting from the Food-Fuel-Financial (FFF) crisis of recent years. In a situation of sluggish economic growth and sustained poverty, this range of FFF factors has coalesced to undermine the stability food security particularly at household level. The complexity of threats posed to household national and food security together with the persistence, extent and enormity of nutrition-related health problems demand that governments and technical agencies rethink efforts at finding appropriate and innovative strategies for combating existing and emerging challenges. strong evidence on the high economic returns from investments

on large scale interventions for improving nutrition should foster urgent action (World Bank, 2006). The human and economic costs of failure to act will be excessive.

indicated above, the essentiality nutrition of to Caribbean development can be demonstrated in several ways, however, only three major aspects are highlighted in the section below: Nutrition in the Millennium Development Goals (MDGs): Nutrition in Mortality Morbidity; and Nutrition in Crises.

Nutrition and the MDGs

Achieving most of the MDGs is largely dependent on improvements in nutrition, particularly in vulnerable and high risk groups. But nutrition intervention goes far beyond the progress towards the MDGs. Although these goals provide excellent targets and developmental benchmarks for the populations of the world, we show below that investments in nutrition in the Caribbean will help to attain and surpass these goals.

There is a false perception that nutrition is related only to MDG 1-extreme poverty and hunger. The case made here is that nutrition has a crucial role to play directly or indirectly in attaining the development outcomes embodied in the first six of the MDGs, and much more.

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MDG 1 – Eradicate extreme poverty and hunger

Most Caribbean countries have poverty rates between 13 to 35%, but this poverty range has many dimensions. The steady shift from agriculture to service economies poses major challenges for poverty and hunger in Caribbean populations. The recent global Food, Fuel and Financial (FFF) crisis has negatively impacted on security and malnutrition and this region did not escape these effects. Nevertheless, with the required commitment and investments, the targets for MDG 1 can be reached in 2015. The recent challenges of the FFF crisis clearly debunked the myth and complacency attributed to the importance of nutrition to development. national malnutrition is an expression of poverty and hunger and even though Caribbean rates may be relatively low significant undernutrition persists which can erode human capital, reduce resistance to illnesses and decrease productivity.

MDG 2 – Achieve universal primary education

Caribbean countries have relatively high school enrollment rates compared to other regions. Reduction in undernutrition has undoubtedly contributed to increased enrollment at the primary level as better nourished children are more likely to enroll and stay in school. However, disparities in performance and achievement levels exist. persistence of iron deficiency anemia and more recently, the widespread availability in schools of "empty calorie" foods i.e. high in calories but low in nutrients, erode gains threaten to nutritional status and consequently performance in schools. Appropriate interventions that seek to improve nutrient intakes not only directly contribute to healthy child growth and improved academic achievements but also provide longer-term benefits such improved employment and health outcomes in adulthood.

MDG 3 – Promote gender equality and empower women

In many Caribbean countries, the gender ratio is favorable for females with regard to literacy and participation at all levels of the educational systems. However, levels of income, access to and control of resources still vary along gender lines and can contribute to female poverty and influence decisions regarding caring and feeding behaviours within households. A striking feature of obesity in the Caribbean is the consistent gender difference showing higher prevalence levels amongst females beginning from young adulthood, compared to their male counter-

parts, perhaps indicative of socialization patterns, cultural norms and differences in lifestyle patterns. The impact of obesity on insulin resistance is well known and as a consequence, a disproportionate number of women suffer from Type 2 diabetes as well. This gender difference in health outcome needs to be addressed urgently as it places a disproportionate burden on women in this region. Gender specific programmes are therefore warranted in such cases. The nutritional challenge for the Caribbean is to reduce obesity in the population but moreso in females.

MDG 4 - Reduce child mortality

Globally, poor nutritional status contributes to more than half the deaths in preschool children and micronutrient deficiencies reduce the chances of survival in young children. However, the good nutritional status of young children in the region is mainly responsible for almost all Caribbean countries falling below the global "high" categories of under five mortality. The rapid decline in malnutrition in preschool children over the last few decades provides optimism that child mortality will remain low. Infant mortality declines have also been impressive in the last 40 years but some countries have much room for improvement. Breastfeeding and appropriate complementary feeding practices are essential elements to low childhood mortality. and adequate nutrition and human development. In recent years, however, the risk of transmission of HIV infections from mother to child (particularly through the dominant pattern of mixed feeding in infancy) presents a new threat and over time could impact on declining child mortality rates. The need for supportive policies and strategies for the promotion of optimal infant and young child feeding practices is therefore paramount.

MDG 5 - Improve maternal health

The goal of reducing maternal mortality by 75% in the Englishspeaking Caribbean by 2015 is a major challenge where rates range from 60 to 170 per 100,000 live births. Although all countries in the region have high rates of skilled birth attendants, mortality rates continue to be unacceptably high. A more comprehensive approach will be needed in the next decade recognizing that maternal health is compromised by poor nutritional intake and that iron, vitamin A, folate and calcium are associated with pregnancy complications. Poor nutrition of the mother in addition to anemia in pregnancy are related to low birth weights and health risks in early childhood. Nutrition interventions should

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therefore be central to the improvement in maternal health.

MDG 6 – Combat HIV/AIDS, malaria and other diseases

The estimated percentage of the English-speaking Caribbean population living with AIDS ranges from 1 to 5%. With more than 100,000 persons living with the infection, this presents an enormous challenge to control the spread and to provide care to those with the infection. An important, but neglected, part of comprehensive care in the region is nutrition intervention. Malnutrition hastens the onset of AIDS among HIV positive persons and it may compromise the efficacy of antiretroviral treatment. With external assistance, a major response with effective therapy has begun. In addition, the cost of drugs is falling. But many will still be outside the reach of these efforts. Dietary interventions can bolster nutritional status and will benefit those reached with therapy and those not.

For a few Caribbean countries malaria is still endemic in some locations. Often those same locations have poor nutritional status and it is important to emphasize that malnutrition reduces malaria survival rates. Chronic diseases, which are largely predicated on nutritional forces, are not explicit in the MDGs but they fall under "other diseases". This categorization of "other diseases" is unfortunate given the prevalence,

severity and consequent financial burden they have on the health systems in all Caribbean countries.

In the Caribbean, nutrition has crucial roles to play in poverty alleviation and safety net programmes; the health sector reform processes; the regional food trade issues; and human rights entitlements. The importance of nutrition therefore goes well beyond the MDG targets and has an even more profound role in "health-for-all" and other aspects of national and regional development.

Nutrition: A Compelling Risk Factor in Caribbean Mortality and Morbidity

Table 1 shows that food and diet are related to no less than 53% of the deaths in the region over a 25-year period. Table 2 indicates the vital role of food and nutrition in both death and disability in the Caribbean. These two tables collectively demonstrate that heart disease, diabetes, stroke and cancer and their risk factors are the dominant health concerns in the Caribbean as they account for over 50% of all deaths and illnesses. More importantly, from an intervention stance, nutrition is central to their prevention and management and can postpone these premature deaths in most of the cases. The mismatch between these highly compelling data and the poorly funded nutrition efforts in this region continues to be an indictment to our planners and policy makers.

2004

Heart Disease*

Cancer*

Stroke*

Injuries

Diabetes*

Hypertension*

HIV/AIDS*

% of

Deaths

16

12

10

10

7

5

4

% of

Deaths

16

15

10

10

7

6

6

7 Diabetes* 4
(Source: CAREC 2004, 2007)

Table 2: Risk Factors of Death and Disability in Countries
Such as the Caribbean

Hypertension*

Rank	Risk Factor as Cause of Death	Risk Factor as Cause of Disability
1	High Blood Pressure*	Alcohol Use
2	Tobacco Use*	High Blood Pressure*
3	Overweight and Obesity*	Tobacco Use
4	Physical Inactivity	Overweight & Obesity*
5	Alcohol Use	High Blood Glucose*
6	High Blood Glucose*	Unsafe Sex
7	High Cholesterol*	Physical Inactivity
8	Low Fruit & Vegetable Intake*	High Cholesterol*

(Source: World Bank, 2006).

^{*} Food/Nutrition related to 53% in 1980; 57% in 2000; and 53% in 2004.

^{*} Food/Nutrition play a major role.

Preserving Nutrition In Crises

If the food crisis was about soaring prices, the financial crisis is about lower purchasing power. When combined, these unleash devastating consequences to poor countries and communities, particularly nutrition on children. But the Food-Fuel-Finance (FFF) crises of the last few years were also instructive and compel us to scale up the nutrition capacity to buffer countries against future shocks (Henry, 2008). The vulnerability of island small developing states is even greater and therefore calls for synergies among health systems strengthening, social protection, safety nets food security and poverty reduction. Vertical nutrition programmes have a low likelihood of long-term success. The lesson is to join with agriculture efforts to promote local nutritious foods; with gender efforts to empower mothers in their child care decisions; with social protection efforts so a condition for support will increase the demand for nutrition services; and with local community efforts to learn together to scale up impact. This will also ensure sustainability using a holistic approach (World Bank, 2006).

The lessons from these crises emphasize the growing recognition that many challenges (including the MDGs) cannot be met soon unless we tackle the nutrition agenda. Nutrition offers opportunity to improve health outcomes (Tables 1 & 2). Collectively, this means that if obesity and its co-morbidities can be prevented, most adults in the Caribbean do not have to be condemned to a lifetime of high medical bills and low productivity. These are essential elements of any serious discussion on economic and human development in this region. It cannot be avoided; it must be at the top of our priorities.

short, the returns investing in nutrition are very high. Benefit - cost ratios for nutrition investments range from a low of 5:1 for breastfeeding to 200-500:1 for nutrient fortification. (World Bank, 2006) Although more funds are needed, improving nutrition needs sound policy analysis to ensure that nutrition policies are linked to nutrition action. In the Caribbean it is critical to develop the capacity of people and institutions implement effective nutrition programmes.

WHY IS NUTRITION NEGLECTED IN THE CARIBBEAN?

Despite the evidence and the public acknowledgement of the vital importance of nutrition, it is ironic that when decisions are made to allocate funds and develop human resources, both the governments and the development partners usually place nutrition on the low priority list (Downey, 2002).

- Caribbean governments are slow to realize the high economic costs of under-nutrition and more importantly of obesity and its comorbidities.
- 2. There is the unrecognized potential of nutrition to advance the progress towards the MDGs. As a result nutrition is not mainstreamed in national development strategies.
- 3. There is inadequate appreciation for the critical and profound influence of poor nutrition as the most important underlying cause of death and disability in the Caribbean. (see Tables 1 & 2).
- 4. There is also the lack of appreciation for the vast contributions that other sectors can make collectively to improve nutrition. Vertical programming is still the norm.
- Nutrition programmes are located in the health sector in most Caribbean countries, and because the health sector is usually under-funded, no large scale action on nutrition can follow.
- 6. The mismatch between nutrition service needs and qualified personnel is highlighted by the lack of support for nutrition as a career option and also the

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- dearth of public health nutrition posts available.
- 7. There is non-recognition of proven cost-effective programmes on a large scale to improve nutritional status
- 8. Despite the expensive school feeding programmes from which Caribbean governments take comfort as a major assault on the nutrition problem, in reality they neglect the truly cost-effective nutrition programmes that are crucially needed. Sadly, most school feeding programmes are badly managed and many actually contribute to the obesity problem in school children.
- 9. Lack of vigorous policy analysis to demonstrate the linkages and value of integrating polices among agriculture, health, education, trade among other sectors.
- 10. Development partners' lack of a common vision to combat obesity and under-nutrition which hampers their collective support to governments. A common revision can move nutrition higher on the priority agenda.

A SUMMARY OF KEY NUTRITION ISSUES

Threats to Food Security and Safety

The reduction in Caribbean undernutrition over the last few

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decades has wrongly led to complacency and to dangerously false conclusion that there is no urgency to further improve the overall nutritional status of the region. A stark reminder of their vulnerability, particularly Small Island as Developing States (SIDS), was noted in the last few years with the devastating effects of the Food-Fuel-Financial crisis. These three threats converged to make it particularly damaging to vulnerable countries and groups within them. The Caribbean did not escape this worldwide phenomenon and commodity price have impacted changes with degrees regional varying on Since economies. 2000. the Price Index, Consumer has increased by 16-18% (Antigua, 22-30% Bahamas, Dominica), (Belize, Grenada, St. Lucia, St. Vincent/Grenadines, St. Nevis), 59-63% (Trinidad/Tobago, Guyana) and 133-230% (Jamaica, Dominican Republic, Suriname, and Haiti) (IMF, 2008). Soaring food prices present a crisis which has devastating consequences on nutrition, particularly in children.

In addition to the FFF crisis, environmental factors also pose considerable threats. Predictions by reputable studies show that as a result of climate change agricultural production and the availability of and access to food are likely to decline drastically thereby increasing the risk of hunger and malnutrition (ECLAC, 2009). Further, climate change is to increase expected nutrition through its effects on illnesses, such as diarrhea and other infectious diseases. Thus, for small island developing states of the Caribbean the issue of nutrition must be high on the policy agenda. Further, the region experiences regular natural disasters and just one event could wipe out decades of development and progress and with it significant gains in health and nutrition. To cushion the effects of these crises the Caribbean nutrition agenda must include strong human, institutional and policy developments at regional and national levels.

Attention and action should focus on addressing the underlying issues and eliminating barriers that affect food security and nutritional health in the region. Food security is defined here broadly to include not only the physical availability of food supplies over time and space, but also the socio-economic and nutritional aspects of having adequate economic and physical access to safe and nutritious food supplies. So, although severe childhood malnutrition has declined and is low in most Caribbean countries it remains a public health problem in some. Childhood malnutrition will be affected not only by household and

national factors but global factors well. Recent changes international trade agreements could be an opportunity but seem more likely, in the short term, to be a potential threat to food security in the Caribbean. Restriction and unfavorable terms of trade as well as subsidies to production and marketing in some countries are factors that exacerbate poverty and food insecurity. The problem is one of determining an appropriate mix price policies food instruments that will enhance food security at the household level (Ballayram, 2007).

Few households Caribbean are totally self-sufficient in meeting their food requirements. Most households today purchase some of their basic food needs, and many households purchase all of their food supplies. However, there are still poverty issues that are considered central to addressing problems of food security in the Caribbean particularly for children whose families are at the economic margin of society. Examples are small farmers, families living in urban and peri-urban marginal areas, small fishermen, indigenous peoples, street vendors, the unemployed and underemployed, and displaced persons, who are more vulnerable to food insecurity.

The need for attention to Food Safety also is paramount in view of the anticipated increased movement of foods across Caribbean borders. There is need consistent attempts to forge the essential link between agriculture and health (Henry, 2007). goes beyond food safety to the critical issue of health benefits from repositioning agriculture the policy. The issue of nutritional and health inequality by gender, SES and minorities will be other targets for investigation and intervention.

The Obesity Tsunami

The silent wave of obesity has become an epidemic with such relentlessness that it is now the most important underlying cause of death in the region. Currently, about 25% of adult West Indian women are obese (BMI > 30), which is almost twice as many as their male counterparts (Henry, 2004b). Obesity presents to the Caribbean the most formidable nutrition problem in its history mainly because of its complex multisectoral causes and solutions.

The Caribbean average per caput energy availability increased from 2100 kcal/day in 1961 to 2800 kcal/day in 2005. This increase in daily caloric intake is even more alarming when one identifies the main sources of this energy. The per caput fat availability within the region has increased from 50g/day in 1960 to over 75g/day in 2005. Unfortunately, this increase has not been mirrored in the contribution

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of fruits and vegetables. This shift in daily energy intake, accompanied by a decrease in physical activity, has produced an explosion in the rates of obesity both in adults and children. The challenge for obesity control and reduction is to design a range of strategies from prevention through weight mainand management tenance obesity co-morbidities, to weight loss (Henry & Xuereb, 2004d). The Caribbean lacks major and widespread initiatives which not only result in better clinical management of persons living with noncommunicable chronic diseases but which also prevent or delay the onset of such conditions.

Behaviour modification is an important ingredient in obesity control. The primary goal of behaviour treatment is to improve eating habits. This includes daily recording of food intake, advice on meal frequency, pace of eating, removing cues to overeating and separation of eating from other activities, besides changing exercise habits. Helping countries to create an environment for successful behaviour change in diet and physical activity is a major challenge for this region.

Other Nutritional Deficiencies

Anaemia caused by iron deficiency is a highly prevalent nutritional disorder in the Caribbean. Some countries show rates of more than 50% in some

population groups. Three high risk groups should be targeted pregnant women, preschool and school-age children. There is a biological linkage between the health risks of mothers and the health risks of children. Anemia reduces the capacity to carry out productive work, to manage the household environment and care for children (Mason, 2001). In pregnant women it can lead to intrauterine growth retardation, low birth weight and increased perinatal mortality, while in infants it causes apathy, inactivity and significant loss of cognitive abilities. Action to reduce this dual effect remains urgent (CFNI, 2002).

The prevalence of Low Birth Weight (LBW) remains between 6 and 9% in the Caribbean. The epidemiological transition nutrition transitions have led to much discussion of the postulate of "fetal origins" of adult disease. The basic hypothesis is that insults during critical stages of fetal development or early childhood followed by relative affluence result in increased risk for chronic disease later in life. Such studies showing the association between low birth weight and adult disease makes urgent the concern of these high LBW prevalence rates in the Caribbean.

The falling rates of exclusive breastfeeding and the earlier introduction of other foods present an area of work needing

information on causes corrective responses. Quality and food safety standards in the food sector are becoming increasingly important components in the demand for and consumption of Increased income information on the importance of food safety are motivating consumers to be selective of food products. Quality is related both to the production process as well as the final product and can be defined as the satisfaction of consumers with all aspects of the product.

Nutrition is perhaps the most neglected aspect of HIV/AIDS management and care in the Caribbean region (CFNI, 2008). Nutrition is essential to maintain an immune system and to achieve optimal quality of life. Weight loss and wasting are the primary nutritional disorders of infection. AIDS illnesses include inadequate food intake, altered metabolism and malabsorption all of which have nutritional consequences. Health care professionals who provide nutrition intervention and support individuals infected with the HIV therefore have a challenging and difficult task, nevertheless, aggressive nutrition intervention is indicated at all stages of HIV infection.

In summary, despite the low rates of severe malnutrition in the Caribbean, the vulnerability of countries to food prices, global recession, climate change and other social and environmental shocks presents a real danger to our development through their intergenerational effects and consequences to early childhood development, adolescent and adult health, including an increased risk of chronic disease.

three sections indicate that poverty is spawning undernutrition as well as obesity. Low purchasing power, fewer purchasing options and reduced access to preventive health care highlight challenge the maintaining health gains while at the same time prevent and manage obesity and NCDs. comprehensive action is taken the Caribbean people will suffer increasing burdens of nutritionrelated diseases.

PART 2 – WHAT MUST BE DONE

Before presenting the Lines of Action for these key nutrition issues it is imperative to examine two overarching questions which have a bearing on the actions.

Are We Addressing the Real Determinants?

Any successful strategy to combat nutrition-related problems in this region must recognize the complex combination of factors operating at the global, national and community level that influence Cajanus

individual nutritional status. A new approach is needed to replace the unisectoral one, which focuses averting outcomes in the individual, with a multi-sectoral focusing on the determinants and inequalities. Coordinated sectoral actions such as the PAHO-led Alliance for Nutrition and Development are required, directed towards the common objective of improved nutrition (PAHO, 2009) Efforts should be primarily focused on social determinants of nutrition and in addressing the various factors that affect accessibility and consumption of safe food at the household level. In this connection, emphasis should be placed on strengthening capacities within countries for inter-sectoral action and advocacy; programme planning and evaluation and social communication.

Is Regulation Needed?

Dietary recommendations themselves do not address social and economic inequalities. It is almost futile to encourage families to eat lean meats, fruits and vegetables when they have little purchasing power and the cost of healthy foods is out of their reach. The private sector must play a critical role in preventing nutrition-related diseases. The strategy should encourage corporate decision makers to support national nutrition and

programmes recognizing that corporate policy on health promotion can be consistent with the pursuit of corporate profits. In determining what must be done some critical questions abound:

- Are our systems balanced enough to promote commerce and trade and at the same time protect the public's health?
- Should our policy makers more carefully examine the connection between food industry business and nutrition and health issues?
- Should market forces be the norm or should some level of food regulation be used to promote and protect public health?

For purposeful and effective programming, the tension between the priorities of food trade and public health must be reduced through examination of economic, political, social issues embedded in the food system of individual countries (Ralston, 2000). Public health nutritionists are vital to the multidisciplinary teams that are necessary to unravel these present trends in each Caribbean country.

Based on the background in Part I, six (6) priority Lines of Action [LOA] are presented, each with Rationale and Strategies. The six LOAs are (1) Food Security and Safety (2) Obesity and Co-morbidities (3) Nutrition Deficiency

LOA 1 – FOOD SECURITY AND SAFETY

Food Security

Rationale

Food security is defined here broadly to include not only the physical availability of food supplies over time and space, but also the socio-economic and nutritional aspects of having adequate economic and physical access to safe and nutritious food supplies. Hence food security should emphasize how food and nutrition policy overlaps with many other sectors - health, trade, agriculture, environment, marketing and culture. Several partners should be involved because food security is an integral part of a process of nutrition and health development.

Many health conditions are linked to food security at the household level through food prices in relation to income. Monitoring of food prices is an important component of food and nutrition surveillance systems as changes in price policies and practices are likely to generate changes in consumption patterns that can have negative or positive effects on nutrition and health status.

Strategy

- Advocate for national economic and social policies in which agricultural activities directly improve conditions of food security and rural development
- 2. Formulate policies and elaborate food security strategies to achieve nutritional and health goals.
- 3. Establish a platform to facilitate dialogue, coordination and collaboration amongst the many development partners within the region, working towards a common goal.
- 4. Promote actions that increase and improve local food production and consumption which will eliminate and prevent nutritional and micronutrient deficiencies, encourage breastfeeding, proper complementary feeding and improve the hygienic control of food in order to guarantee a safe and secure food supply. All these activities should explicitly address gender-related issues on the basis of efficiency.

Food Safety

Rationale

Quality and food safety standards in the food sector are becoming increasingly important components in the demand for, and consumption of, food. Cajanus

Increased income and information on the importance of food safety are motivating consumers to be selective of food products. Quality and safety are related both to the production process as well as the final product and can be defined as the satisfaction and right of consumers in all aspects of the product. The achievement of food safety goals should require active participation and collaboration among the private, public and state sectors. Supporting better hygiene throughout the food chain and improving the marketing infrastructure will facilitate the food chain system to deliver, fresh, clean and good quality food products in an efficient manner.

Strategy

- Formulate multi-sector policies to support food safety objectives and strategies.
- Develop and maintain procedures, standards and legislation for food safety and nutrition labeling.
- Sensitize consumers to the emergence of new pathogens in food and food products;
- 4. Provide technical information to encourage food processors, food handlers and exporters of food and food products, to follow food safety guidelines.
- 5. Facilitate the linkage between relevant food industry and

- government officials to reorient food safety authorities and personnel towards monitoring and training functions and inspection.
- 6. Improve food safety in all stages of the food chain emphasizing (a) practice of personal hygiene; (b) care and attention in preparing and adequately cooking foods; (c) avoiding cross-contamination of foods from unsafe sources; and (d) storage of foods at safe temperatures.

LOA 2 – OBESITY AND CO-MORBIDITIES

Rationale

Obesity is now the important risk factor for chronic disease mortality. Unless comprehensive action is taken involving primordial, primary, secondary and tertiary preventive strategies, the Caribbean people will increasing burdens of nutritionrelated non-communicable diseases (Abegunde, 2006). Obesity is largely preventable through changes in lifestyle, especially diet but this must be achieved through (a) public policies and (b) effective behaviour change strategies.

Vital to the success of preventing obesity is public policy action where clear targets and the cost-effective interventions are

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detailed. Changing diet exercise behaviours must beyond increasing knowledge and must strive for long-term behaviour change. The best evidence to guide intervention development must be sought and should include cognitive - affective and behavioural approaches that are useful in helping a person change behaviour. In the Caribbean research methods to provide such information are generally unfamiliar to health care professionals and researchers but must be developed. Additionally, given the prevalence of obesity and related co-morbidities, adequate attention also needs to be given to corrective and management strategies.

Strategy

- Increase access to appropriate nutritional management of obesity and NCDs.
- 2. Strengthen obesity prevention as a foundation/focus of intervention programmes:
- Develop public policies to change relative prices of healthy and unhealthy foods.
- Remove price incentives for high fat foods and increase incentives for healthier foods.
- Place tough standards on the fat and sodium content in processed foods and provide guidelines on

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nutrient content in food labels.

- Develop multi-sectoral approaches to address the marketing of unhealthy food to children.
- Promote physical activity in community programmes.
- Develop population-based guidelines for healthy eating.
- 3. Form partnerships and build alliances between private and public sector interests with specific focus on the media.
- Selective and effective targeting of public policy makers, schools, worksites, community organizations, health care system, among others.

LOA 3 – NUTRITION DEFICIENCY CONDITIONS

Undernutrition

Rationale

Undernutrition impacts negatively on economic growth and perpetuates poverty through (i) direct losses in productivity (ii) indirect losses from poor cognitive function and deficits in schooling; and (iii) losses due to increased health care costs. It is estimated that GDP losses to malnutrition is 2-3% and productivity losses to individuals are about 10% of lifetime earnings. But a constellation of factors coalesce and cause undernutrition hence the strategy must be to generate evidence on

nutrition and development as a basis for public policy advocacy.

Strategy

- Assess patterns and levels of malnutrition and its determinants and identify measures to reduce vulnerability.
- 2. Strengthen approaches for monitoring inequities in health and for assessing population based intervention impact
- 3. Examine adaptive or coping strategies of households to alleviate economic stresses on households and how these influence food choices, consumption patterns, and young child feeding behaviours.
- 4. Develop appropriate methods to identify cost-effective and sustainable nutrition-related intervention programmes.
- 5. Strengthen food and nutrition knowledge platforms to strengthen advocacy and communication skills to promote policy development and planning.

Anaemia

Rationale

Iron deficiency anaemia is common in the Caribbean particularly among pregnant women, adolescents, and pre-school children. The prevalence of anaemia in the region ranges from 34% to 49% in young children; 24% to 57% in school

children and 36% to 52% in pregnant women. In addition to increasing susceptibility to infection, iron deficiency lowers work capacity in adults and hence productivity in the workforce. In children, it results in retarded growth and impaired learning. On the other hand, improving iron nutrition is one step towards a healthier, more productive population.

Strategy

- Advocate for policies to address increased/improved supplementation and fortification programmes.
- Build alliances with private and public sector groups and nongovernmental organizations.
- 3. Promote a process of social mobilization, including the dietary guidelines, to support a programme of anaemia control.
- 4. Foster awareness in the general population about the magnitude, severity, consequences and feasible solutions available for iron deficiency and anaemia.
- 5. Develop and evaluate formal and informal food and nutrition education programmes, with standardized information, to promote dietary diversification and behaviour change.
- 6. Develop, produce and disseminate materials to support social mobilization and nutrition education programmes.

7. Research the following:

- Iron content of local foods (food composition studies).
- Consumption of foods which affect iron status (food consumption studies).
- Iron status as it relates to maternal and child health.

NUTRITION and HIV / AIDS

Rationale

Nutritional support can improve the nutritional status of People Living With HIV/AIDS (PLWHA), as it is a function of intake, absorption and metabolism. Viral load. chronic diarrhea. and infections opportunistic impair growth in HIV-infected children and poor growth is associated with increased risk of mortality. Improved dietary intake is essential to enable children to regain weight lost after opportunistic infections. Nutrition is therefore not only an essential component in the management of those who are receiving medication to control their viral load but also in those whose viral load is not yet high enough to need medication. In this latter group good nutrition will not only improve their quality of life but will also slow down the process by which the viral load increases. This will result in a longer life and in more productive years to society. Nutrition therefore needs to be a major component in the prevention and care of all those at risk of living with these conditions in the Caribbean.

Strategy

- 1. Provide nutrition interventions to improve the individual's strength, endurance, ability to tolerate and respond to therapy; decreases the risk of developing opportunistic infections and for PLWHAs to have a better quality of life.
- 2. Provide appropriate nutrition/dietary information and adequate training to equip health-care workers and caregivers to help combat HIV/AIDS.
- Promote an adequate, balanced diet for weight maintenance and prevention of vitamin and mineral deficiencies in asymptomatic persons.
- Provide technical information on various supplemental regimes for the later stages of the disease.
- Develop algorithms and toolkits to manage nutrition in HIV/AIDS in different settings.

LOA 4 – INSTITUTIONAL DIETETICS

Hospitals

Rationale

Nutritional disorders are amongst the most prevalent and costly health conditions encountered, and often Cajanus

necessitate hospitalization patients. Pharmaceutical therapy is response the usual to conditions in spite of empirical evidence that supports lifestyle related approaches as essential for curative as well as preventive measures. Additionally, research shows that appropriate dietetic intervention is essential in the management of all conditions and provides a cost-saving alternative or support to other therapies.

Strategy

- 1. Develop improved clinical and administrative dietetic systems.
- Develop operational and technical guidelines for use by member countries in the improvement of the dietetic services.
- Enhance the capacity of countries to manage and deliver dietetic services more effectively.
- Identify and develop core dietetic services in countries, with a view to:
- Establish appropriate nutrient and operational standards.
- Improve quality of dietetic services data information management systems.
- Improve planning for dietetic services.
- Strengthen linkages between clinical and administrative dietetic

- service as well as between institutional and community-based nutrition and dietetics programmes/interventions.
- Assure quality through ongoing monitoring and effective reporting systems.

Schools

Rationale

In the Caribbean 27% of boys and 33% of girls aged 11-13 years are either overweight or obese. It is known that the growing prevalence of obesity predisposes children at a young age to diabetes and other noncommunicable diseases. Students represent a captive audience for cost effective nutrition intervention. students addition spend predominant portion of their waking hours at school and hence the need to have their nutritional needs adequately met. The nutritional status and satiety of students impact on their academic achievements. There is a clear need to foster an environment that enhances the health of school children in the Caribbean thorough healthful food choices thereby contributing optimal learning capacity.

Strategy

- Support existing school health programmes towards a more comprehensive one and strengthen:
- Collection and analysis of data to:

lifecourse approach into current policies and programmes to enhance their effectiveness. Maternal nutrition, fetal growth and young child nutrition as well as adolescent nutrition should be given special attention to prevent and control the epidemic of nutrition related chronic diseases in the Caribbean. Aggressive implementation of several WHO strategies in the Caribbean will advance this approach, for example, the global strategy for the prevention and control of diet and physical related chronic diseases, the new growth standards and energy recommendations for children and the report on fetal growth and development.

Strategy

- 1. Define policy and develop programmes, strategies and guidelines using the lifecourse approach to address obesity and the pockets of under-nutrition in the Caribbean.
- 2. Focus resources on neglected portions of the life course and ways of addressing the special needs of each.
- 3. Partner with other UN agencies and bilaterals to effectively address under-nutrition and obesity throughout life.
- 4. Support programmes that focus on the role of women in achieving lifecycle/course optimal nutrition and health for the household/family unit.
- 5. Protect nutrition of older adults in the Caribbean as they are a

- Establish trends.
- Provide evidence for nutrition interventions
- Plan and monitor the outcome of interventions
- Nutrition education towards a more behavioural focus as opposed to information sharing focus only.
- 2. Develop guidelines for the development, implementation and evaluation of school feeding programmes in the Caribbean.
- Develop operational and technical guidelines for the feeding of children in schools with special emphasis on canteens/tuck shops/ cafeterias and vendors.
- 4. Develop policies and plans which promote healthy eating and physical activity.
- 5. Partner with specific government ministries to promote schools as healthy spaces.
- Facilitate reinforcing environments in schools, communities and homes which enable sustainable healthy dietary and exercise behaviours.

LOA 5 – NUTRITION THROUGH THE LIFE COURSE

Rationale

Nutrition in the lifecycle overlaps with other lines of action. The important aspect here is to implement a holistic reinforcing

- growing segment of the population who are impoverished and nutritionally vulnerable.
- 6. Plan and evaluate programmes at a national level that promote recommended breastfeeding and complementary feeding behaviours.
- Plan and evaluate social communication programmes aimed at the promotion and adoption of `healthy eating and caring behaviours in pregnancy and childhood.

LOA 6 – HUMAN RESOURCE DEVELOPMENT (THROUGH TRAINING INSTITUTIONS)

Rationale

The shortage of human resources in nutrition and dietetics has been and will continue to be a significant constraint in achieving regional and national goals in nutrition and food security. In the absence of minimal and appropriately trained personnel, the best laid strategies will worth little in any attempt to substantially improve the nutritional status in the region. An examination of the severity and extent of nutritionrelated problems in the region compared with the available trained human resources shows a huge capacity gap. Except for a few countries, only 1-2 adequately trained personnel are available in each country. In all countries, trained personnel are only found in the Ministry of Health. Inadequate attention has been given in sectoral human resource plans to the mix of skills required for nutrition policy and programme development, the recruitment and retention of trained personnel through the upgrading of posts which are generally in the lower echelons of the health system and the creation of career paths for nutrition and dietetic personnel.

Within the region there community colleges that can support the training and certification of food handlers, and there are some institutions that offer a bachelors course specifically in nutrition and dietetics. For example, the University of Technology and the Northern Caribbean University in Jamaica, and the University of the West Indies, St. Augustine Human Nutrition and Ecology course. The UWI Mona Campus offers a Master in Public Health (MPH) degree which has a substantial nutrition component. The Tropical Medicine Research Institute (TMRI) also runs courses leading to a Master of Sciences, MPhil and PhD in Nutrition. These efforts are welcome but, more importantly, not structured to meet the public health nutrition needs of the region.

Strategy

1. Support countries in human resource planning for food and nutrition-related programmes and services to determine current and future human resource requirements as well

- as the preparation of strategic human resource development plans to meet national food and nutrition objectives.
- 2. Support the training institutions through designing additional courses, curriculum development and modification to meet current and future Caribbean needs in food and nutrition.
- 3. Promote national capacity building by supporting participation in tertiary level training programmes and appropriate inservice training programmes based on national human resource development plans.
- 4. Support countries in developing and implementing evaluation methodologies for assessing impact of staff training and development activities.

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