

# CIFSRF CARICOM Food Security Project



## **“An integrated “farm to fork approach” to improving food and nutrition security in the Caribbean by linking agricultural productivity and diversity on small holder farms to school feeding programs”**

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Presented at the International Food Security Dialogue 2014

Theme: “Nutritional security - relations between food, agriculture, health and nutrition”

**Presented by Leroy E. Phillip**

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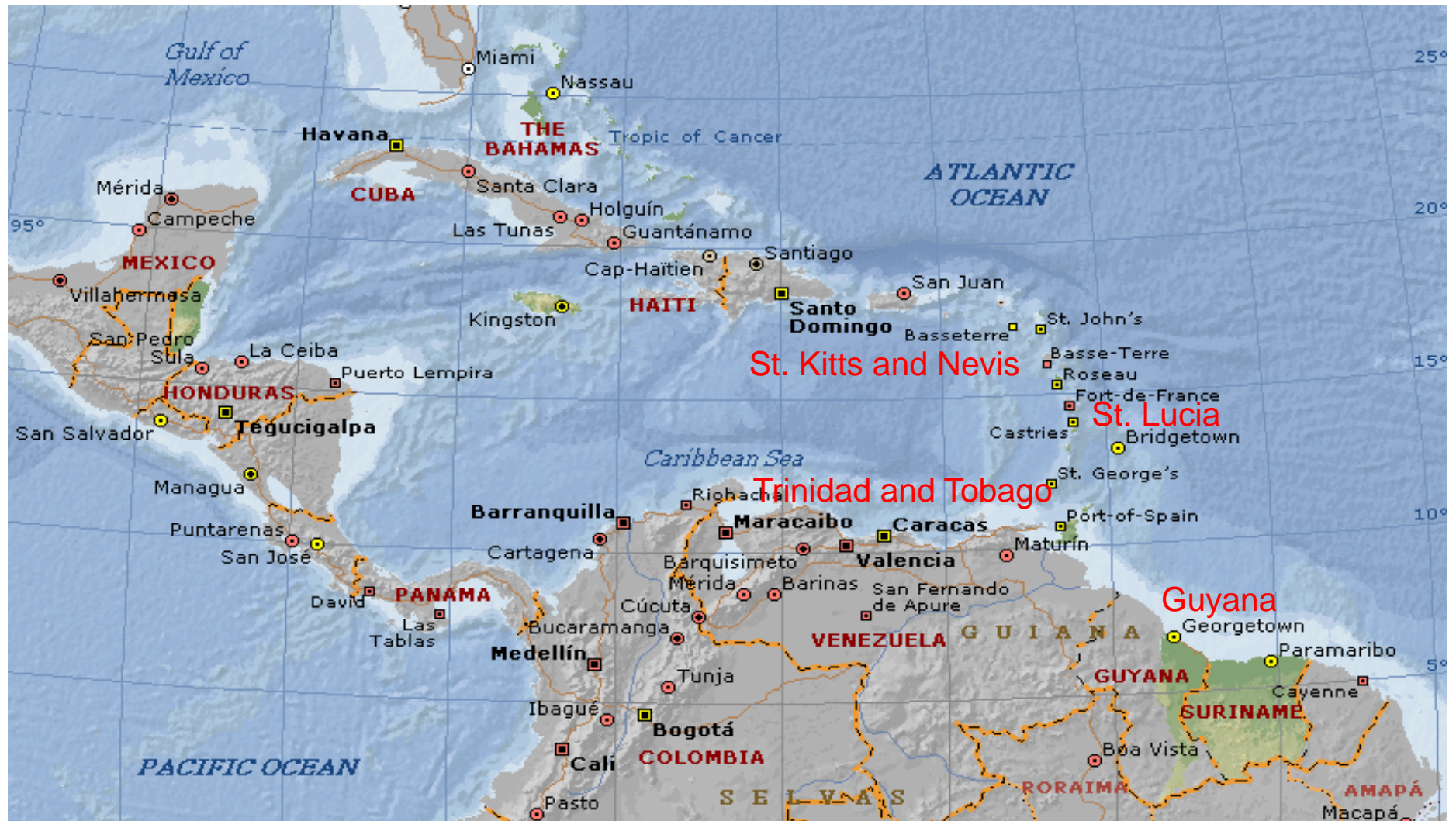
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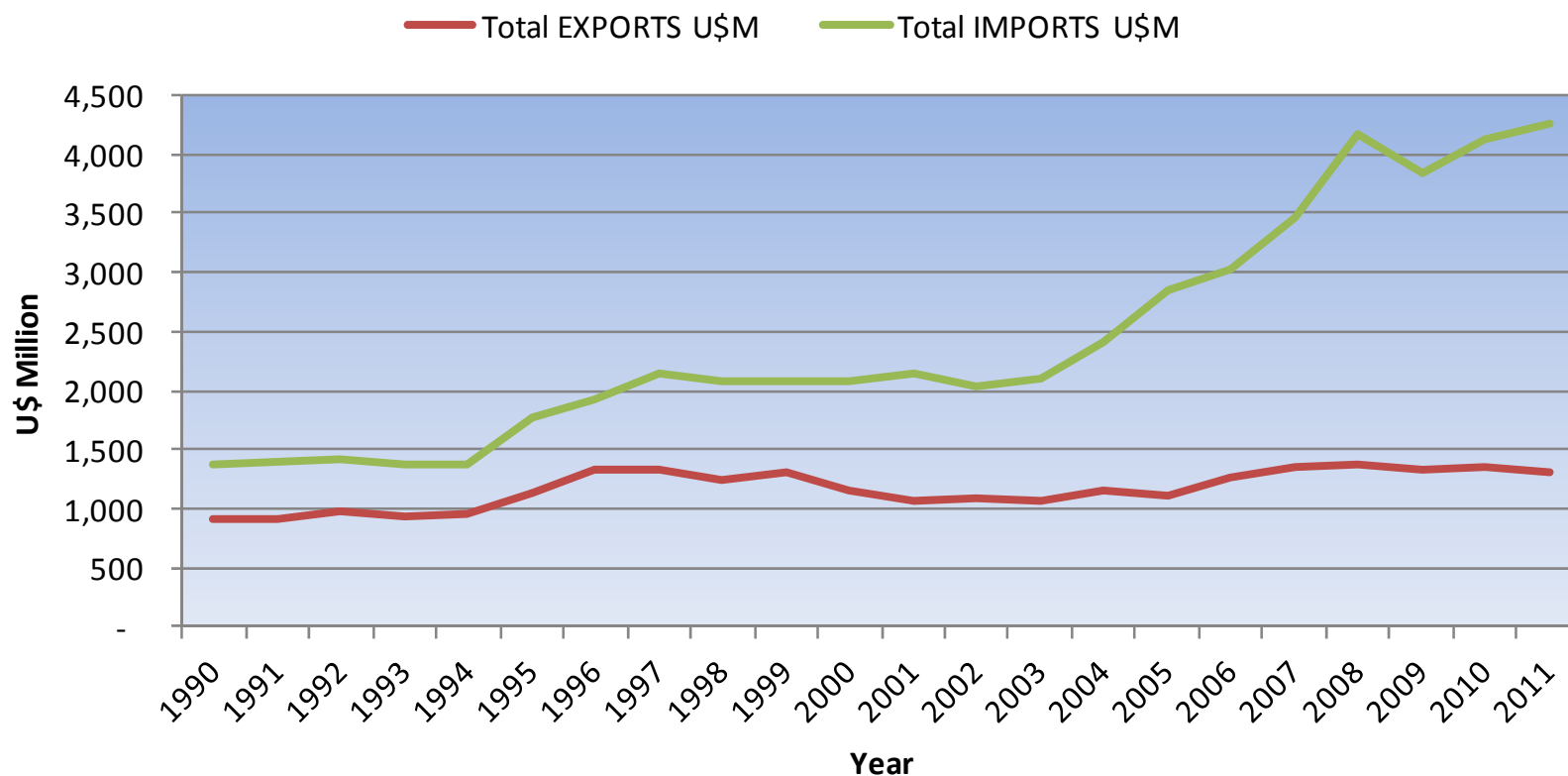


# CIFSRF CARICOM Food Security Project

BACKGROUND: CARICOM Countries



### TRENDS IN CARICOM AGRICULTURAL TRADE IN CROPS AND LIVESTOCK PRODUCTS 1990-2011



Source: J. R. Deep Ford 2013; FAO

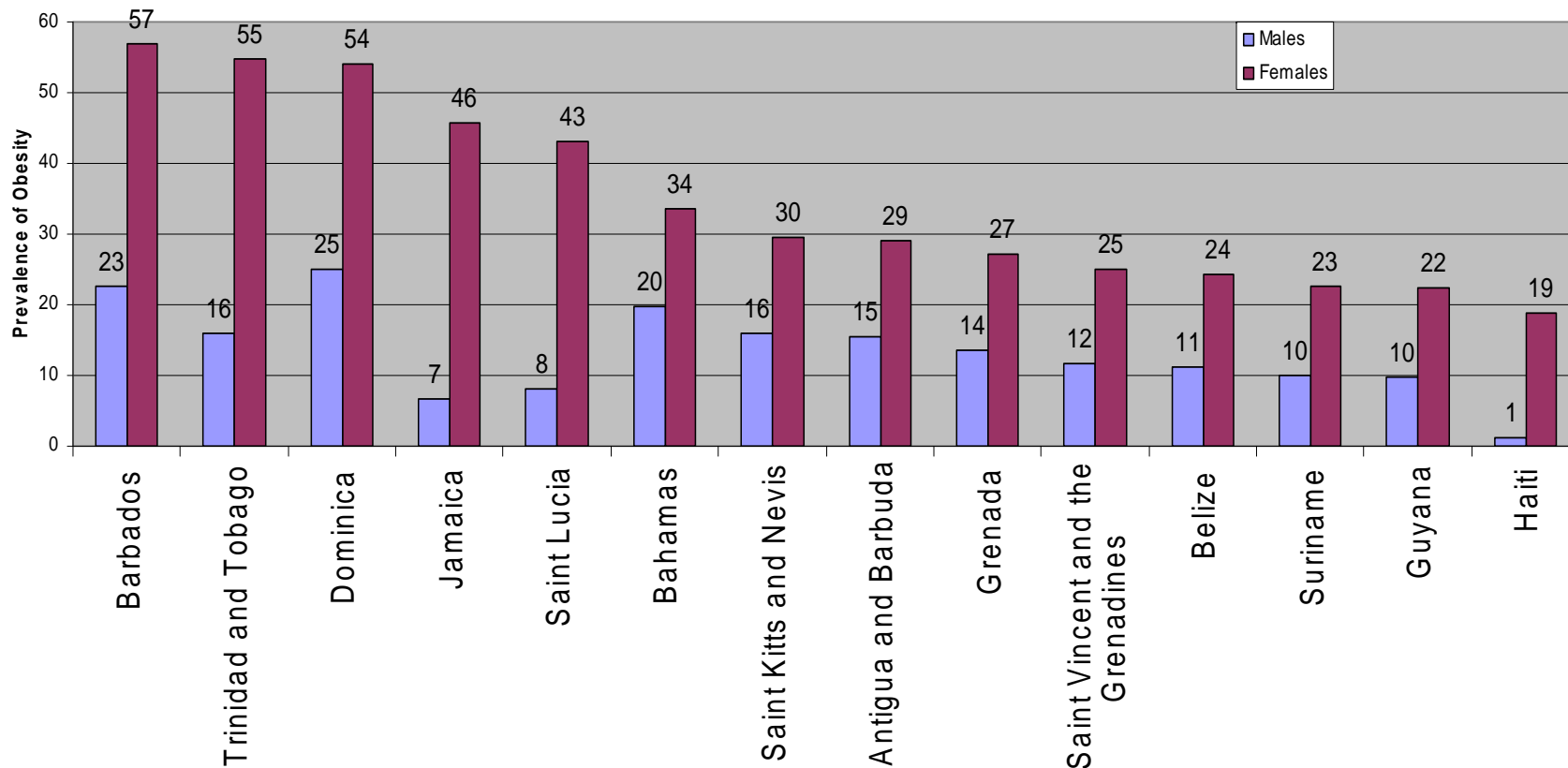
Food Availability	Availability <sup>1</sup> (Kcal/per capita/day)		% of change 2009-1990	RPG <sup>2</sup>	2009 Surplus (+) or Deficit (-) relative to RPG (%)
	1990	2009			
Total Food Calories	2393	2636	10 (+)	2250	17 (+)
Staples <sup>3</sup>	965	1140	18 (+)	1012	13 (+)
Fruits & Vegetables	162	213	31 (+)	337	37 (-)
Sugar & Sweeteners	389	367	6 (-)	180	104 (+)
Fats & Vegetable Oils	842	838	0	450	83 (+)
Protein	229	263	15 (+)	225	17 (+)

<sup>1</sup>Kcal/per capita/day; <sup>2</sup>Recommended Population Goal (2002); <sup>3</sup>Staples= Cereals + Starchy Roots  
 Source: Food Balance Sheets - FAOSTATS, <http://faostat.fao.org/>, April 2014

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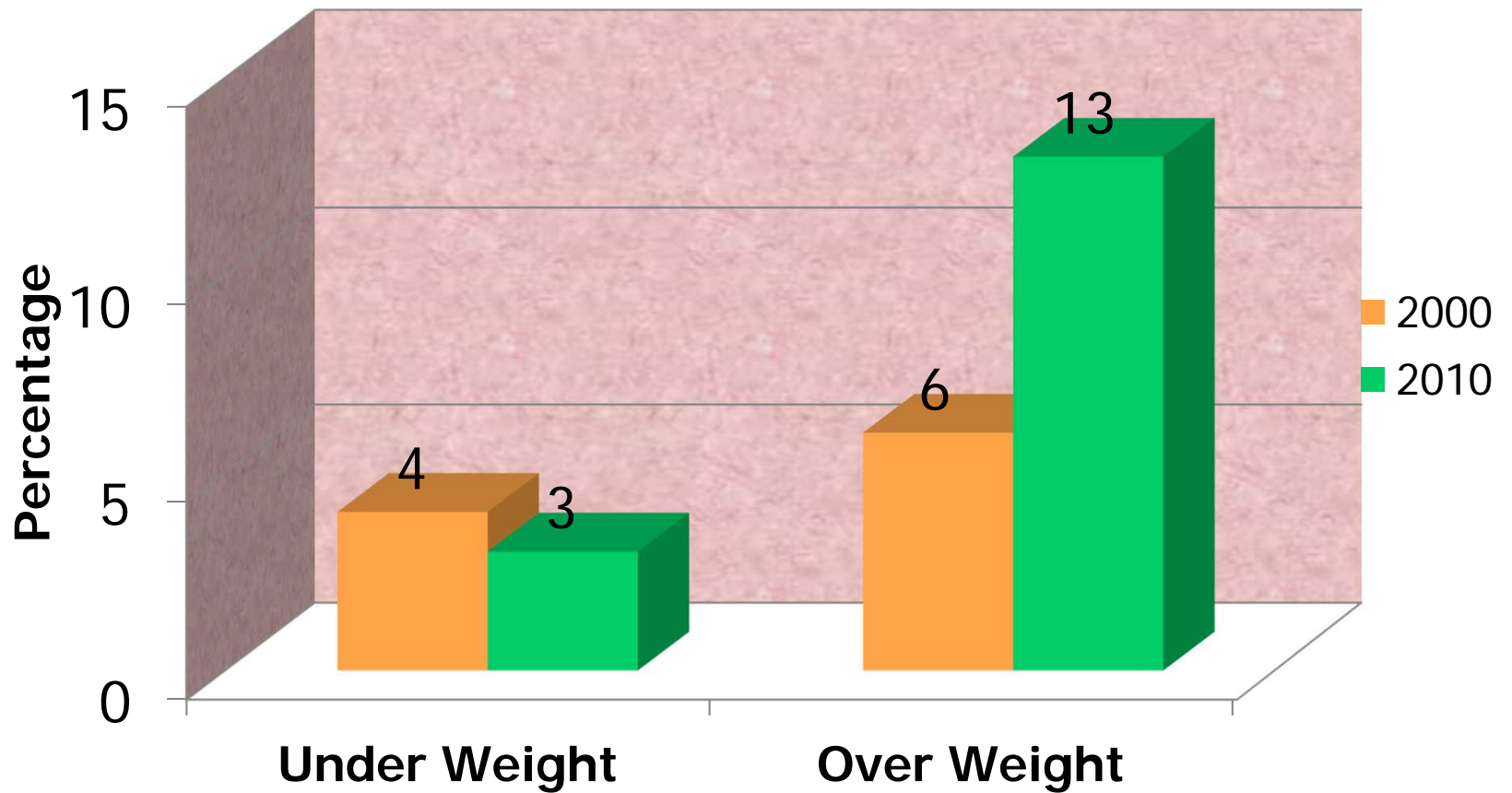
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## Prevalence of Overwt / Obesity in the Caribbean in > 30 years old



Source: J. R. Deep Ford 2013; FAO

**Changes in Childhood (0-5yr) Underweight and Overweight Status During a decade**



Source: CFNI

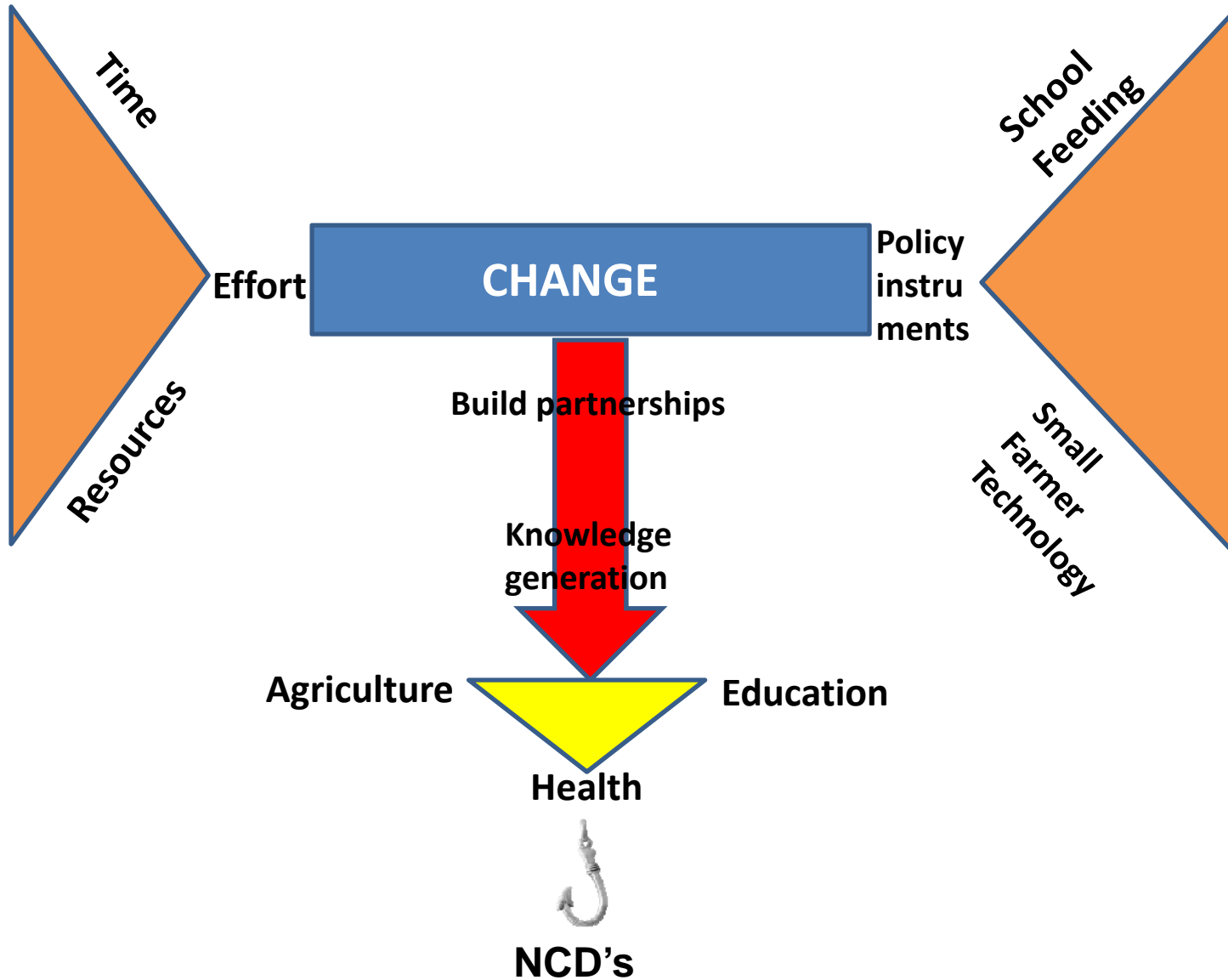
- CARICOM Food Insecurity has taken the form of **overweight & obesity**
- Obesity is high risk factor in **NCDs, costing CARICOM 5-8% of GDP** (Hospedales et al. 2011)
- Obesity , **especially women**, is rapidly increasing, and on the rise among **children**
- Obesity: linked to **low intakes of fruits & vegetables**, high intakes of fats, oils, sweeteners;
- Poor consumer food choices and lifestyles;
- Institutional and **market constraints** on domestic production of nutritious food
- **Seasonality in crop and livestock productivity , floods and droughts**
- **Limited Institutional Capacity**
- High **food import bill** (US \$5 bil/yr) – energy- dense food types



- Improve nutrition & health outcomes of CARICOM populations through increased availability of foods that would increase intake of vegetables & fruits, decrease caloric intake, and increase micronutrient intake;
- Develop food production systems based on agricultural diversification, water conservation & efficient use of land;
- Understand constraints to, and accelerate the rate of technology adoption by small farmers;
- Adapt international standards of food safety and quality for a healthy, market-oriented food supply chain;
- Build and test a Farm to Fork Model for CARICOM food and nutrition security;
- Expand and build human and institutional capacity to solve problems of food and nutrition insecurity in CARICOM;

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MODEL BUILDING: Framework for change:  
CIFSRF Project Opportunity



# **MODEL Building**

**Household &  
Community**

**Food & Nutrition security**

School Feeding for  
Child Nutrition and  
Health

Social  
Science

- ✓ Collective action
- ✓ Innovation

Produce Procurement  
from Small Farmers

Social  
Science

- ✓ Technology adoption
- ✓ Social capital
- ✓ Policy

Agricultural  
Technology for  
Food Production

**Farm to Fork Model**

**Research Interventions**

Project Themes	Research Interventions/ Activities	St. Kitts and Nevis	Trinidad and Tobago	Guyana	St. Lucia
Community Nutrition & Health	<b>Menu modification to school lunch</b>	X	X	n/a	n/a
	<b>Nutrition education</b>	n/a	X	n/a	n/a
	Food safety	X	X	X	X
Socioeconomics	<b>Policy and Institutions</b>	X	X	X	X
	<b>Food choice experiments/ Technology adoption</b>	X	n/a	X	n/a
Water and Land resources (Agricultural technologies)	<b>Drip Irrigation for food crops</b>	X	X	X	X
	<b>Protected agriculture</b>	X	X	n/a	X
	<b>Open field cropping systems</b>	X	X	X	X
	<b>Post harvest Quality</b>	X	X	X	X
	<b>Silage-based small ruminant production</b>	X	n/a	n/a	n/a

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## Pilot Countries



# School Lunch Feeding

# CIFSRF CARICOM Food Security Project

**METHODOLOGY: Study  
Period ad Sample Size**

**St. Kitts  
and Nevis**

**Start date  
Jan/2013**

**End date  
Mar/2014**

**Trinidad  
And Tobago**

**Start date  
Sept/2012**

**End date  
Feb/2014**

Country	Treatment	# of children (total=1871)	# of children assessed (5-12 yr) (Total= 491)
St. Kitts and Nevis	Menu modification	839	101
	Control	567	87
Trinidad and Tobago	Menu modification (MM)	119	80
	Nutrition education (NE)	99	54
	MM+NE	150	101
	Control	97	68



**Menu Planning goals in keeping with the US National School Meals Program, 2010.**

<b>1/3 of daily recommendations</b>	
<b>Fat:</b>	<b>Reduce total fat to no more than 30 percent of calories.</b>
<b>Sodium-</b>	<b>Reduce intake of sodium to 600-800 mg</b>
<b>Iron</b>	<b>include iron rich foods to provide approximately 2-4 mg</b>
<b>Protein</b>	<b>To include a variety of protein sources (peas and beans, fish and poultry)</b>
<b>Energy</b>	<b>Approximately 470 kcal</b>
<b>Fiber</b>	<b>Increase use of whole grains, roots and tubers</b>
<b>Fruits &amp; Vegetables</b>	<b>1 serving of whole fruit or 100% fruit Juice, and 1 serving of Vegetables</b>

## Before

- Rice and beans, turkey wings, Noodles/ground meat
- Hot dogs
- Chicken soup with pumpkin and dumplings
- Cheese sandwich
- Sugar drink



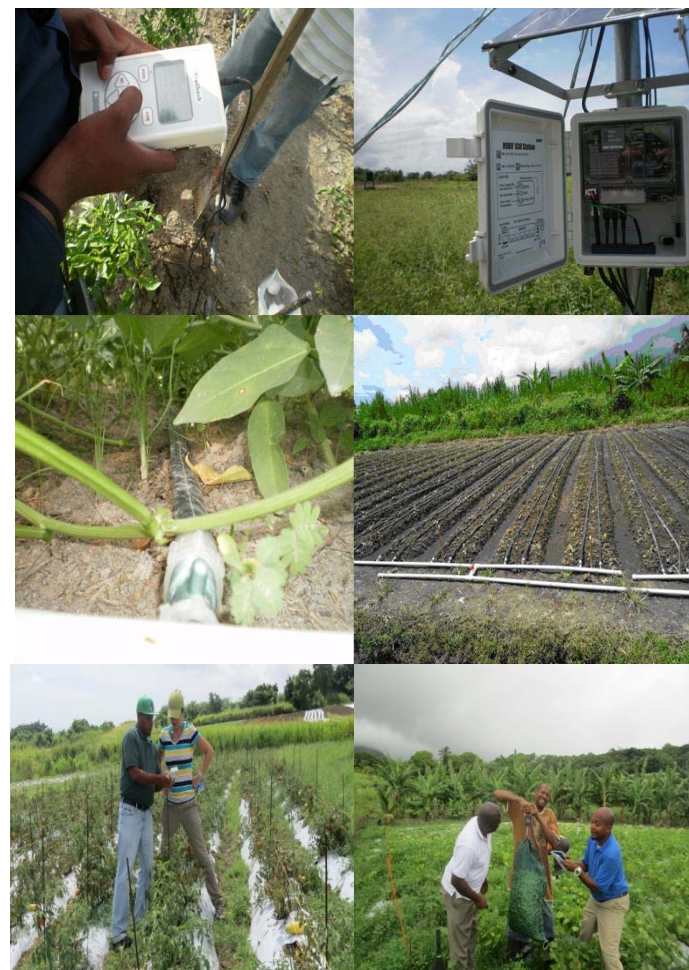
## Added

- String beans, carrots
- Tomatoes, cucumbers
- Sweet potato, pumpkin
- Melon, green banana
- Mutton



# **Agricultural technology for crop productivity and diversity**

- **4 on-farm experimental sites (2 in St. Kitts ; 2 Guyana);**
- **16 farmers in SK; 10 in east coast Guyana**
- For St. Kitts, the irrigated area was 1.84 ha in total; 0.66 in Stapleton and 1.18 in Mansion.
- In Guyana, the irrigated area was 1.65 ha in ( total; 0.85ha in Parika region and 0.80ha in Black Bush Polder).
- **Crops :** 13 different crops (F& V)
- **Study Design:** 3 irrigation scheduling treatments (Control, 80% of AWC and 100% of AWC)
- **Measurements :** crop yield, soil moisture, climate parameters





Drip irrigation



Drip + mulching



Post-harvest loss measurement  
(Penetrometer)



Mulato grass conservation  
for small ruminants

# **PROJECT RESULTS**



Melons



Cucumbers



Tomatoes



Watermelon



Pumpkin



Cabbage



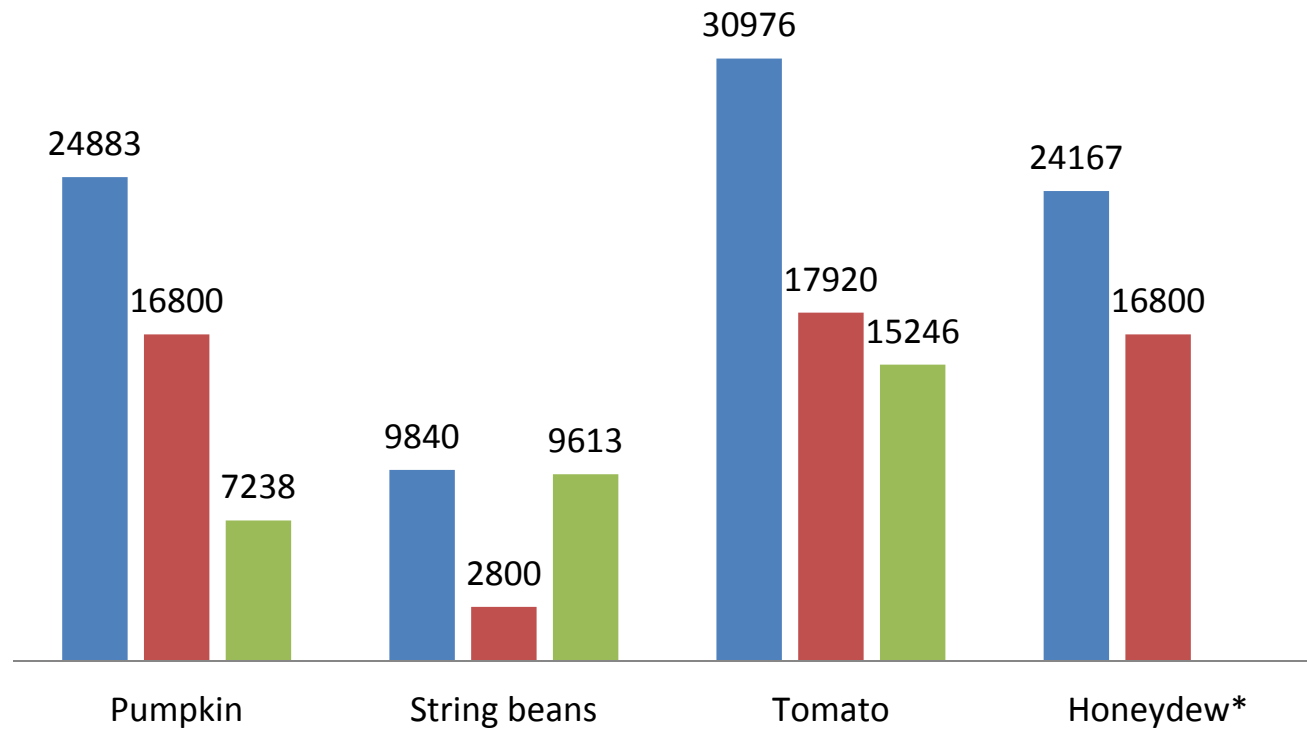
String beans



Carrots

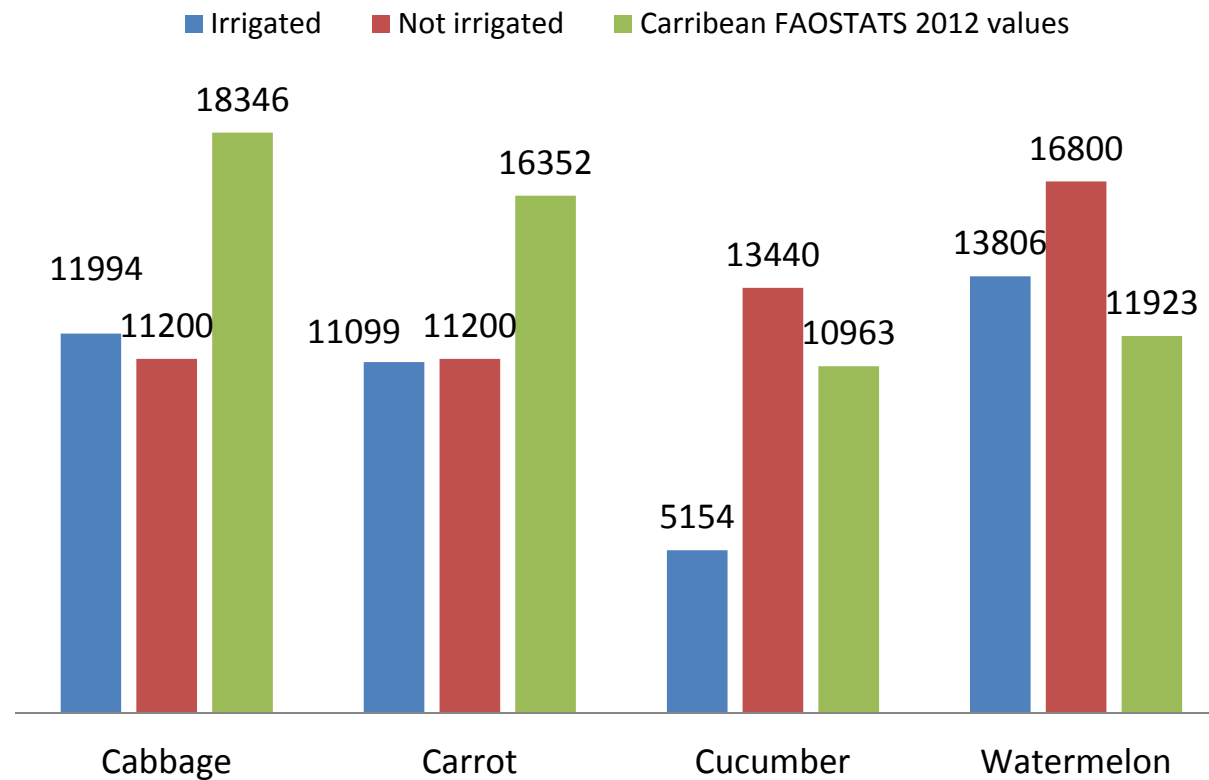
**Comparative project yield (Kg/ha) - St. Kitts**

■ Irrigated ■ Not irrigated ■ Carribean FAOSTATS 2012 values

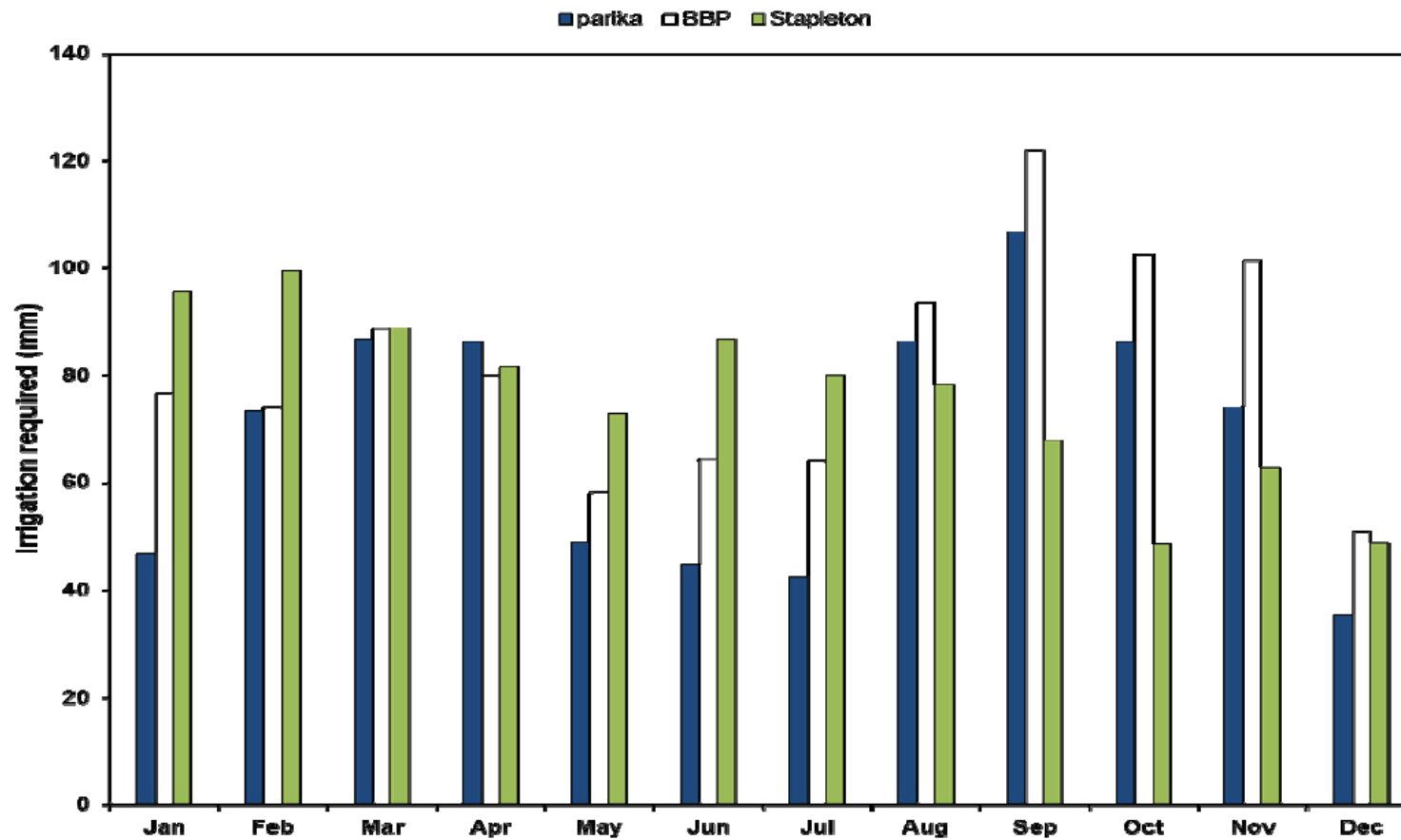


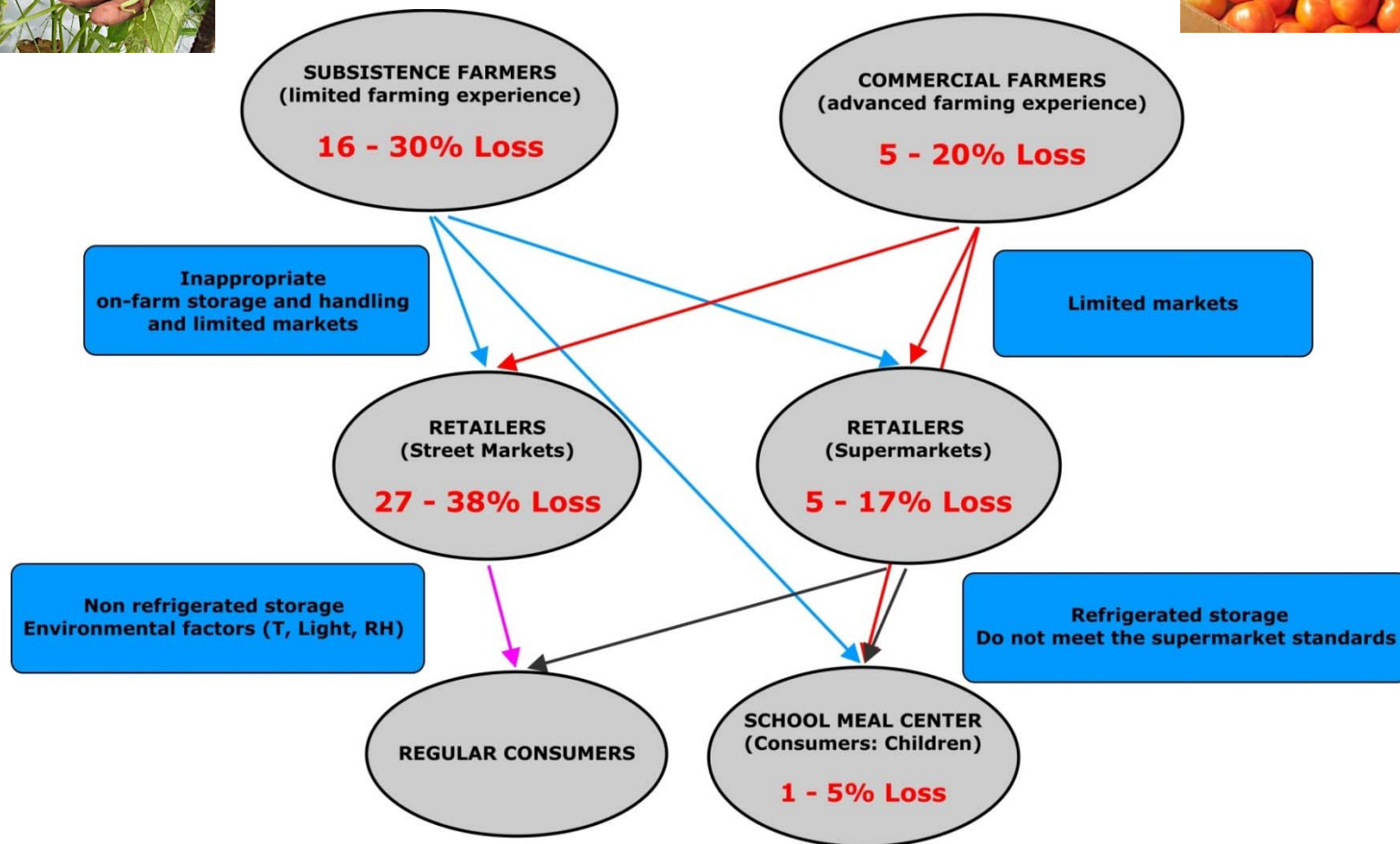


**Comparative project yield (Kg/ha) - St. Kitts**



## Average monthly irrigation requirement at the three study sites during 2005-2012







***Direct sunlight control***



***Packaging materials***

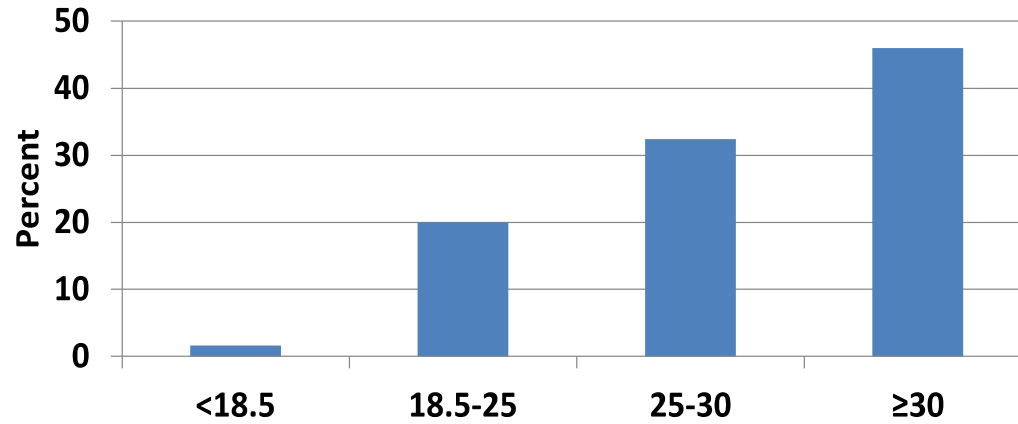


***Wrapping materials***

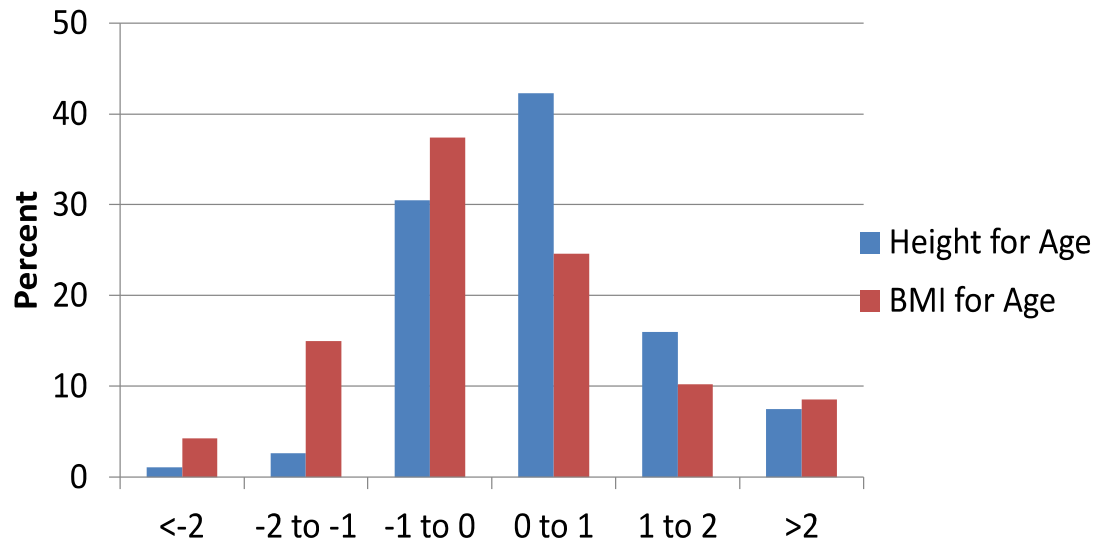
# **School Feeding**

- **Baseline Data: food security; nutritional status; obesity**
- **Produce Procurement by school meals Centre:**
  - produce supplied by local Farmers
  - Diversity of produce procured
- **Cost of Improved lunch menu**
- **Menu Compliance**
- **Diet Quality :**
  - Nutrient content of meals as offered
  - Meal Acceptance ( plate waste)
- **Nutrition outcomes of children**
  - 24 h recall dietary intake
  - Fruit and vegetable intake
  - Anthropometry (BMI; height for age)

**BMI of Caregivers of school children**



**Children: Height and BMI for Age**

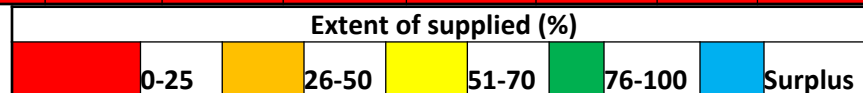


<b>Food security status</b>	<b>% of households</b>	<b>% of thin children</b>	<b>% of overweight and obesity children</b>
<b>Food insecure</b>	<b>46</b>	<b>5</b>	<b>28</b>
<b>Food secure</b>	<b>54</b>	<b>4</b>	<b>38</b>

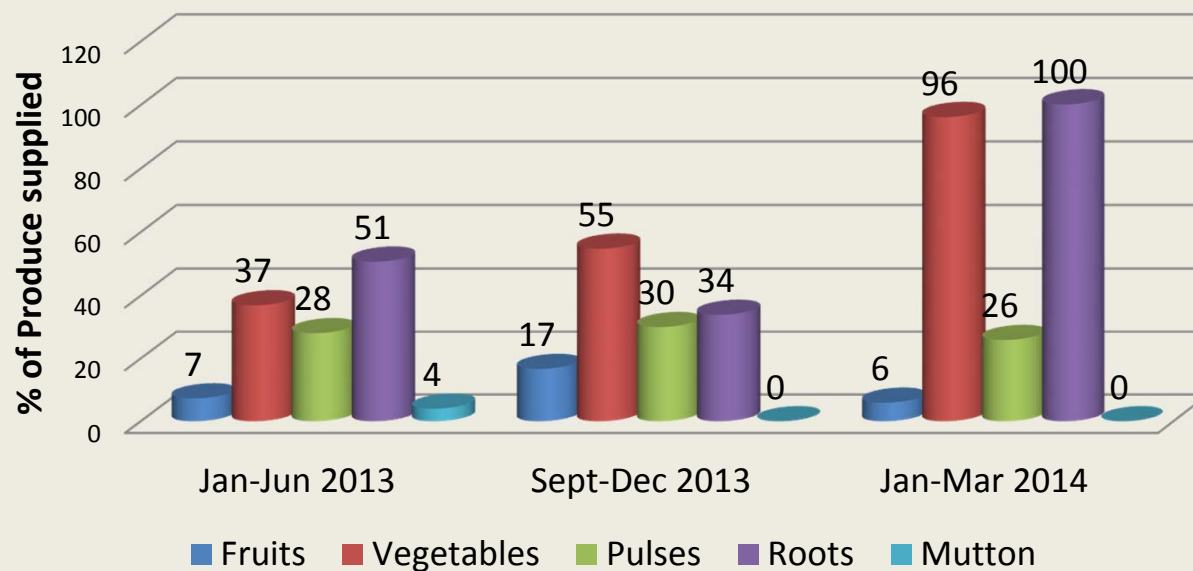


**Extent of produce supplied by Local Farmers (Project and Non Project Farmer) in St. Kitts relative to School Meal Centre Needs – January 2013 to March 2014 school year**

Product	2013										2014		
	Jan	Feb	Mar	Apr	May	Jun	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Tomato	26	19% surplus	83% surplus	0	0	17	57	43	53	36	82	78	80
Pumpkin	19	0	23	45	62	88	25	72	97	22	67	88	94
Cucumber	63	33% surplus	25	0	30	73	14% surplus	0	38	67	33	0	0
String Beans	43	33	41	8	33	20	15	0	53	70	17	18	43
Carrots	8	25	5% surplus	33	14% surplus	92	0	0	0	86	77	82	8% Surplus
Sweet Potato	73	0	33	0	19	35	19	58	59	0	22	28	10
White Potato	0	29	31	60	14	0	0	16	0	0	43	87	1% Surplus
Cabbage	0	0	0	0	92	0	0	23	93	0	86	97	92
Watermelon	0	0	21	14	79	26	25	0	9	0	8	0	13
Cantaloupe	0	0	0	0	0	0	26	0	0	0	0	0	0
Banana	0	0	0	0	0	0	7	0	25	0	4	7	1
Other fruits	0	0	0	0	0	0	0	13	53	25	8	3	0
Onion											28	42% Surplus	85
Mutton	0	0	24	0	0	0	0	0	0	0	0	0	0

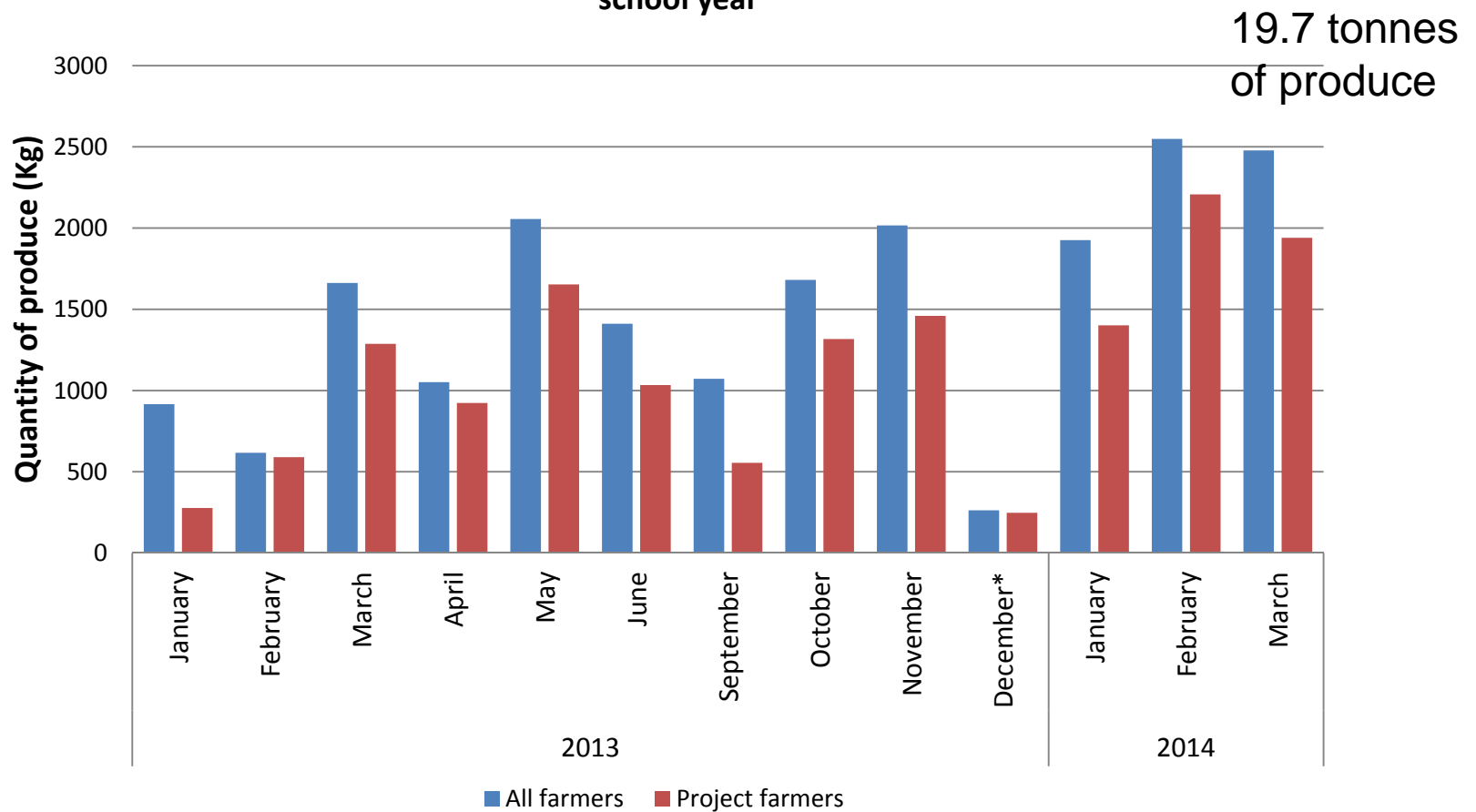


Proportion (%) of produce supplied to St. Kitts School Meals Centre (SMC) by local farmers ("project" and non-project farmers ) in relation to SMC needs- January 2013 until March 2014 school year

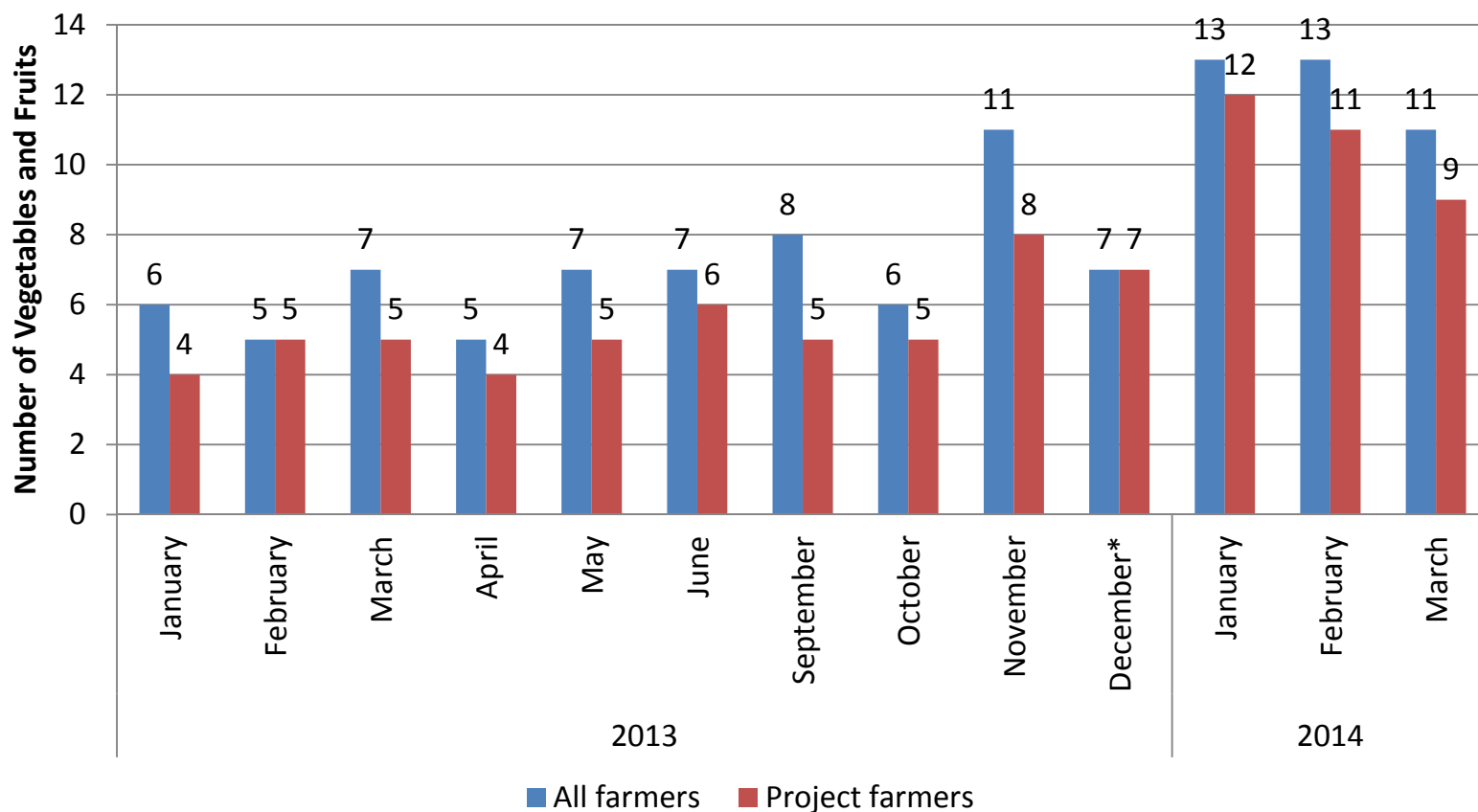


**Roots** – White potato, Sweet potato, Carrots and Breadfruit; **Vegetables** – Tomato, Pumpkin, Cucumber, Cabbage. Collard leaves and Onions; **Pulses** – String beans; **Fruits** – Watermelon, Banana, Cantaloupe, Oranges, Sour orange, Star fruit and Lime; **Mutton**

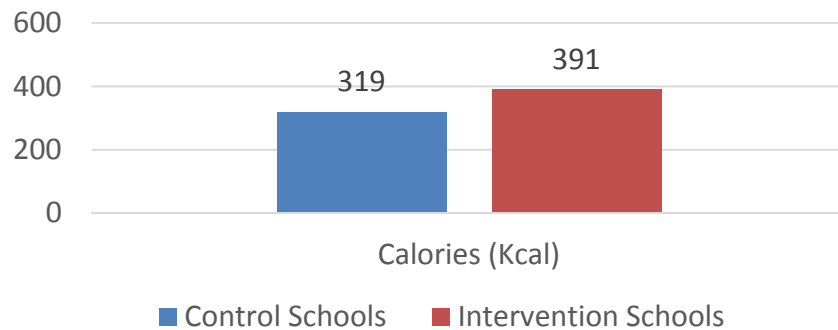
Total quantity of all produce received by St. Kitts School Meals Centre from local farmers ("Project "and non-project farmers) - January 2013 until March 2014 school year



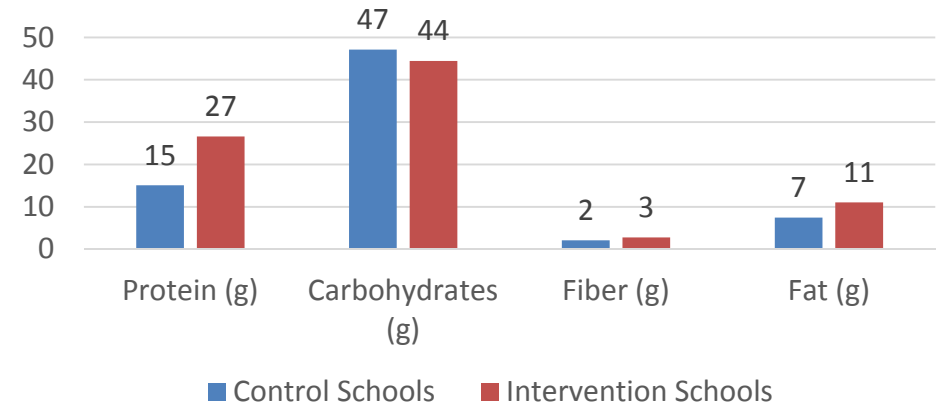
**Diversity (number ) of Fruits, Vegetables , Pulses and Roots received by St. Kitts School Meals Centre from local farmers ("Project" and Non Project Farmers) -January 2013 to March 2014 school year**



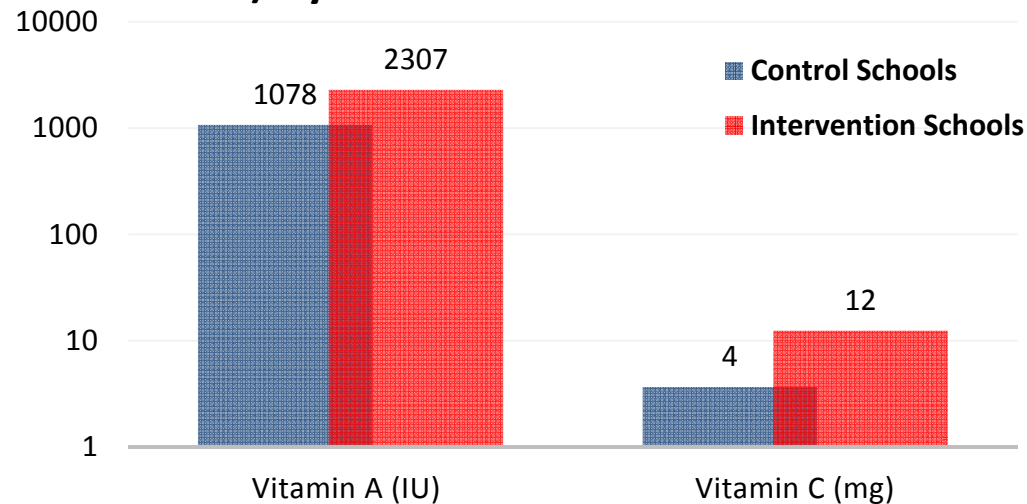
Energy intake (Kcal/child/d/lunch meal) by school children in St. Kitts



Nutrient intake (g/child/d/lunch meal) by school children in St. Kitts

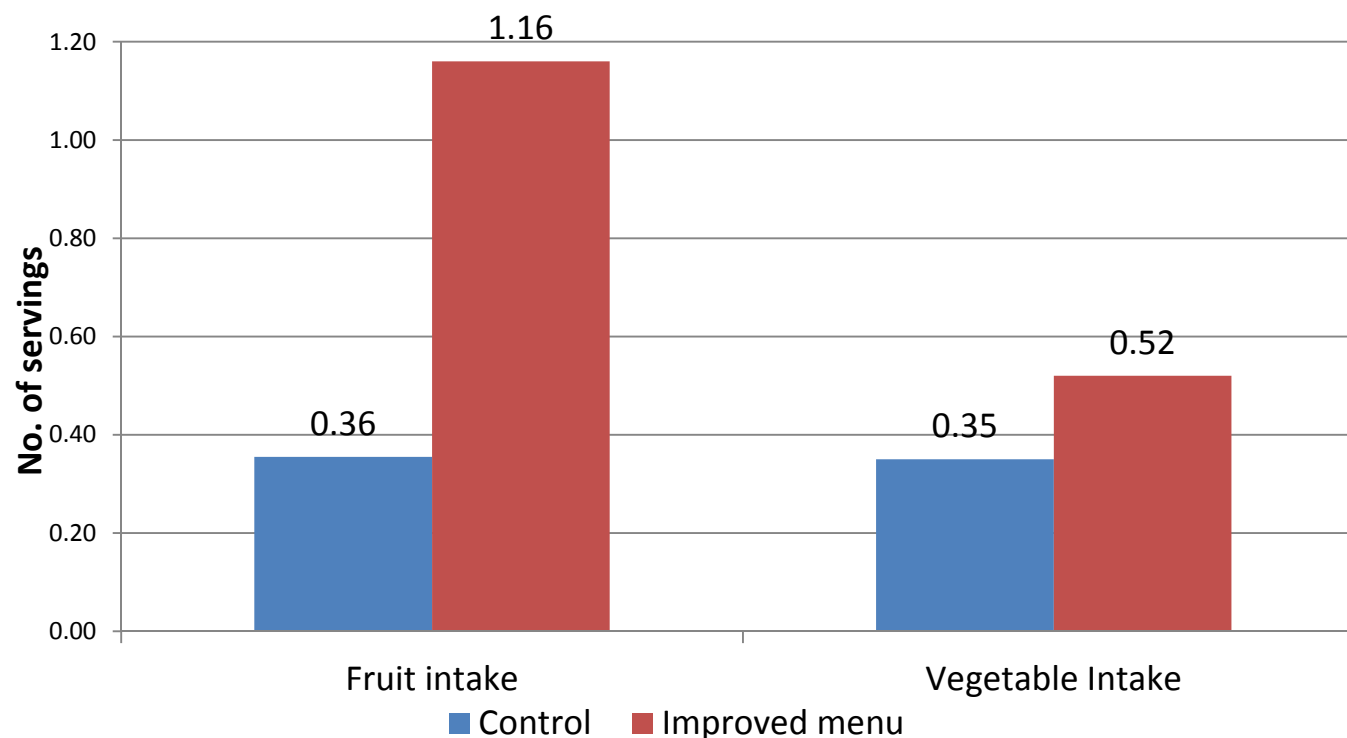


**Vitamin intake ( per child/d/lunch meal) by school children in St. Kitts**



“End of project” intake of fruit and vegetables (no. of servings) by children (8 to 12 year old) in Trinidad, based on 24 h dietary recall and the number of children eating the school lunch meals on recall day (preliminary results)

**Intake of fruit and vegetable by children (8 to12 year old)**



**Process Evaluation Study in St. Kitts**

	Control	Test meal -April 2013	Test meal – Sept-Oct 2013
<b>Fruit /Veg servings</b>	<b>0.13</b>	<b>0.51</b>	<b>1.07</b>
<b>% of Children accepting new foods (%)</b>	<b>N/A</b>	<b>46-85</b>	<b>--</b>
<b>Compliance with test menu</b>	<b>N/A</b>	<b>67%</b>	<b>89%</b>
<b>Cost per meal per child (\$EC)</b>	<b>0.96</b> <b>(\$0.39 CAD)</b>	<b>1.57</b> <b>(\$0.64 CAD)</b>	<b>2.06</b> <b>(\$0.84 CAD)</b>

## Conclusions

- School feeding programs (SFP,s) are underutilized vehicles for reversing the obesity trends in CARICOM while providing market opportunity for small holder farmers ;
- Equipped with drip irrigation and other agricultural technologies, local farmers delivered about 20 tonnes of new nutritious produce in one year to the SFP in St. Kitts- a novelty in food procurement by the SFP in the Eastern Caribbean
- Project results from serve to construct a useful farm to fork model for regional application in finding solutions to CARICOM food and nutrition insecurity
- Findings from the Project could inform policy makers of a new, and integrated approach to addressing food insecurity in CARICOM



## Acknowledgements

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Special appreciation is expressed to Patrick Cortbaoui, all other Project Team members and Project Partners for their contributions to the project.

Project website: <https://www.mcgill.ca/globalfoodsecurity/research-initiatives/caricom-project>



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**THANK YOU**



**CARICOM Project website:**  
**[www.mcgill.ca/globalfoodsecurity/research-initiatives/caricom-project](http://www.mcgill.ca/globalfoodsecurity/research-initiatives/caricom-project)**