



Ministry of Agriculture

Agriculture - Our Vehicle for Sustained Economic & Social Prosperity

A NATIONAL STRATEGY FOR AGRICULTURE IN GUYANA 2013-2020



ACKNOWLEDGEMENT



**Mr. George Jervis
Permanent Secretary
Ministry of Agriculture**



**Agriculture Minister Dr. Leslie Ramsammy flanked by
Members of the Technical Team for the
Agriculture 2020 Vision Strategy**

On behalf of the stakeholders of the agriculture sector, we would like to express gratitude to Ministers of Agriculture, Hon. Dr. Leslie Ramsammy and Hon. Mr. Ali Baksh for their invaluable contribution and guidance in crafting the Agriculture 2013-2020 Strategy.

Additionally, gratitude is extended to all Heads of Department of the Ministry for their leadership, commitment, technical inputs and fervent support in developing this document.

Recognition must be accorded to Dr. Oudho Homenauth, CEO NAREI for his continued support and inputs during the process of developing the strategy.

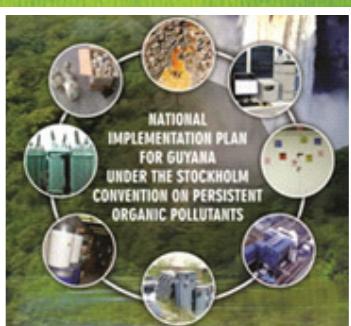
In addition, we would like to acknowledge the contribution of Ms. Natasha Beerjit Deonarine, Head of M&E for her work on the document.

We are indebted to the Hon. Minister of Agriculture, Dr. Leslie Ramsammy for being the Lead Writer of this Strategy.

As PS I will lead a team that will meet twice per year to assess implementation of this strategy and I look forward to the Annual Report which will provide an Implementation Index.

MINISTRY OF AGRICULTURE

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Message from the Ministers of Agriculture

We are pleased to introduce the 2013-2020 National Agriculture Strategy for Guyana. This is the first overall Agriculture Strategy for Guyana. In the past sub-sector agriculture strategies have been presented, however this is the first time we have developed and presented a strategy that is an overall agriculture strategy, to go along with the various sub-sector strategies.

The strategy provides clear indicators to ensure a robust monitoring and evaluation mechanism. It will be accompanied by detailed annual workplans and an Annual Report that will measure implementation rate. There will also be an Implementation Index to assess our annual achievements.

The title of our agriculture strategy is AGRICULTURE – OUR VEHICLE FOR SUSTAINED ECONOMIC AND SOCIAL PROSPERITY. The title declares unambiguously our view of agriculture. It is not merely another economic pillar. Indeed, agriculture in Guyana is a lifestyle; it is the very root and fabric of our society.

The 2013-2020 Agriculture Strategy loudly rejects the notion promoted in developing countries that agriculture is for subsistence livelihood. The MOA presents the Strategy as a wealth generation economic system. While we accept that agriculture is the most powerful economic and social tool to eliminate poverty and hunger, we present an Agriculture Strategy for Guyana that has the potential to generate wealth at both family and national levels.

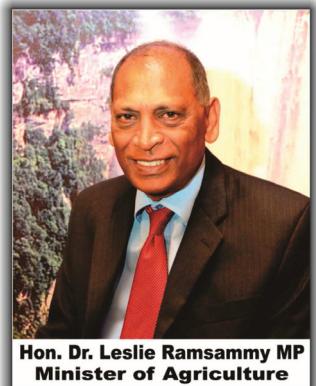
The Agriculture Strategy presented through this document is one that if implemented fully will ensure that agriculture continues to be a dominant force in Guyana's economy. In part this is because it also seeks to industrialize agriculture. Never before in Guyana's history has there been such concerted effort in transforming agriculture from a grassroots producer of primary products to one in which manufacturing provides value-added commodities.

The Agriculture Sector is one of the largest areas for investment in Guyana's economy. More than \$50B is invested in current expenditure each year by small scale and large farming enterprises. The strategy we present today is one where ample opportunities are provided for Guyanese families and international investors to engage in entrepreneurship.

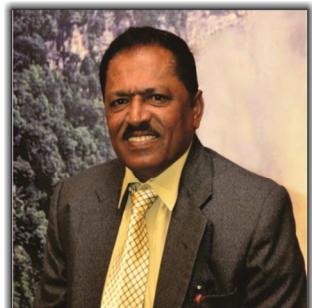
Clearly, agriculture is the most vital element in food and nutrition security. The 2013-2020 Agriculture Strategy outlines a Roadmap to ensure that Guyana achieves its ambitions as a food and nutrition secure nation and as a major contributor to Food and Nutrition Security within CARICOM. But the strategy also recognizes that agriculture is more than food and nutrition security. One exciting new thrust for agriculture in Guyana is agri-energy. The 2013-2020 strategy seeks to establish Guyana as the major agri-energy producer in CARICOM.

Further, the 2013-2020 Strategy promotes Guyana's Agriculture in the field of fashion and medicine and furniture and other recreational products. It is for these reasons that we call this strategy the F5 Strategy. The F5 Strategic Approach abandons the more familiar commodity approach. For example, in the past, we focused like many developing countries, on commodities like the 5Cs (citrus, coconuts, cocoa, cassava, cattle) and the 4Ps (pepper, pineapples, pumpkin, plantain). The F5 approach targets all facets of agriculture – food, fiber, fuel, fashion and furniture. It targets value-added etc.

This strategy commits to reduce import of agriculture commodities and increase agriculture export.



**Hon. Dr. Leslie Ramsammy MP
Minister of Agriculture**



**Hon. Alli Baksh MP
Minister within the Ministry of Agriculture**

It ensures that women and youth become even more engaged in agriculture than they are presently in Guyana.

We promote mechanization as a way forward. A link with science is made an imperative. While we are a small nation, we endeavor to be one of the more important agriculture centers in the Region of the Americas.

The strategy recognizes the need for infrastructure and there is an Infra-structure Portfolio as part of the strategy. It further recognizes the need for financing, trade, marketing, research, human resource etc.

We commend this strategy to all stakeholders. We urge the agriculture leadership to promote the strategy and to ensure awareness as widely as possible.

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Acronyms

ABIS	Agriculture Business Information System
ACTO	Amazon Cooperation Treaty Organisation
ADP/AEDP	Agriculture Export Diversification Project
ADRM	Agriculture Disaster Risk Management
APP	Agriculture Policy Programme
ASDU	Agriculture Sector Development Unit
BRD	By-Catch Reduction Device
5Cs	Caribbean Community Climate Change Centre
CACHE	Caribbean Council for Higher Education
CAFAN	Caribbean Farmers Association
CAHFSA	Caribbean Agricultural Health and Food Safety Agency
CAP	Conservancy Adaptation Project
CARDI	Caribbean Agricultural Research & Development Institute
CARICOM	Caribbean Community
CARTF	CARIFORUM Agribusiness Research and Training Fund
CCA	Climate Change Adaption
CDC	Civil Defence Commission
CDIP	Community Drainage and Irrigation Program
CDM	Clean Development Mechanism
CELAC	Community of Latin American and Caribbean States
CFC	Chlorofluorocarbons
CIMHI	Caribbean Institute of Meteorology and Hydrology
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CIAT	International Centre for Tropical Agriculture
CJIA	Cheddi Jagan International Airport (Timehri)
CMO	Caribbean Meteorological Organisation
COTED	Council for Trade and Economic Development
CRFM	Caribbean Regional Fisheries Mechanism
D&I	Drainage and Irrigation
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EDWC	East Demerara Water Conservancy
EMIS	Export Management Information System
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuária (Brazilian Enterprise for Agricultural Research)
EWS	Early Warning System
EU	European Union
FAC	Fisheries Advisory Committee
FAO	United Nations Food and Agriculture Organization
FD	Department of Fisheries
FDD	Food and Drug Department
FMD	Foot and Mouth Disease
FNSS	Food and Nutrition Security Strategy
GAP	Good Agriculture Practices
GAPA	Guyana Agro-Processors Association

GAPA-FG	Guyana Agricultural Producers Association Farmers Group
GDP	Gross Domestic Product
GEA	Guyana Energy Agency
GFC	Guyana Forestry Commission
GHG	Green House Gases
GIS	Geographical Information System
GPS	Global Positioning System
GMC	Guyana Marketing Corporation
GMF	Genetically Modified Food
GMP	Good Manufacturing Practices
GMO	Genetically Modified Organisms
GLDA	Guyana Livestock Development Authority
GLSC	Guyana Land and Survey Commission
GRDB	Guyana Rice Development Board
GRA	Guyana Revenue Authority
GROC	Guyana Agriculture Research Oversight Committee
GSA	Guyana School of Agriculture
GUYSUCO	Guyana Sugar Corporation
GUYWID	Guyanese Women in Development
HACCP	Hazard Analysis and Critical Control Points
HCFC	Hydro chlorofluorocarbon
HCR	Harvest Control Rules
HOD	Heads of Department
IDB	Inter-American Development Bank
ICAO	International Civil Aviation Organization
ICT	Information and Communications Technology
ICCM	International Conference on Chemicals Management
ICCR	Indian Council for Cultural Relation
IFAD	International Fund for Agricultural Development
IICA	Inter American Institute for Cooperation on Agriculture
IPNM	Integrated Plant Nutrient Management
INM	Integrated Nutrient Management
ISO	International Organization for Standardization
ISM	Integrated Soil Management
ITEC	Indian Technical & Economic Cooperation Programme
LCDS	Low Carbon Development Strategy
M&E	Monitoring and Evaluation
MACC	Mainstream Adaptation to Climate Change
MCYS	Ministry of Culture Youth and Sports
MOA	Ministry Of Agriculture
MOF	Ministry of Finance
MOFA	Ministry of Foreign Affairs
MOH	Ministry of Health
MOU	Memorandum of Understanding
MMA/ADA	Mahaica Mahaicony Abary /Agricultural Development Authority
MNRE	Ministry of Natural Resources and the Environment

MSC	Marine Stewardship Council
NAREI	National Agricultural Research and Extension Institute
NDIA	National Drainage and Irrigation Authority
NGO	Non-Government Organization
NOAU	National Ozone Action Unit
ODS	Ozone Depleting Substances
OIE	World Organization for Animal Health (Office International des Epizooties)
PAHO/WHO	Pan American Health Organisation/World Health Organisation
PDMS	Pest Data Management Systems
PFA	Pest Free Area
PIC	Prior Informed Consent
PMP	Pest Management Practices
PPQ	Plant Protection Quarantine
POP	Persistent Organic Pollutants
PRA	Pest Risk Assessment
PRSP	Poverty Reduction Strategy Programme
PS	Permanent Secretary
PTCCB	Pesticide & Toxic Chemicals Control Board
QMS	Quality Management Standard
RPA	Rice Producers Association
RDCs	Regional Democratic Councils
SAICM	Strategic Approach to Chemical Management
SPS	Sanitary and Phyto-sanitary Measures
SSA	Satyadeo Shaw Aquaculture Station
TC/TS	Tons Cane/Tons Sugar
TOR	Terms of Reference
TED	Turtle Excluder Device
UG	University of Guyana
UN	United Nations
USAID	United States Agency for International Development
UNCED	United Nations Conference on Environment and Development
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UNICEF	United Nations Children Fund
UWI	University of the West Indies
VMS	Vessel Monitoring System
VRA	Vulnerability and Risk Assessment
WEN	Women Entrepreneurs Network
WHO	World Health Organization
WUA	Water Users Association
WMO	World Meteorological Organization

GUYANA'S VISION FOR AGRICULTURE 2020

Agriculture as our Vehicle for Sustained Economic and Social Prosperity

Agriculture not only gives riches to a nation, but the only riches she can call her own
– Samuel Johnson

Agriculture remains at the very heart of Guyana's people-centered developmental agenda. In a country and in a world where the pursuit of equity for our citizens remain a major challenge and a fundamental development goal, where we have identified food security as a way to end poverty and hunger by 2025, it is our imperative to robustly promote a knowledge-based, multifunctional transformative agricultural sector. We see agriculture as a vehicle to promote national prosperity, end poverty and hunger and provide the opportunity for better lives for ALL OUR PEOPLE.

Guyana's Vision for Agriculture 2020 seeks to change the view that agriculture is for subsistence livelihood while it also seeks to promote agriculture as a wealth generator and entrepreneurial enterprise, producing food and non-food commodities to meet local and export demands.

The Agriculture Strategy 2013-2020 is based on the F-5 Strategic Approach for Agriculture. The F-5 Strategic Approach is as follows:

- ***Food Security – Consolidating the End of Hunger in Guyana, ensuring everyone has enough food in every community***
- ***Fiber and Nutritious Food Accessible by citizens – Nutrition Security for All***
- ***Fuel Production - helping to develop alternative fuel sources, reducing dependency on fossil fuel and creating a Bio-Energy Industry in Guyana***
- ***Fashion and Health Products – An Agro-Process Industry which creates a new industry in Guyana***
- ***Furniture and Crafts – An industry which we expect to grow in importance in Guyana***

Previous strategies have focused on the 5-Cs and the 4Ps. Recall that in pre-independence years and shortly after independence, Guyana pursued a 5Cs approach targeting citrus, cassava, coconut, cocoa and cattle. In recent years, we adopted a 4P approach as a priority for the agriculture strategy – pepper, plantain, pineapple and pumpkin.

The present strategy of the F-5 takes a more holistic approach and embraces all facets from food to non-food aspects of agriculture. It seeks to benefit from all aspects of agriculture and builds on the initiatives of the past.

Introduction – Guyana’s Considerable Reputation as an Agricultural Country

1.0 History has shown that no country has escaped poverty or become wealthier without first making progress in agriculture. Civilization as we know it today could not have evolved, survived and prospered without food, the initial product of agriculture. Growth in agriculture has been shown to create jobs, raise incomes, boost the wider economy and provide affordable food. Today, agriculture has expanded its scope and can contribute to development also through non-food commodities, like bio-fuel, furniture, including niche furniture and crafts. There are boundless opportunities for economic and social growth and prosperity with agriculture, particularly for countries like Guyana.

Indeed, Guyana’s agricultural destiny is rooted in history. We once provided the colonial masters with agriculture-based food and raw materials to satisfy the needs of their people. Demerara Sugar and Rum are historical products that still are preferred goods in many parts of the world. ***And, indeed, the agriculture sector has largely been the vehicle which has propelled Guyana forward and which will play a pivotal role in the country being high middle-income by 2025.***

- 1.1 Our vision for agriculture in Guyana is based on the country’s considerable reputation as a successful agriculture country and its vast potential for significant expansion. It is based, further, on the fact that Guyana is blessed with large expanse of suitable land, fresh water and climate well-suited to production. In spite of recent cycles of dry and flood-like conditions, Guyana’s climate is a relatively stable one and Guyana is still a country without hurricanes, cyclones, tornadoes, volcanoes, etc. The country also enjoys the advantage of being certified as free from certain debilitating agricultural impediments, such as fruit-fly and foot-and-mouth diseases, and other Class A highly contagious diseases (OIE classification). Guyana is presently in advanced stages of constructing and establishing an international standard abattoir, an artificial insemination and veterinary laboratories. These assets, together with our people’s commitment to agriculture, make Guyana a country with natural advantages as a leader in agricultural production.
- 1.2 Our vision for agriculture takes into consideration that the world’s population, including the population of our Region of Latin America and the Caribbean, is growing, having reached 7B and projected to reach 9B by 2050, with changing consumer habits, and projections for continued growth in the demand for food and agriculture-derived non-food products, such as bio-fuel. We are cognizant of the goal to end poverty and hunger by 2025 in our Region of Latin America and the Caribbean where 48Million people daily go hungry.
- 1.3 The Vision for Agriculture 2020 is a mandate for Guyana to use its natural resources and advantages for agriculture as efficiently and sustainably as possible. This will require continuous research, training and adaptation, especially in view of the vicissitudes of climate change, evidenced by more frequent and more intense climate events such as droughts, floods and pests and diseases.
- 1.4 Guyana’s vision for agriculture 2020 strongly posits that there is need to make more and better investments in the agriculture sector, not only for the good of agriculture and farmers, but also for the good of all, because of the beneficial effect of the sector on food security and its ability to activate the rest of the economy and promote improved economic status and wealth in a population.

Summary of Agriculture Contribution

- ▲ AGRICULTURE CONTRIBUTES ALMOST 20% TO OUR ECONOMY
- ▲ AGRICULTURE ACCOUNTS FOR MORE THAN 33% OF EMPLOYMENT IN OUR COUNTRY
- ▲ ALMOST 40% OF GUYANA’S EXPORT EARNINGS COME FROM AGRICULTURE.
- ▲ AVERAGE OF ABOUT 11% OF THE NATIONAL BUDGET ESTIMATES GO TO AGRICULTURE

1.5 It is worthy to note, before we present Guyana's Vision for Agriculture 2020 that Agriculture is already a mainstay in Guyana's development. Indeed, Guyana's history has been one where agriculture has been the backbone of the economy. Since independence and to this day, the Sector has been a catalyst and a pillar in our development trajectory.

- Today agriculture contributes almost 20% of our economy.
- Agriculture today also accounts for more than 33% of employment in our country.
- Almost 40% of Guyana's export earnings come from agriculture.
- An average of about 11% of the national estimates go to agriculture
- The significant contributions of agriculture as a major component of our economy is likely to persist, even though we envisage accelerated growth of mining, the emergence of ICT as a major player in our economy, the significant growth in the service industry and the fledgling manufacturing industry.
- It is likely, too, that agriculture will retain its significance in our development trajectory even if oil becomes a growth pole in Guyana.

The Premise – The Guyana Vision for Agriculture 2020

- 2.0 **The Premise is that agriculture will continue to grow and propel Guyana towards a brighter future.** Our Agriculture Vision 2020 is premised on Agriculture being the National Facilitator for Food and Nutrition Security, Economic Opportunities and for Environmental Sustainability and is based on the Low Carbon Development Strategy for which Guyana has gained international commendation.
- 2.1 Our premise is that Agriculture is central to food and nutrition security, to sustained economic growth for Guyana, in further building our export portfolio, in providing opportunities for entrepreneurs and in creating and sustaining employment, livelihoods and wealth generation for our people. The Sector is already effectively playing these roles in the country and, indeed, agriculture has played a crucial role in moving Guyana up from a least developing, highly indebted country in 1990 to today being a low middle income country.
- 2.2 But as Guyana looks to further climb the development ladder, agriculture will become an even more productive sector. It remains absolutely crucial as Guyana continues its efforts of transforming our economy, social development and our infrastructure from a low middle income country to a high middle income one by 2025.
- 2.3 We will diversify and modernize the sector, overcoming barriers that presently exist. We will enhance genetic stock with improved varieties of crops and breeds of livestock, improve access to more affordable and better fertilizers, more effective financing arrangements, improve availability and access to land, better drainage and irrigation systems, improve access roads and farm-to-market roads, stronger and wider markets and enhance weather-related disaster management.
- 2.4 **Agriculture will continue to be a catalyst to build our export portfolio.** Agriculture in Guyana is not only about feeding our people, even though this objective will continue to be a major priority of the agriculture thrust. Agriculture in Guyana has always been a foundation through which Guyana has built an export-oriented economy. As part of CARICOM and being a part of the CARICOM Single Market and Economy, we will make full use of the fact that CARICOM countries import more than \$US4.5B of food from outside of the Region. Guyana has its eyes firmly fixed on the opportunities that CARICOM provides as a net-importer of food. In this context, we look to the trade arrangements in CARICOM to be more trade-friendly among Member-States.
- 2.5 But we will be cognizant of the opportunities of exporting food and non-food agricultural commodities like ethanol to countries beyond CARICOM. We remain cognizant of the fact that 48M persons in Latin America and the Caribbean live with hunger today. Guyana must not be unaware of the fact that the world's population has reached 7B and is projected to reach 9B by 2050. Importantly, too, we must be cognizant that almost 1B people go hungry and more than 1B people are overweight and obese around the world today. These circumstances provide an opportunity for a country like Guyana to be a supplier of food and non-food agricultural commodities.
- 2.6 **Agriculture provides a solid opportunity for entrepreneurial investment, for cooperatives and for rural livelihood.** We do not see Agriculture merely as a vehicle to reduce poverty and promote subsistence living. We see it from a context of an export-driven economy and a growth promoter in Guyana. Agriculture provides ample opportunity for entrepreneurs and cooperatives to invest. Agriculture will be a vehicle to help families move from poor families into the category of middle class and wealthy families. Agriculture is the most feasible way to provide economic opportunities for poor, rural and vulnerable communities. In this context, Guyana's Agriculture Vision takes into consideration IICA's, IFAD's and CELAC's priority for small farmers.

- 2.7 **There are boundless opportunities for agriculture beyond the priority of food production.** Agriculture must not be seen only as a producer of food for local consumption or for export. Agriculture in Guyana must be developed beyond food. For example, Guyana has the opportunity to create biomass for the production of bio-fuel, satisfying needs other than feeding our people, needs that ensure a sustainable and affordable fuel source. Guyana has already used agriculture to produce energy on a small scale. But now we must embark on a deliberate path to develop biomass to support a large scale bio-energy industry for Guyana.
- 2.8 **In this context, Guyana's Agriculture Strategy is designed as the F5 Agriculture Trajectory – Food/Calories (Food Security), Fibre and Other Nutrients (Nutrition Security), Fuel (Agro-Energy), Fashion and Medicine (Health and Beauty) and Furniture and Crafts (Comfort in Living).**
- 2.9 Agriculture 2020 is consistent with Guyana's destiny as the "bread basket of the Caribbean". It is, therefore, consistent with the Regional Food and Nutrition Security Policy and Plan for CARICOM. It also is consistent with the CARICOM Agriculture Vision 2015 and takes into consideration the ten Key Binding Constraints for Agriculture in CARICOM identified in the Jagdeo Initiative.
- 2.10 The Vision for Agriculture 2020 recognizes the significance of Forestry. Agro-Forestry is an important plank for the expansion and transformative goals of agriculture. But we have excluded discussion of forestry in this Vision for Agriculture 2020, leaving the articulation of the Forestry component of this vision to the Ministry of Natural Resources and the Environment.
- 2.11 Taking into consideration the above, **Guyana's Vision for Agriculture 2020** is entitled **Agriculture - Our Vehicle for Sustained Economic and Social Prosperity**.

**Guyana's Vision
for Agriculture
2020** is entitled
**Agriculture - Our
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Guyana's Vision for Agriculture 2020

Agriculture will continue to drive sustained economic and social prosperity, moving Guyana to a high middle-income developing country by 2025. Agriculture will further contribute towards wealth generation, providing entrepreneurs with investment opportunities, promoting employment, helping to eliminate inequity and poverty, building Guyana's export portfolio and ensuring a Brand Guyana that people everywhere recognize and want.

Guyana will produce and export safe and wholesome food and non-food agricultural products, such as bio-fuel, at competitive prices, utilizing land, water, marine and other resources and will support commercial agriculture through provision of requisite client-friendly state and technical services.

Guyana's Vision for Agriculture 2020 seeks to maintain our rich tradition of being a major producer of sugar and rice, reaching and sustaining production of greater than 450,000 annually for both products, moving towards packaged and processed sugar, ethanol and packaged and processed rice products, rather than bulk exports.

Agriculture will preserve and enhance Guyana's reputation as a food-secured country with a diversity of food at the disposal of our people and for export. Guyana will enhance its reputation as a major producer of quality vegetables and fruits, to feed our people and to be a supplier of food to CARICOM and non-CARICOM countries. We will cultivate a wide variety of vegetables and fruits, introducing new crops, adding considerably to the export portfolio and reducing our own imports. In reducing the food import bill, we would pursue cultivation of crops such as onions, carrots, potato, garlic and spices. While guaranteeing people, in and outside of Guyana, fresh farm produce, we will expand our options with processed vegetable and fruit products in processing plants owned and operated by farmers.

We will strengthen the livestock industry to consolidate self-sufficiency, but to also establish Guyana as a major meat exporter within CARICOM. Guyana is proud that we are self-sufficient for poultry products, both meat and table eggs, but we will enhance the poultry industry by producing our own hatching eggs and by positioning Guyana to be a major supplier of duck meat for local consumption and for export to CARICOM. Guyana will achieve self sufficiency for beef, pork and mutton by 2020 and will be a major supplier to the Caribbean market. But Guyana will also seek to reduce the importation of pasteurized milk and other dairy products by developing a more vibrant dairy industry.

Guyana will maintain its capacity to export marine fish and further develop its capacity to meet local and external demands for fish products through significant expansion of aquaculture and inland fishing. Guyana will also promote sports fishing, combining agriculture and tourism as a viable industry.

We will establish apiculture and make honey production an economic opportunity for people in communities across Guyana. We will expand opportunities for non-food agricultural products. In this regard, we will promote horticulture and biomass development for production of bio-fuel and specialized crops, such as bamboo, to support the furniture and craft industries.

Guyana's Vision for Agriculture 2020 creates opportunities for Guyana's GDP to grow, provide boundless opportunities for our people, our youth, our women, for indigenous people and for local and international entrepreneurs and will provide a vehicle for sustained economic and social prosperity.

Guyana's Vision for Agriculture 2020 – Twenty-Five Priorities for Success

3.0 Our Vision for Agriculture 2020 will be achieved through accelerated modernization and diversification of the agriculture sector in Guyana. To accelerate modernization and to orient the agricultural sector to achieve our goals as outlined in Guyana's Vision for Agriculture 2020, we will build agriculture around 25 Priority Areas.

3.1 Priority 1 is sustaining and expanding Guyana's Agro-Diversity Policy and Program as imperatives to meet the goals of agriculture in Guyana. Emphasis will be placed on safeguarding of plant genetic resources. In this regard, we will seek genetic stocks and varieties that improve quality and yield for crops, fish and livestock and demonstrate resilience to climate change. Further, we will finalize a policy on Genetically Modified Organisms (GMO) and Genetically Modified Food (GMF).

Guyana will expand and improve on the present crops and livestock and our aquaculture pursuit will seek to promote the growth of specialty fish. We will also introduce genetically improved varieties and breeds that can withstand various environmental conditions and provide higher yields. In this regard, we will further support the work of NAREI, GLDA, GRDB, GUYSUCO and GSA, the lead applied research agencies for agriculture in Guyana. The GROW MORE FOOD campaign will be enhanced, including a focus on improved genetics, and will be oriented to contribute to food security and agro-diversity, leading to expansion of food export and reduction of food import.

3.2 Priority 2 is a new focus on Farming Systems and Techniques, Biotechnology and Precision-Agriculture. We recognize that farming systems, techniques, biotechnology and precision-farming play significant roles in improving productivity, competitiveness and promoting commercialization and in adaptation for climate change. We acknowledge that our farm systems and techniques can benefit from modernization, including the use of biotechnology and precision-agriculture. While genetic technology will feature prominently in improved practices, we will promote technologies such as tissue culture, seed preparation and cleaning, use of molecular markers, various irrigation technologies such as drip irrigation, sprinkler and micro-sprinkler systems, greenhouses, modern farming techniques such as hydroponics, plastic mulch, mechanized cultivation and reaping methods, modern agronomic practices, market information and entry development, post-harvest technology and agro-processing, climate-smart agriculture, etc. For example, sugar and rice cultivation will advance to almost 100% mechanization, and more processed products.

3.3 Priority 3 reaffirms that Water Security and, therefore, Water Management is crucial for success. Water management was identified in the Jagdeo Initiative as one of the Key Binding Constraints for development of agriculture in CARICOM. In countries with Guyana's terrain, where agriculture is done in a significant way on land below sea level, and in a country that is very vulnerable to climate change, water management systems are critical. Climate change has made water security an even more major issue, not only because of short term drought-like situations that may result from frequent El Niño conditions, but from equally frequent flood risks from La Niña conditions. This is further compounded by river drainage which is relatively sluggish because of average gradient of main rivers of only 0.2/00. Drainage into rivers and directly into the ocean is also impeded by intense and rapid sedimentation of river mouths and ocean outfalls. Water use efficiency will, therefore, be critical in our agricultural pursuits.

Guyana has done a remarkable job in building and maintaining a comprehensive Drainage and Irrigation System. There are about 500 km of main irrigation canals and 1,100 km of secondary canals and similarly about 500 km of main drainage channels and 1,500 km of secondary drainage channels. There is a network of sluices and pumps to aid drainage and irrigation. But this system is still inadequate and its maintenance must be improved. Mapping the present system and agreeing on future development of this system are critical steps. These include:

- The acceleration of the Conservancy Adaptation Project (CAP) for the East Demerara Water Conservancy and extending the adaptation initiatives to the Boereserie and Tapakuma Conservancies and the irrigation canals of Region 5 and 6.
- The construction of additional drainage channels, like the ones at Hope/Douchfour and Cottage (Region 4), Canal Polder #2 (Region 3), the Abary River Drainage Facade, Black Bush Polder (Region 6) and their associated structures (sluices and pumps).
- Completion of Phase 2 and 3 of the MMA
- Re-construction of Cunha Sluices to improve releases into the Demerara River from the East Demerara Water Conservancy
- Acquiring of more fixed site and mobile pumps
- Improving the equipment (excavators, bulldozers etc.) ownership of the NDIA, the MMA and the RDCs
- Human Resource development for Drainage and Irrigation Management

The participation of farmers and farming communities in the management of drainage and irrigation systems, such as the Water Users' Associations, must be optimized so that management of water, drainage and irrigation can be improved.

3.4 Priority 4 is a strengthened focus on Infrastructure Development (other than drainage and irrigation structures) for the agricultural sector. Outside of drainage and irrigation and their associated structures, other agriculture infrastructure such as access roads, farm-to-market roads, dams, bridges, and support structures such as laboratories, abattoirs, libraries, information systems etc. are *sine qua non* for agriculture development. Infrastructure must be developed to support mechanization, allowing Guyana to reduce manual methods, particularly in large-scale cultivation crops such as sugar, rice and corn. In the development period to 2020, major focus will be placed on Roads and Dams, Abattoirs, Processing Centers, Libraries, Training Facilities, Laboratories etc. Outside of their critical importance in supporting agriculture in general, these infrastructure initiatives will foster trade and market integration.

3.5 Priority 5 establishes Soil Health as a major priority in the development of a modern and effective agricultural sector, assuring food security, economic benefits and environmental protection. Soil health must be promoted through the prudent utilization of biological, chemical and physical methods in an eco-system agronomic approach. The escalating demand for agricultural products, particularly food, increasing land degradation because of unsustainable practices and the need to improve yield demand that we maintain soil health through improved soil fertility management (improved soil nutrient and pest management practices). Guyana's Vision for Agriculture 2020 embraces the concept of Integrated Soil Management (ISM) and Integrated Plant Nutrient Management (IPNM) and Pest Management Practices (PMP). Guyana will ensure implementation of an affordable and practical ISM which will emphasize the management of nutrient flows, but will not ignore other important aspects of soil health, such as maintaining organic matter content, soil structure and soil biodiversity. In this regards, a program for Site-Specific Nutrient Management will be introduced. A GIS Map for Soils will be developed for long term usage. Guyanese farmers will be encouraged to pay close attention to the biological activity of microbes and macro-fauna that contribute to healthy soil. Farmers will be educated to take into consideration the complex interaction between environmental factors, such as temperature, moisture, acidity and several chemical components of soil and biological activity. In this regard, we will develop training and awareness program and introduce new technology and techniques to address biological inputs, organic matter inputs, inorganic matter inputs, tillage and use of pesticides. Every agriculture extension worker and every farmer must benefit from these awareness and training programs.

3.6 Priority 6 is Plant and Livestock Health and Protection as a platform for modern agriculture practices in Guyana. Proper management and the implementation of policies to protect Guyana's crops and livestock must be a pillar on which we build sustainable agriculture. Plant and Livestock Health and protection are important for human health.

Plant diseases can be devastating to human health, both directly, if plant toxins are consumed, leading to serious illnesses and deaths, and indirectly, if plant diseases result in crop loss and subsequently malnutrition or significant increase in prices of food. Similarly, livestock diseases can kill off livestock or can reduce production of meats, milk or eggs.

A policy of pre-emptive surveillance, control and exclusion of pests and invasive species must become an important strategic line of action in the agricultural sector. We must develop and maintain a Pest Data Management System, a Pest Risk Assessment Program and further improve the Plant Protection Quarantine (PPQ) and Inspection Systems and Procedures for entry at our Ports of Entry. New regulations were previously developed. These would be revised and more rigidly enforced.

The use of appropriate pesticides is an important component of sound agriculture policy. We must recognize that the strengthening of the Pesticides and Toxic Chemicals Board and the strengthening of our laboratory capacity to measure pesticides in water, in soil and in agriculture produce are important priorities.

Special emphasis will be placed on the management of pests and diseases affecting crops and livestock. In the case of crops, we will intensify efforts to control and manage pests such as acoushi ants and fruit flies, using an Integrated Pest Management (IPM) approach. Similarly, in collaboration with our international partners, we would continue working on the management of Sigatoka diseases affecting plantains, as well as viral diseases affecting Solanaceous crops.

In the case of livestock, Guyana's status of being certified by the World Organization for Animal Health as free from Foot-and-Mouth Disease (FMD) without vaccination will be guarded, while efforts will be intensified to control livestock diseases in general.

A Farmer Information System will be developed and implemented to enhance traceability and marketing. While this will begin with the Livestock Industry, the Farmers Information System will be developed across the board for all farmers, including crop farming.

3.7 Priority 7 commits to an increased Livestock Production as a priority in the agriculture strategy and in the diversification of Guyana's agriculture portfolio. We will complete a Livestock Development Strategy 2012-2020 before the end of 2013. The provision of meat, milk and eggs to satisfy the food need and the development of commerce in Guyana is critical, but developing an export capacity for livestock products is crucial if Guyana will attain its potential for export. We will diversify poultry products and improve on production of milk, beef, pork, mutton and goat meat. We are self-sufficient in poultry meat and eggs production, but will continue to build the poultry industry by building a capacity for production of hatching eggs. We will also increase production of duck meat for both local consumption and for export to the Caribbean. Guyana will use its foot-and-mouth free status to expand beef production for local consumption and for export. We will build a modern abattoir that will support beef, pork, mutton and goat-meat production. We will expand the dairy industry and become self-sufficient for milk by 2020.

But Guyana will always develop our livestock sector in a sustainable way, through policies that reward sustainable land use, water conservation, biodiversity and emissions reductions as well as better animal health to prevent zoonoses. Guyana will increase livestock productivity while maintaining environmental protection.

3.8 Increased Production of Fish Products is important in the diversification of the agriculture profile and in supporting a growth of agriculture in Guyana. A Strategy for the management and development of the Fisheries Sector 2012-2020 will be completed before the end of 2013. We will continue to improve marine fishing (deep-water, trawl and artisanal fishing) in a sustainable environment to support export of fish products. But we will also pursue farmed-based fishing (aquaculture) and inland fisheries as a significant part of diversification and as a critical

component for wealth generation. There are challenges that Guyana must confront. In marine fishing we will have to tackle more effectively the growing issue of robbery at sea and also tackle the issue of stock sustainability by preventing over-fishing. We must also address the effects of climate change on the fishing industry. As we move to strengthen the industry, we will fully explore and promote the emerging area of sports fishing in Guyana, taking advantage of an expanded and diverse continental shelf (almost 50,000 sq. km) and our distinct inland river environments and the fact that Guyana provides an opportunity for world anglers to sport-fish for some of the world's most exotic fresh water species, utilizing the catch and release method.

3.9 Sustained High Production of Rice is critical to maintaining annual growth increase in the agriculture sector and in maintaining high export earnings from agriculture. By 2011, rice production reached 400,000 tonnes. Guyana will maintain rice production to no less than 500,000 tonnes of rice per year and annual rice export to no less than 450,000 tonnes. The GRDB will ensure that Guyana's Aromatic Brand of rice is promoted and at least 5,000 tonnes are on the market – locally and internationally – by 2020. Importantly, Guyana will continue to focus on increasing yield to at least 6 tonnes per ha in each rice-growing region and lowering cost of production. Value-adding for price products will be a major focus for the sub-sector with at least 20% of production sold as packaged rice. And at least 5% of production committed to rice products such as rice flower, feed, and beverages by 2020. The industry will strengthen its mechanization program to be the first agriculture sub-sector to be fully mechanized.

3.10 Increasing Sugar Production to 450,000 tonnes per year is a significant part of the agriculture vision 2020, for maintaining high employment and is a pillar on which we continue to build an export portfolio for agriculture. The period since 2008 has seen difficult times for the sugar industry. But we expect that the sugar industry will be able to respond to the challenges facing it, particularly the impact of climate change. The industry will reach 450,000 tonnes sugar production by 2020 and its export will reach 400,000 tonnes for the first time by 2020. Sugar production will be further mechanized and the industry should attain greater than 60% mechanization by 2020. Cane harvesting will reach greater than 60% mechanization by 2020 and cane punt loading will be reach greater than 85% by 2020. Sugar cane production will be greater than 4M tonnes and TC/TS will be less than 12 by 2020. GUYSUCO will produce at least 50,000 tonnes of packaged sugar by 2020, reaching 25,000 tonnes by 2018. Skeldon is expected to produce at least 50,000 tonnes of sugar by 2018 and 75,000 tonnes by 2020.

3.11 Increased Production and Diversification of Crops, other than sugar and rice, represents a high priority in the Agriculture Vision 2020 and in the goal for increased annual growth rate for agriculture and the economy to 2020. In this priority area, strategic areas for focus will be as follows:

- Increased production and improved quality of traditional crops, including vegetables, tubers, fruits etc.
- Cassava, Plantain/Bananas and sweet potato have been identified as priority crops for expansion and improvement
- The Coconut industry will be re-engineered with a new orientation for value-added products
- New Crops will be introduced on a commercial scale in Guyana. The would include;- carrots, spices, garlic, potato, corn, soya, quinoa
- Mega-Farms by Local, Regional and International Investors in Rupununi, Intermediate Savannahs and Canje Basin with rubber plants, palm oil, quinoa, corn, soya and sugar cane

3.12 Agro-Processing and Value-Added will become a new growth pole for agriculture in the Agriculture Vision 2020. Agro-processing and value-added for agriculture products is an integral part of the Agriculture Vision 2020 for Guyana. Value addition, which involves turning agricultural produce into other commodities, semi processed and or processed products for market has the potential for small scale farmers to capture a larger share of the food cash. In addition, since post-harvest losses are very significant and since many crops, particularly fruits are seasonal, agro-processing and

value-added mechanisms can prevent post-harvest losses and ensure year-round supply of products. Seasonal overproduction of many agricultural produce, accompanied by heavy post harvest losses of the perishable foods calls for an adequate, efficient and sustainable agro processing, value addition chain system.

The Agriculture Vision 2020 seeks to promote Food Processing and Value Addition for diversification and commercialization of agriculture, employment generation in rural and urban areas, and increased export possibilities for various crops. One of the main goals is to empower rural farm families to participate fully in the processing of their farm produce and earn value added profits giving higher incomes and in return enjoy improved livelihoods. Food processing has several benefits:

- Minimizes post harvest food losses and thus strengthens food security
- Improves preservation, enabling transportation of delicate perishable foods across long distances and increase seasonal availability of food as well as easing marketing.
- Removes toxins and makes foods safe to eat by de-activating spoilage and pathogenic microorganisms.
- Increase in income through job creation, self employment and sale of processed foods at a better price than when sold raw.

We will further strengthen the production of the fledgling condiment production line, such as pepper sauce, jams, peanut butter etc. At the same time, we will promote agriculture products being used to manufacture porridge and cereals. The snack food industry is growing globally and Guyana will become a major player in the Caribbean with products such as snacks with plantain, banana, cassava, tamarind, mango, bread fruit etc. The use of plant products to produce health and medicinal products will be promoted. Meat and animal products will be encouraged as Guyana's Agro-Processing Industry picks up. It is expected that Guyana's agro-processed products will generate about 20,000 tonnes of product by 2020.

The Ministry of Agriculture will ensure technical support, such as food science and Sanitary and Phytosanitary Measures (SPS), is provided to increase product line and quality. A Guyana Brand will be actively promoted for Guyana's Agro-Products.

3.13 Priority 13 identifies Marketing as an important area for realizing the vision of an agricultural sector being the vehicle for economic and social prosperity in Guyana. Without marketing we will not be able to make agriculture profitable. Particular focus of our agriculture enterprise has to be on linking farmers, especially small-scale farmers, with markets. Successfully facilitating and supporting efforts to link small farmers to dynamic markets have become important issues on the agricultural and rural development agendas. The Jagdeo Initiative for the development of agriculture in CARICOM recognized the need for effective marketing as a Key Binding Constraint. We must have a robust export marketing program. In this regards, development of a Market Information System is critical. We will also work with our partners to complete and operationalize a Market and Data Information System. Guyana must pursue production geared towards establishing a Brand Guyana and develop Brand Guyana as a reliable high quality product. Guyana's Demerara Gold, El Dorado Rum etc. are examples of Brand Guyana. We must ensure similar success stories for other agricultural products out of Guyana. We will work with our farmers to guide production to satisfy changing consumer preferences, establish grades and standards, manage risks (farmers and exporters) and ensure greater fidelity of contracts. We will work with stakeholders, other than farmers and exporters, to create a more export-friendly environment. In particular, we will promote better understanding and greater cooperation of stakeholders such as shippers and the Custom and Excise Department. We will be proactive in removing hiccups such as the two weeks time period for processing custom documents and the regular unavailability of Custom Officers to process and approve shipment at Ports of Exit.

The Guyana Shop will be a National Franchise by 2020 with its full range of products available throughout Guyana. Branches of Guyana Shop will be opened in New York, Miami, Toronto, London and at the CJIA by 2020.

3.14 Priority 14 recognizes the importance of Transportation, Packaging, Storage and Cargo Space Facilities as crucial elements to support a modern and more effective agricultural sector. This important priority was identified in the Jagdeo Initiative as a Key Binding Constraint for the development of agriculture in CARICOM. In Guyana, we will more comprehensively address the issue of transportation, packaging and storage facilities, including refrigerated storage facilities and trucks, port cargo spaces and improved river and sea transportation. Food production includes the production of some seasonal products, but consumption is usually continuous. Food security (priority #11), therefore, depends upon robust systems of packaging and storage, including frozen, chilled and dry. Insufficient cargo space and irregular shipping schedules are major impediments and these must be addressed. As we extend agriculture and move beyond the present cultivated land, and expand export capacity, this priority will become a critical factor.

3.15 Priority 15 reiterates the imperative of a secured agriculture workforce through Human Resource Development as part of our strategy to accelerate agricultural development in Guyana. We will continue to build Human Resource for Agriculture. The Jagdeo Initiative for development of agriculture in CARICOM also recognized this need as a Key Binding Constraint. In this regard, the Guyana School for Agriculture and the Agriculture Department of the University of Guyana must be elevated in prominence. A new curriculum review would be conducted to ensure the programs are in line with the Vision for Agriculture 2020. The curriculum review for the GSA will consider the introduction of a degree program for agriculture. We will pursue enhanced collaboration with international training institutions. Programs such as the new Introduction to Bio-Energy and the Technical Cooperation program with McGill University to build capacity among our engineers must be institutionalized. Specialized Post Graduate training would be crucial part of this strategy. Educating farmers and building their knowledge and awareness must become an everyday function of Government, the various agricultural institutions, NGOs, etc. A learning environment that continually informs, educates, upgrades skills, nurtures innovation and builds business acumen is the base for developing human capital among our farmers. Guyana will maximize farmer-to-farmer education in our quest for developing more knowledge and skills among farmers. We will complete a Agriculture Sector Labour Forecast for 2020 by the end of 2013.

3.16 Priority 16 addresses Food and Nutrition Security and Safety as fundamental imperatives for agricultural development in Guyana. We will vigorously implement the Guyana Food and Nutrition Security Strategy 2011-2020 which was launched in October 2011. A major objective of the agricultural sector in Guyana will continue to be the prevention of hunger and malnutrition and chronic diseases through the provision of safe and healthy food. We already produce a remarkable abundance of safe, healthy food for our people. But we can further strengthen the production of food for local consumption and export by adapting the **GROW MORE FOOD Campaign** to address inadequate selection of cultivars and scarcity of planting materials, inadequate extension services, high input costs, poor access to financing by farmers, inadequate marketing information, absence of formal contracting arrangements with farmers, lack of organization for farmers and poor access to land for cash crop farmers.

Nutrition Security and Safety is one of the Key Binding Constraints identified by the Jagdeo Initiative for the development of agriculture in CARICOM. The Food Security Plan for Guyana is consistent with the CARICOM Regional Food Security Policy and Plan

Guyana has already developed a food export reputation. In this regard, the development of SPS – Sanitary and Phytosanitary Standards – is not only important, but it is an imperative if we are to promote and sustain export of food and agricultural products. Guyana must not be limited in its institutionalization of Good Manufacturing Practices (GMP) and the implementation of Hazard Analysis Critical Control Points (HACCP), the fundamental standard for food safety adopted by the UN.

The Sugar and Rice Strategies up to 2015 have already been articulated and are being implemented. But these must be adjusted to realize the vision to 2020. There is still no formal strategy to promote crops outside of rice and sugar and we will complete a Crops Strategy before the end of 2013.

3.17 Priority 17 orients Guyana's Agricultural Sector to build a capacity for Agro-fuels (bio-fuels) and to be a meaningful player in the growing alternative energy field to meet its own needs and to add to its portfolio of exported products. The global economy, the growing global population, rising oil prices and the recognition that fossil-based oil is a diminishing commodity create an opportunity for agriculture-based fuel production. Guyana is best placed among CARICOM countries to be a meaningful player in the bio-fuel revolution. With sugar cane to support potentially 50M gals of ethanol per year and oil palm to support production of diesel, Guyana is well-placed to play a lead role in the Caribbean for bio-fuel production. Currently, Guyana's dependency on fossil fuel (fuel oil and diesel) and our total dependency on importation of fuel consume about 35% of GDP. Guyana's bold move to construct a hydro-electricity plant at Amaila Falls will reduce the dependency on fossil fuel and will contribute to the low-carbon industry for Guyana, but the addition of bio-fuel to Guyana's productive capacity will add the country's considerable low-carbon emission potential. We will accelerate the capacity-building programs to support this emerging new agriculture initiative.

3.18 Priority 18 is Environmental Sustainability through the agricultural sector. Our vision for agriculture 2020 proudly recognizes Guyana's lead role in the advocacy and in implementation of programs for global solidarity to stop climate change and its adverse effects. Our vision for agriculture is consistent with the low carbon development strategy. The global trajectory and the global consensus on climate change have created a special place for "going green". Guyana's agriculture has always been practiced within a "going green" environment, and as we further develop the sector we will consolidate around a sustainable environmental milieu. Guyana will develop its own RIO +20 Agricultural Environmental Agenda and we will lead by example.

3.19 Priority 19 commits Guyana to further develop its Agriculture Risk Reduction and Disaster Management Program. Guyana is already experiencing the impact of climate change. Our approaches to agriculture expansion and sustainability are, therefore, based on climate-smart agriculture. Risk and Disaster Management was identified in the Jagdeo Initiative as one of the Key Binding Constraints for agricultural development in CARICOM. For Guyana, Agriculture Risk Reduction and Disaster Management revolve around adaptation and mitigation initiatives to prevent and manage floods and droughts, but also recognizing other kinds of disasters, such as disease outbreaks. Risk management is an integral part of the disaster preparedness. With the kind of economic losses and developmental setbacks that Guyana has experienced because of El Nino-related dry or drought-like periods and La Nina-related floods, particularly since 2000, it makes good economic sense to invest in prevention and mitigation of disasters. The Ministry of Agriculture is presently finalizing an Agriculture Sector Risk Reduction and Disaster Management Plan for the period 2012 – 2020. The Agriculture Disaster Management Plan will address actions for:

- Risk Assessment and Reduction
- Preparedness and Early Warning
- Response and Rehabilitation

As part of this disaster Plan, Guyana is adapting its drainage infrastructure to manage rainfall from its present capacity of approximately 1.5 inches (approximately 40mm) to 2.5 inches (about 66mm) per a 24 hour period. At the same time, we are building more relief channels, more sluices to release water into the ocean and rivers, installing more pumps to complement the sluices and increasing the holding capacity of water conservancies. We will also expand the present irrigation system by greater connectivity to water sources, more capacity for irrigation canals and improve the irrigation pump capacities.

3.20 Priority 20 identifies hydrometeorology and weather forecasting as part of the lives of the farmers.

Hydrometeorology and weather forecasting are even more important today because of the impact of climate change. The potential impact of climate change is one of the most serious problems facing sustainable development globally and it is of great concern to developing countries. Since agriculture is very sensitive to weather and climatic conditions, and since the impacts of climate change are already evident in Guyana, climate change is already having considerable impacts on Guyana's environment and in the agriculture sector. In this period of Guyana's development, there will be increased emphasis on providing better agricultural meteorological applications and targeted weather information to the agricultural community. The hydrometeorology Service will be strengthened so as to deliver the full range of weather, water and climate services to support agriculture in a more meaningful way. Great emphasis will be placed to provide data with geographical sensitivity to help farmers in all Regions of Guyana. An Early Warning System is being developed to make farmers more aware of weather predictions and how to apply these to agriculture planning of crops and livestock.

3.21 Priority 21 seeks to make Land Availability, Land Zoning and Land Tenure for Agriculture easier for farmers and entrepreneurs. Ownership and access to land by small farmers will be more equitable by simplifying legal and administrative procedures. Land availability for small farmers will be protected even as large scale crop cultivation by large enterprises is encouraged. Guyana will map where our agricultural land exists and how much we will need to supply future demand for food, fiber, and fuel production, and for the maintenance of eco-systems in changing economic, environmental and demographic circumstances. A comprehensive land use plan will be completed, clearly demarcating areas for increased agricultural production. This priority was identified as a Key Binding Constraints for agricultural development in CARICOM in the JI. It is also a key outcome in the mandate of the National Land Use Committee which was appointed by Cabinet on April 2014.

3.22 Priority 22 is significant Long-Term Investment in Research and Development as an important pre-requisite to raise productivity, improve profitability and enhance competitiveness. Research Development as a priority in our agriculture development is consistent with the approach of a knowledge-based agricultural development. It is further consistent as Research and Development was identified in the Jagdeo Initiative as one of the Ten Key Binding Constraints for CARICOM's Agriculture. We must build sustainability and competitive value chains in agriculture. In this regard, NAREI, GLDA, the Guyana School of Agriculture and the University of Guyana must be leaders in agricultural research and development. The Guyana Rice Development Board's Rice Research Center will become the premier rice training center in the Caribbean. Adding value to local farm produce by building strong linkages to food and beverage manufacturing or agro-industry is a priority objective for agriculture in Guyana. But research must lead to improved practices, such as application of fertilizers and soil health, better and improved varieties and breeds, more affordable farming techniques etc. We must also seek varieties and genetic stocks that are more pest resistant and more adaptable to climate change. The Ministry of Agriculture will develop a National Gene (Germplasm) Bank. We will formulate a national agriculture research agenda by the end of 2014. The Agriculture research agenda will be guided by the National Agriculture Research Committee.

3.23 Priority 23 is a strengthened Organizational Structure within the agriculture sector. We will continue to reform and streamline the organizational structure, institutions and services of the agricultural sector to ensure they serve farmers more efficiently and cost effectively. These will include services such as extension, training, research, and regulatory. A strong Monitoring and Evaluation Unit at the Ministry of Agriculture must be established. In addition, the mandates and the operation of the GLDA, NAREI, NDIA, NGMC, Guyana School of Agriculture, Fisheries Department, MMA, the Pesticides and Toxic Chemicals Board, the Water Users Association and Agriculture Cooperative Movements must be strengthened. The organizational structure must empower departments and agencies to take ownership of their mandates and to optimize participation at all levels, including farmers and extension workers.

An important part of the reformed organizational structure will ensure effective arrangements are in place for policy formulation, research coordination, priority setting, infrastructure and human resource development, technology transfer, regulatory framework, trade mechanisms and strong international linkages.

The Ministry of Agriculture will ensure an organizational structure that will strengthen Guyana's relationship and participation with partners such as FAO, IICA, IFAD, CARDI, CAHFSA, CARPHA, PAHO, EMBRAPA, CDB, USAID etc.

3.24 Priority 24 is a Policies and Legislative Framework which will help in developing and supporting agriculture. Guyana will enhance the policy and legislative framework to catalyze growth of the sector, rather than hinder development. We will institute policy, legal and regulatory reforms to encourage market-oriented production, use of more modern farming practices and a greater integration of agriculture with other parts of the national economy, such as manufacturing. In this regard, we will undertake a comprehensive review of all policies and legislations in the sector and we will add to these to better address issues such as crop financing, land tenure, trade, food policies etc. We will introduce a Food Safety and Protection Bill in 2014 and establish a single Food Safety Agency. In addition, the Traceability Bill will be completed and introduced in Parliament also in 2014. The sector will advocate for national policies relating to vehicular fuel, particularly providing for bio-ethanol and bio-diesel utilization.

3.25 Priority 25 is a Program of Financing Mechanisms for Agriculture. This is an imperative if we are to successfully craft an agricultural sector that is able to drive economic and social prosperity. This priority has been identified in the Jagdeo Initiative as one of the 10 Key Binding Constraints for the development of Agriculture in CARICOM. Strategic public investment in agriculture, particularly in roads, drainage and irrigation and agricultural research, is highly effective in increasing agricultural productivity. The Guyana Government will continue to be the main financier for the infrastructure development in the agriculture sector. Presently, this amounts to about \$14B annually. We will also pursue strategic public private partnerships to promote private investment in specific projects, such as the development of the abattoir and processing plants.

Limited access to finance, particularly short term crop financing, for farmers remains an obstacle. Several new large scale investors are exploring investment, particularly in agro-fuel production. But access to financing by medium size and small farmers continue to be a problem. Indeed, the local banking system has been making access to about \$4B annually in financing and this represents only a small proportion of what is needed in terms of short and long term crop financing.

Public offerings of shares in agricultural endeavors will be emphasized to help absorb the high liquidity in our banking system and to provide low cost capital to improve agricultural production. Agriculture insurance is one of the most important financial instruments and is an essential condition for prosperity in agriculture. Agricultural insurance which

Agriculture Vision 2020 seeks the following results:

- Sustained agricultural growth for uplifting the living standards of our people.
- Enhanced provision of safe and high quality food for our people and reduced importation of certain staples like onions, potato and milk.
- Agriculture as an attractive source for livelihoods, employment and wealth generation.
- Agriculture for rapid economic growth in an export-oriented country.
- Guyana's agriculture sector will become a choice destination for entrepreneurs.
- Promote industrialization through the packaging and processing of agriculture products.
- Cultivate crops as biomass to generate bio-fuel, such as bio-ethanol and bio-diesel.

provides indemnification for damage to or loss of crops and animals in the event of adverse natural and other phenomenon is a matter of urgency in Guyana.

Conclusion

Our vision for agriculture seeks the following results:

- Sustained agricultural growth for uplifting the living standards of our people.
- Enhanced provision of safe and high quality food for our people and reduced importation of certain staples like onions, potato and milk.
- Agriculture as an attractive source for livelihoods, employment and wealth generation.
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The twenty five priorities described in this Guyana Vision for Agriculture 2020 represent the opportunities, challenges and the strategic thrust for the sector to 2020.

AGRICULTURE SECTOR OVERVIEW

The agricultural sector of Guyana continues to be an important contributor to the Gross Domestic Product (GDP), employment generation, foreign exchange earnings and rural development of the country. Agriculture accounts for approximately 20% of Guyana's GDP, providing more than 33% direct employment, both at rural and urban levels.

Although, there are a number of large private and public sector farming enterprises, agriculture is predominantly undertaken by small farmers, farming less than 5 ha of land. Guyana epitomizes the call by the UN (FAO and IFAD) and IICA for small family farming – 2014 was declared as year of the family farms.

The sector comprises five (5) principal sub-sectors:

- The Rice Industry
 - The Sugar Industry
 - The Non-Traditional Agricultural Commodities (fruits, vegetables, ground provision, seasoning etc)
 - Livestock' including apiculture
 - Fisheries.
- }
- Traditional Agriculture Commodities

The Forestry industry is a major contributor to foreign exchange and is one of Guyana's main export products. Until December 2011, the Forestry Industry was under the Ministry of Agriculture. Even though it is part of the larger Agriculture Sector, the Forestry Industry is not included in this strategy and its development is presently being coordinated through the Ministry of Natural Resources. The statistics included for Agriculture in this document is not inclusive of Forestry.

Agro-Processing is emerging as an important thrust in agriculture. Outside of sugar, Guyana's Agriculture targeted the production of fresh and unprocessed products. This is gradually changing. Sugar and rice are accelerating value-added production.

The Agriculture Sector is given prominence in the National Budget. It is usually one of the sectors that accounts for a large part of the budget. In 2013, the Agriculture Sector accounted for about 11% of the total National Budget. The 2014 Budget allocated approximately \$22B to the agriculture sector. Outside of salaries and wages, infrastructure represents the largest part of the agriculture budget. In addition, research is being funded in a significant way.

Human Resources for Agriculture

Farmers' play a large role in the success of the Agriculture Sector in Guyana. Their commitment and dedication and their investment in the sector are indispensable for the triumphs of the industry. The agriculture sector's success cannot be measured merely from the perspective of the thousands of farmers; rather the success of the industry has its genesis from farming families.

Most of the farms in Guyana are owned by small family farmers. Most of these family farmers own less than 5ha of agriculture land. These farmers have shown great resiliency and have faced challenges of unpredictable weather and

commodity prices. Yet, the country's farmers have ensured that agriculture has always had continuous growth and there has never been a period of sustained poor performance for agriculture in Guyana.

For a long time, Guyana's agriculture success also depended on a large labor pool. The industry at one time employed more than 60% of the work force in Guyana. Today, the sector still is the largest source of employment, with at least 33% direct employment. But the labor needs are no longer supported by a sufficient labor force. Indeed, the shortage of labor is today one of the great difficulties that the sector confronts.

But at a time when traditional farming and agriculture must face the difficulty of a labor shortage, the sector is also threatened by climate change, the demand for greater yield and productivity, challenges from pests and diseases etc., This has heightened the need for agricultural professionals such as veterinarians, engineers, plant pathologists, machine operators, marketers, researchers, meteorologists, hydrologists, extension workers, etc.

Guyana has a long history of investing in an agriculture sector human resource capacity. More than 50 years ago, the Government of Guyana recognized that a human resource capacity for agriculture is an imperative. It was at that time that Guyana invested in establishing the Guyana School of Agriculture and the University of Guyana. Both of these institutions have contributed significantly to building capacity for skilled professionals in the agriculture sector.

The GSA was established by Dr. Cheddi Jagan in 1963 and in its 51 years has graduated more than 3,000 agriculture professionals. Most of the agriculture professionals in Guyana today are graduates from the GSA. It offers both theoretical and practical agriculture training for food security and rural development. Its courses cover the full range of agriculture and forestry.

Its courses include general agriculture and specialized courses in forestry, fisheries and agro-processing. Its training is both in classrooms and in the field. While much focus is placed on field preparations and special training for specific crops and livestock, the GSA has targeted post-harvest processes for attention. Presently, the school is offering courses and training in climate change and precision farming.

Short courses on operation, repairs and maintenance of small equipment, urban agriculture and hydroponics, water management, enhance the skills set available to the sector. Every student is required to obtain a driver's license before graduation and to complete a short course in basic maintenance and repair of field equipment.

The GSA maintains demonstration facilities such as drip/sprinkler irrigation, green house, hydroponics, aquaculture, compost making, artificial insemination and embryo transplants. An active plant hybridization program also provides practical training for students.

The University of Guyana has a long-standing Agriculture Program that offers a BSc in Agriculture. The two institutions have been working closer to ensure better use of resources.

The Pesticide and Toxic Chemical Board, in collaboration with the GSA, conducts training programs for Pest Control Operators. In addition, the PTCCB conducts regular community-based courses for farmers on the handling and storage of fertilizers and pesticides. The PTCCB also conducts courses for Persistent Organic Pollutants as Guyana phases out the use of POPs.

The Hydromet Services provide training for Refrigerator Technicians as Guyana controls and eliminate the use of Ozone Depleting Substances (ODS). Staff of the Hydromet Services receives professional training from the Caribbean Institute of Meteorology and Hydrology (CIMHI) in Barbados where Guyana annually have several students completing Meteorology and Hydrology Studies. Training is also provided to meet ICAO certification.

Chapter 2: Agriculture Sector Overview

The sector has benefitted from Guyanese students studying in Cuba where many of its veterinarians are graduates. In addition, Guyanese students have over the years graduated from various Cuban study programs, including Agronomy and Veterinary Sciences.

Guyanese have also received training from the Indian Government sponsored ITEC and ICCR Programs, the Government of Israel's MASHAV Program, IICA/Government of Mexico Program, the Government of Brazil (EMBRAPHA and PANOFTOZA) and other programs sponsored by FAO, IICA and CARDI.

The Sector has provided training for the private sector and for NGOs and civil society. For example, the sector is collaborating with the Guyana Agriculture Producers Association (GAPA), the Guyana Women in Development (GUYWID) and the Women and Environment (WeN) in implementing several agriculture and environment projects.

Agriculture Land

It is estimated that there are 1,740,000 ha of land being used for agricultural purposes. But, only about 200,000 ha (500,000 acres) are used effectively with relatively adequate drainage and irrigation. The major contribution comes from rice (90,000 ha), sugar (48,000 ha), and coconut (25,000 ha), and nontraditional crops occupy about 30,000 to 40,000 ha and showing upward trends.

About 100,000 ha additional agricultural lands are occupied with crops, but these have minimal or no drainage and irrigation. About 158,473 ha of agricultural land are used for livestock. It is estimated that about 3.3M ha of additional agricultural land can potentially be brought into use. This is an asset that Guyana must begin to use as our economy is developed.

Guyana is 214,970 square Km, equivalent to 21,497,000 ha. The National Land Use Plan (August 2013) indicates that 68% of Guyana's land area has soils that can accommodate agriculture, while 32% were considered to have soil not suitable for agriculture.

Water Resources Management

In 2010, water withdrawal from Guyana's fresh water supply was about 1.44B cubic meter. It is estimated that 94.4% of water withdrawal was for the agriculture sector. Guyana ranks as one of the top countries in the world for water resources, with access (if harnessed) to water that is over 317,000 cubic meter of water per capita, compared to less than 10,000 for most countries.

The enhancement of the Drainage and Irrigation System and – in some cases – the sea defenses is the most important challenge the country faces in increased production and productivity in agriculture.

The National Drainage and Irrigation Authority (NDIA) is Guyana's apex organization dealing with public matters pertaining to management, improvement, extension and provision of drainage, irrigation and flood control infrastructure and services in declared areas of the country. Established in 2006, the NDIA has developed an institutional structure in terms of water resources management strategy and water use planning for the primary purpose of locating, evaluating, conserving and distributing water resources of the country for agricultural purposes. In meeting its mandate, the NDIA has focused on improving and upgrading drainage and irrigation services countrywide, thereby enhancing the competitiveness of the various sectors and improving productivity. Through the NDIA, the Ministry of Agriculture is ensuring that agricultural land is better protected against adverse weather-related events.

Over the years, the NDIA has been building its capacity, resulting in a significant number of equipment being acquired, inclusive of mobile and fixed pumps, long reach excavators and other machinery. The NDIA has adopted a policy of constructing and rehabilitating sluices that are found to be functional through suitable foreshore conditions along the coast and riverine areas, aimed at upgrading and expanding the system. These works allowed for expanded acreage of agricultural activities and to better cope with extreme rainfall events associated with climate change. All improved and rehabilitated sluices are now serving areas to withstand in excess of 2.5" of rainfall in 24 hours as compared to 1.5" in 24 hours before.

The NDIA's implementation of an aggressive plan for upgrading and rehabilitating D&I infrastructure to ensure optimum capacity is making a difference. Rehabilitation and new structures have been undertaken in all Regions, particularly Regions 2,3,4,5,6 and 10. The NDIA, through its Community Drainage and Irrigation Program (CDIP) has also been supporting vulnerable residential areas by clearing critical drains and canals. About 900 miles of canals and drains are cleared by CDIP workers monthly. In addition, over the last five years, over 9,000 miles of drains and canals were maintained yearly in Regions 2,3,4,5,6 and 10. The Water Users Associations (WUAs) have also assisted with the maintenance of the secondary drainage and irrigation systems in key farming areas.

Over the period 2003-2012, agricultural water resource capacity received the largest share of investment in agriculture. For example, between 2005 and 2012, water resource management investment varied between \$5.9 and \$7.5B. Current projects include the Hope Northern Relief Channel and Associated Structures at a cost of \$3.6B, acquisition of drainage pumps under an Indian Line of Credit (\$800M), Aurora Land Development Scheme and the East Demerara Water Conservancy Project. A major project being designed is the MMA Phase 2 which includes the construction of a dam on the Mahaicony River.

Trade and Agriculture

Approximately 31% of total exports are agriculture exports, leaving out Forest Products. In 2013, rice exports amounted to US\$243M (14% of total exports), sugar accounted for US\$132.2M (9.5%), shrimp and fish amounted to US\$63.9M (4.6%), timber amounted to US\$39M (2.8% of total exports) and other crops (fruits & vegetables) accounted for US\$4.7M (0.3% of total exports)¹.

Although Guyana's traditional sugar and rice industries continue to play an important role in Guyana's economy, agricultural diversification has been a major pillar in the strategy to broaden the productive base . However, immense opportunities are still unexplored. For instance, while Guyana is self-sufficient in some livestock products, primarily meat, there is minimal export of livestock products.

As regulation of the trade has increased there are needs for improvements in food safety, agriculture health standards and competitiveness of the produce and products for exports. Guyana like many other developing countries is attempting to build effective food safety and agriculture health management systems in the face of multiple deficiencies and limited resources. Enhance competitiveness through lowering costs of production and reengineering the supply chain for faster time-to-market, is one pillar being pursued.

Crops

Guyana has strategic advantages of suitable land availability for growing crops, sufficient water resources, suitable weather, as well as policy support of government to enhance its role as a regional leader in agricultural production and export of surplus, in the CARICOM region and beyond. The largest share of agriculture production is constituted by crops, that is, it represents 24.5% of agriculture GDP and 4.8% of total GDP. It is also the major source of income and employment for the

¹ It should be noted while fresh exports are on the decline, processed products exported are increasing.

rural population. Non-traditional crops, rice and sugar are the three main categories representing 24.5%, 13.8% and 19% of agriculture sector GDP respectively.

Rice

The rice industry continues to be the champion sector of Guyana's economy, recording annually increases by as much as 22 percent. Rice contributes around 5% of total GDP and 13.8% of agricultural GDP. In 2013, Guyana exported approximately 400,000 tonnes of rice to Europe, CARICOM and Venezuela. Presently, about 90,000 ha are cultivated for rice in Regions 2, 3, 4, 5, and 6. Rice production has started in Region 9.

Sugar

Guyana's sugar industry has come a long way since its inception, with the industry recording several success stories. Farmers across the cane-growing regions continue to expand their cultivation by opening more lands for cultivation.

Private farmers contribute about 10% of sugar cane utilized in the sugar industry.

Table 1: Rice Production and Export (1960-2013)

Year	Production (t)	Export (t)
1960	121,733	
1970	144,605	59,347
1980	183,200	81,008
1990	101,231	50,943
2000	291,681	207,638
2010	361,525	336,313
2011	402,479	305,382
2012	422,058	334,140
2013	535,555	398,988

Table 2: Sugar Production from GUYSUCO (1960-2013)

Years	Actual Sugar Produced (Tonnes)
1960 - 1969	3,128,617
1970 - 1979	3,081,852
1980 - 1989	2,428,893
1990 - 1999	2,430,139
2000 - 2009	2,748,299
2010	220,818
2011	236,505
2012	218,007
2013	186,520

Guyana is heavily dependent upon the sugar sector both economically and socially. Sugar now accounts for 3.8% of GDP and 19% of agricultural GDP. Even though Guyana attained production levels as high as 350,000 tonnes per year, in the 1980s, the sugar industry suffered many setbacks and production was lowered to as low as 150,000 tonnes. It recovered in the 1990s and reached 300,000 tonnes for several years. In recent years, weather conditions and labor shortages have forced mechanization and production has lagged. In 2013, production was only 186,520 tonnes, the lowest in 20 years.

Guyana exports a significant portion of its sugar to mostly Europe and to the Caribbean as raw and packaged sugar. In 2009, the US\$181M Skeldon Sugar factory was commissioned, making the project one of the largest single investments in Guyana's history. Almost two years later, the Guyana Government welcomed another significant project to the Agriculture Sector: The Enmore Packaging Plant was commissioned in 2011, at a cost of US\$12.5M.

The Plant has the capacity to produce 40,000 tonnes of packaged sugar annually. For years, the industry was confined to producing raw sugar hence, the need for the plant which has enabled Guyana to once again capitalize on the opportunity to embark on mechanization. There is also a packaging plant at Blaumont Factory with a capacity for 10,000 tonnes annually.

Non-Traditional Agricultural Crops

The non-traditional agriculture sector has been increasing in importance as the Government of Guyana has introduced programs and projects promoting diversification and expansion. This sector comprises grain crops, oil seeds, root and tuber crops, vegetables and “greens”, spices and seasonings and a wide variety of fruits. It also comprises livestock and fisheries, including aquaculture.

These crops are mainly produced by small farmers and contribute to the domestic market and food security, as well as supporting the incomes of small farming communities. Crops are cultivated in all of the regions in Guyana; however, commercial level production is concentrated in regions 1, 2, 3, 4, 5, 6 and 10.

The cultivation of fruits in Guyana remained unorganized and through small holders of land. The main fruits remain pineapple, banana, grapefruit, citrus, cherry, avocado, carambola, passion fruit and mango. These have been a source of regular income and nutrition, especially for women and children, and result in economic empowerment to them.

Like fruits, the vegetable sector also remains unorganized in Guyana although it is dynamic and vibrant, generating regular income and employment opportunities both in urban and rural areas. Clusters were developed under Agricultural Development Programme (ADP). The major vegetables grown are tomato, bora, eggplant, ochro, hot pepper, pumpkin, squash, pak-choy and other minor vegetables. Other commodities that are produced include plantains and ground provisions. A list of main commodities produced in Guyana is found Table 3.

Table 3: Main Production regions for non-traditional crops

Region	Targeted crops
1	Cereals, Food legumes (Peanuts), Cassava, Eddoes, Yam, Dasheen, Ginger, Tangerine, Cocoa, Coffee
2	Cereals, Food legumes (Blackeye, Minica), Cassava, Coconuts, Plantain, Pumpkins, Ochro, Hot pepper, Lime, Banana, Mango, Pineapple, Avocado, Carambola, Cherry, Passion fruit, Bilimbe, Coffee
3	Cereals, Food legumes, Cassava, Sweet Potato, Eddoes, Yam, Plantain, Tomato, Pumpkins, Squash, Cucumber, Bora, Ochro, Boulanger, Corilla, Hot Pepper, Lime, Grape fruit, Orange, Tangerine, Pineapple, Avocado, Carambola, Cherry
4	Cereals, Food legumes (Blackeye, Minica), Cassava, Coconuts, Sweet Potato, Eddoes, Plantain, Lime, Tomato, Cabbage, Pumpkins, Squash, Cucumber, Bora, Eschalot, Ochro, Boulanger, Corilla, Hot Pepper, Grape fruit, Orange, Tangerine, Pineapple, Avocado, Carambola, Mango, Cherry, Passion fruit
5	Food legumes (Blackeye, Minica), Coconuts, mustard, Pak Choi, Eschalot, Sapodilla, Watermelon, Passion fruit, Cashew
6	Cereals, Food legumes, Coconuts, Cassava, Sweet Potato, Cabbage, Pumpkins, Squash, Cucumber, Bora, Eschalot, Ochro, Boulanger, Pak Choi, Hot Pepper, Eschalot, Citrus, Lime, Grape fruit, Orange, Pineapple, Banana, Sapodilla, Mango, Watermelon, Cashew
7	Cassava, Sweet Potato, Eddoes, Yam, Dasheen, Pineapple
8	Cassava, Sweet Potato, Eddoes, Yam, Dasheen, Pineapple
9	Food legumes (Peanut), Cassava, Eddoes, Yam, Dasheen, Pineapple, Passion fruit, Cashew, Mango, Lime, Grape fruit, Orange, Tangerine, Watermelon,
10	Cereals, Food legumes (Blackeye, Minica), Cassava, Eddoes, Yam, Dasheen, Plantain, Tomato, Lime, Cabbage, Hot Pepper, Grape fruit, Orange, Tangerine, Pineapple, Watermelon, Cherry, Passion fruit

Source: NAREI

The crops listed in Table 1 are just those that are grown at some commercial scale. There are approximately 75 crops that are grown as food and are available at markets in Guyana.

Diversification into spice cultivation, especially in hinterland communities began in 2008. This programme seeks to reduce the imports of spices such as turmeric, ginger, black pepper and nutmeg and improve the economic livelihoods of hinterland communities. There are currently about 50 acres of turmeric, 100 acres of ginger, 5 acres of black pepper and 1 acre of nutmeg.

A Crop Development Unit has been established for NAREI to focus primarily on the expansion of cultivation of corn and soya bean (for livestock feed), black eye, sour sop and ranbutan. Emphasis is also being placed on new crop types (to reduce importation) such as carrots, onions, chickpeas and culinary herbs and spices. Other crops targeted include quinoa and white potatoes.

The GROW MORE FOOD Campaign was launched on March 2008, it aimed at encouraging farmers (crops & livestock), fisher folks, and investors to increase production to meet local demand and to target an export market. This was done through a five step plan: implementation of US\$21.9M Agriculture Export Diversification Program and US\$6M Rural Enterprise and Agriculture Development Project; Increase Investment in Drainage and Irrigation; Enhanced extension and marketing services to farmers and traders; Increase availability of seed and planting materials and breeding animals; and approval of all outstanding viable production investment projects.

The production levels of the most important crops are shown in Table 4.

Table 4: Production of vegetables and fruits (2006-2013)

CROPS	2006	2007	2008	HY2009	2010	2011	2012	2013
Coconut (dry) - 000 nuts	61,918	63,595	71,785	33,993	92,507	18,800	17,068	23,216
Ground Provision								
Cassava (Sweet)	11,107	2,848	11,724	767	9,612	3,750	3,993	7,650
Sweet Potato	1,500	760	1,217	177	2,153	1,305	2,636	2,144
Eddoe	4,256	1,591	4,628	396	3,523	2,256	4,525	3,385
Plantain	4,187	3,228	4,821	1,023	19,992	4,753	9,163	15,246
Vegetables								
Tomato	4,032	1,976	1,831	572	6,945	23,042	9,711	11,657
Cabbage	1,796	1,493	1,501	353	2,480.	8,241	4,124	2,256
Pumpkin	2,394	1,681	2,069	414	14,057	5,546	4,834	9,623
Bora	4,404	4,563	4,019	830	11,942	9,626	6,193	8,270
Ochro	2,803	2,169	2,712	640	7,479	2,613	2,628	3,394
Boulanger	1,788	1,608	1,482	456	8,886	2,870	2,802	5,741
Squash	2,178	1,511	2,009	437	3,952	1,383	1,099	3,172
Cucumber	2,862	1,958	1,707	802	6,651	1,596	1,558	3,144
Spices & Seasonings								
Eschalot	789	517	503	191	2,204	3,889	1,974	4,428
Hot Pepper	2,147	1,883	1,740	516	4,053	3,675	3,461	7,969
Ginger	522	0.0	522	68	11	144	761	1,915
Citrus								
Lime	1,627	1,427	1,350	422	3,392	779	1,259	986
Orange	5,969	5,212	4,231	1,768	7,164	2,982	1,306	2,581
Fruits								
Banana	6,664	6,129	7,629	1,350	5,795	6,204	3,845	5,168
Pineapple	3,053	1,390	1,888	376	3,583	2,47	3,035	6,113
Avocado	446	272	844	49	185	167	73	212
Watermelon	1,764	1,924	2,233	451	13,991	5,380	2,329	2,191
Mango	5,097	4,253	3,609	1,225	2,524	3,447	1,499	1,125
Cherry	954	770	467	183	533	271	89	1,249
Passion Fruit	796	912	1,342	244	809	841	527	889
Papaw	Na	na	Na	na	na	5,990	4,712	4,980

Worlds ranking of Guyana in agricultural production

In spite of Guyana's small size and small population, Guyana ranks highly in agriculture production. Sugar and rice are Guyana's main agricultural products. About 48,000 ha of land are under sugar cane cultivation. Guyana produces overall about 300,000 tonnes of sugar and its cane production is about 4M tonnes on an annual basis. This ranks Guyana at 39th

place in the world for sugar cane production. Guyana is targeting a production of about 450,000 by 2020 and this would lift Guyana's place in sugar cane production among the top 30 in the world.

Guyana's rice paddy production is about 800,000 tonnes per year. Approximately 90,000 ha are under rice production. This ranks Guyana in the top 40 in the world for rice production.

As small as Guyana is, the country has two agricultural products in the top 10 in the world. These are Natural Gums (#2) and Cashew Apples (#4). There are 19 agri-commodities of Guyana featuring in the rank of 2-49 in the world, whereas another 19 feature in the rank ranging from 52-174 globally (Table 5).

Efforts will be further strengthened to elevate the global ranking of Guyana in other non-traditional crops which are low volume and high value crops.

Table 5: World ranking of Guyana in production of different agri-commodities (value wise)

World Ranking	Commodity	World Ranking	Commodity
2	Gums Natural	52	Cherries
4	Cashew apple	55	Eggplants (aubergines)
23	Ginger	59	Pineapples
27	Pepper (<i>Piper</i> spp.)	60	Avocados
31	Cow peas, dry	60	Grapefruit (inc. pomelos)
31	Okra	61	Coffee, green
33	Coconuts	66	Mangoes, mangosteens, guavas
33	Taro (cocoyam)	70	Cassava
33	Spices, nes	74	Lemons and limes
37	Plantains	76	Pumpkins, squash and gourds
37	Roots and Tubers, nes	85	Oranges
38	Fruit, tropical fresh nes	85	Sweet potatoes
39	Sugar cane	87	Chillies and peppers, green
39	Beans, green	90	Bananas
42	Rice, paddy	95	Cucumbers and gherkins
43	Broad beans, horse beans, dry	99	Watermelons
44	Cocoa beans	120	Honey, natural
44	Yams	126	Tomatoes
49	Citrus fruit, nes	132	Cabbages and other brassicas

Abbreviations, prp: Prepared, nec: Not elsewhere classified, nes: Not elsewhere specified. Source: FAOSTAT, 2012

There is growing interest for Guyana's non-traditional crops overseas: Export volumes of non-traditional crops have increased through the agriculture export diversification initiatives (AEDP). This program was designed to promote certain crops for both the local market and to target the export market, particularly the CARICOM market. Among the crops promoted were the 4Ps (peppers, plantains, pineapples and pumpkin) and the 4Cs (Coconut, citrus, cassava, carrots).

During 2013, about 12,700 tonnes of fresh fruits, vegetables and processed foods were exported from Guyana to Caribbean region and other countries. The total export value during 2013 of non-traditional agricultural commodities was \$US6.95M (\$G1.4B).

Table 6: Major non-traditional crops (tonnes) exported from Guyana during 2010-2013

COMMODITY	EXPORT VOLUME				EXPORT VALUE	
					\$G	\$US
	2010	2011	2012	2013	2013	2013
Coconut (dry)	5,449	7,883	8,630	10,213	612,801,840	3,003,930
Copra	901	734	971	755	133,170,213	654,585
Heart of Palm	489	393	320	386	211,813,852	1,040,522
Crude(coconut oil)	361	357	334	289	79,502,572	390,099
Mango	328	170	182	163	40,988,094	201,187
Pumpkin	546	452	189	146	26,135,174	128,417
Watermelon	479	289	84	116	19,510,190	95,843
Coconut (Water)	231	461	132	94	21,206,100	104,272
Eddo	95	157	61	89	30,433,402	149,419
Pineapple	60	106	52	71	26,580,688	130,520
Copra Meal	82	7	0	61	19,939,770	97,744
Sauces	6	2	35	54	36,899,750	173,540
Pepper (wiri wiri)	56	38	41	42	32,588,938	160,178
Lime	78	85	21	29	14,697,882	72,367
Breadnut (Katahar)	10	9	12	22	13,731,761	67,386
Other Exports	329	407	116	169	96,307,741	480,647
TOTAL	9,561	11,621	11,186	12,700	1,416,307,967	6,950,655

Livestock

Livestock includes dairy and beef cattle, swine, poultry, sheep, goats, wildlife and other livestock such as rabbits and bees. The livestock industry contributed more than \$US58M to Guyana's economy in 2012, playing a significant role in furthering Guyana's economic and social development. Guyana is "self-sufficient" in fresh meats, but not in milk. Some sub-sectors, such as swine and small ruminants, operate at subsistence level. Table 7 provides an overview of livestock production over the past five years. Livestock production is still well below potential capacity.

Table 7: Livestock Production in Guyana (2009-2013)

	Unit	2009	2010	2011	2012	2013
Poultry Meat	KG	27,086,806	24,969,212	25,573,466	30,452,761	29,280,260
Table Eggs	Each	18,914,422	14,169,197	23,508,323	21,234,317	17,964,574
Beef	KG	2,110,394	2,260,339	2,153,320	1,635,374	2,262,373
Mutton	KG	95,017	99,750	167,080	129,391	125,551
Pork	KG	265,906	304,639	202,599	199,048	571,962
Milk	Liters	30,900,000	26,800,000	34,175,857	39,191,368	46,483,931

The **Guyana Livestock Development Authority** (GLDA) was established in 2010 to ensure that Guyana's livestock industry is developed in a sustainable manner and one which would contribute to the country's drive for self-sufficiency in meat and meat products, and ultimately to capture export markets. The different units (Animal Health, Animal Protection, Genetic Improvement, Livestock Industry Development, Livestock Research, Disease Surveillance and Disease Control) of GLDA execute the programs in such a manner to ensure that this goal is realized in a competitive and cost effective manner.

Genetic improvement is an important strategy being used to increase yield of meat and other products used in industries. Guyana commissioned the first Genetic Improvement Lab in October 2012, an important component of the infrastructure to support improved genetic and breed improvement in the livestock industry. This laboratory will improve the artificial insemination and embryo transfer program for livestock, especially the cattle industry.

GLDA also promotes the establishment of adequate and quality pastures to support the livestock industry. During 2012, the GLDA established 46.5 acres pasture development, 16.5 acres at Mon Repos and 30 acres at Leonora.

A **Livestock Development Unit** has been established for GLDA to further enhance the industry. Focus is also on enhancing milk production to satisfy local demands.

Fisheries

The fishing industry continues to grow in economic importance in Guyana. This industry employs around 6,500 people in harvesting and a further 6,000 people in processing, with many more benefiting indirectly through fishing related industries such as boat building and gear supply and repair. It provides a source of relatively cheap animal protein (estimated per capita annual consumption of fish was 54kg in 2003), among the highest per capita consumption of fish and fish products within the Caribbean region.

Marine production has continued to increase over the last 5 years (Table 8) with 2012 production approximately 10,000 MT greater than 2007 and 8,169 MT greater than 2011. Causes for concerns in the marine industry are the rising costs of inputs such as fuel, feed for aquaculture and piracy attacks on fisher folks.

Table 8: Marine Fisheries (2007-2013)

	UNIT	2007	2008	2009	2010	2011	2012	2013
Prawns	MT	657	931	747	931	577	587	653
Seabob	MT	14,179	14,420	15,427	20,322	20,043	24,903	23,400
Whitebelly	MT	1,039	1289	1,329	526	832	603	685
Total Shrimp	MT	15,875	16,640	17,503	21,779	21,258	26,016	24,738
Finfish (industrial)	MT	339	374	1,336	1,186	1,905	1,952	2,440
Finfish (artisanal)	MT	26,082	23,455	23,175	22,969	21,135	24,288	21,288
Red Snapper	MT	976	871	789	1037	770	981	1,032
Total Fish	MT	27,397	24,700	25,300	25,192	23,810	27,221	24,760
Total fish and shrimp	MT	43,272	41,340	42,803	46,971	45,068	53,237	49,498

Inland Fisheries is now emerging as a more important part of the fishing industry of Guyana. Guyana has abundant inland aquatic resources and a rich and diverse resource base. The Guiana Shield fresh water resource, which is believed to be 10-15% of earth's available fresh water, should now be considered capital that needs to be carefully used and wisely managed for posterity.

The diverse aquatic as well as terrestrial life that is sustained by these waters also sustains the nation. The potential of the inland fisheries resources is hardly tapped. A wide variety of commercially attractive fish species, such as Lukanani, Hassar, Pacu, catfishes, Houri, etc. populate the rivers, streams and wetlands. It should be acknowledged, however, that some inland fish species are overfished and endangered (e.g. Arapaima) or threatened due to aquatic habitat degradation, modification and destruction.

Capture fishery for food and aquarium fish, recreational fishing and a newly emerging aquaculture sector (in fresh water as well as in brackish water environment) are the activities that currently utilize the inland aquatic resources. Production and employment in inland fisheries and aquaculture are small compared to those in marine fisheries, but the potential for development is larger as major marine fisheries resources are fully or overexploited.

Aquaculture production occupies about 3,000ha of aquaculture space around the country. For 2013 alone, the Satayadeo Sawh Aquaculture Station at Mon Repos produced in excess of 93, 180, fingerlings compared to 20, 000 in 2008; 85,872 for 2009 and 74, 950 in 2010, 86,689 in 2011 and 81,000 in 2012 which has been distributed to farmers countrywide. This sector will continue to be given prominence by the MoA in its diversification drive.

Table 9: Aquaculture Production (2009-2013)

Unit	Tilapia	Mullet	Querriman	Bashaw	Black Shrimp	Tambaqui	Hassar
2009	KG	343,302	35,208	31,306	23,913	77,711	-
2010	KG	163,660	35,286	35,407	13,862	47,215	40,435
2011	KG	236,827	19,066	17,770	6,603	28,794	119,160
2012	KG	120,697	7,001	6,837	3,451	11,278	108,518
2013	KG	82,844	7,729	6,682	5,016	8,700	106,748

Source: Fisheries Department

Guyana has also been developing its potential for sports fishing with the Ministry of Tourism, Industry and Commerce.

Table 10: Annual Exports (MT) for Fish, Prawns and Fish products (2008-2013)

ITEM	2008	2009	2010	2011	2012	2013	
	WEIGHT (MT)	WEIGHT (MT)	VALUE (G\$000)				
Prawns	623	823	641	294	280	560	1,628,310
Seabob/Whitebelly	9,686	9,669	8,773	9,114	12,509	11,091	7,933,965
Shrimp Dried	15	10	10	2	16	7	9,077
Fish Frozen	7,935	8,210	5,706	6,983	7,880	8,337	3,998,816
Fish Fresh		0	0	0	1	6	2,591
Fish Salted	0	0	0	0	0	3	273
Fish Smoked	19	36	15	54	75	154	53,186
Fish Fillets	379	486	540	577	905	825	496,488
Fish Dried	214	215	123	264	75	121	105,340
Fish Eggs	7	9	14	32	39	25	1,164
Fish Glue	95	96	98	156	141	171	427,154
Shark Salted	23	10	56	21	43	1	517
Shark Fin	36	36	28	68	23	38	209,409
Shark Bones		7	0	0	0	6	0
Crab Meat/Back	22	22	20	15	22	20	13,625
Live Crab	1	0	0	0	0	1	269
Squid	10	17	9	0	0	0	0
Ornamental Fish	29	23	4	0	2	37	8,357
TOTAL	19,094	19,669	16,037	17,581	22,011	21,403	14,888,541

KEY ELEMENTS OF THE POLICY ENVIRONMENT AND STRATEGIC DIRECTION

What are our goals?

Our Overarching Goal

Our overarching goal is to end hunger and eliminate poverty by 2025

Guyana has attained food security status. It has made tremendous advances in nutrition security. Our overall goals are to:

- Consolidate Guyana's Food Security status
- Achieve Nutrition Security
- Ensure reduction of food imports, such as corn, soya, potato, garlic, onion and spices
- Increase exports of rice and sugar, as both bulk and value-added agriculture commodities
- Increase export of non-traditional crop products
- Meet the local demand for milk and dairy products through local production
- Reach export level production for meats, such as beef and small ruminant meat
- Increase agro-processing for the local and export markets
- Transform agriculture to a F5 strategic direction, accomplishing its target for food and fiber (nutrition) security, but playing a significant role in fuel production, fashion and medicine and furniture and other commodities
- Achieve an annual growth of greater than 5%

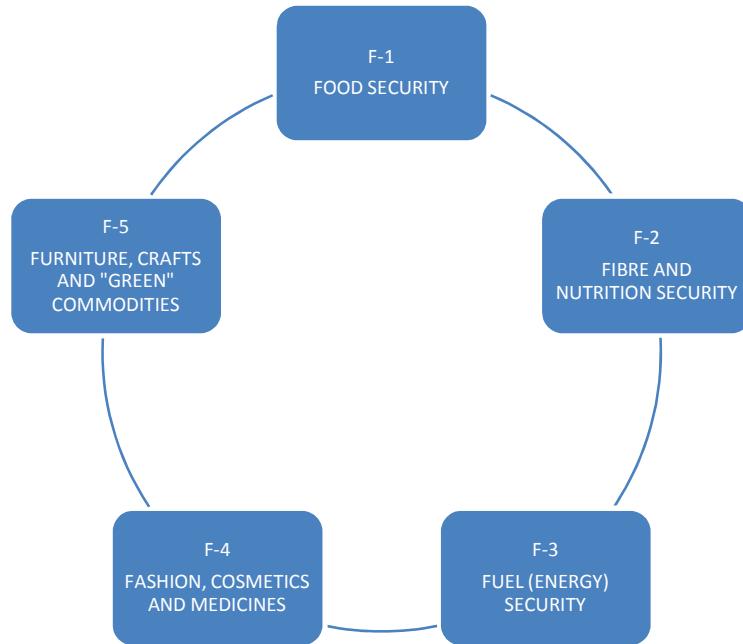
TRANSFORMATIVE VISION FOR AGRICULTURE

The Agriculture Strategy 2013-2020 is driven by our vision described on pg 11 and summarized by the following diagram:



AGRICULTURE IS MORE THAN FOOD AND NUTRITION SECURITY

The Agriculture Strategy 2013-2020 is designed to maximize employment and investment opportunities, and generate wealth at family and national levels, producing food and non-food commodities that contribute to economic growth.



ACHIEVING THE VISION

Guyana's Vision for Agriculture 2020 entitled *Agriculture, our vehicle for sustained economic and social prosperity* lucidly communicates the premier role of the sector in transforming the nation's development outlook in the medium and long term. It denotes a powerful tool for engendering optimism and action in elevating Guyana to a high middle income country within the next decade. The vision cognizant of disaster and climate change risks will be achieved through accelerated modernization and diversification of the agri-sector.

The priority activities to be implemented under the 25 focus areas would further catapult the growth of the sector by 2020 and beyond. Agricultural production is projected to increase greater than 20% during the intervening period. This will have a significant impact on food and nutrition security and enhancing the economic livelihood of farming communities. In addition, agriculture land coverage would increase by 100% and agriculture products will be expanded outside of food and nutrition security.

It is structured around twenty five (25) priority areas shown below:

Table 11: Guyana's Vision for Agriculture 2020 – Twenty Five Priority Areas for Success

VISION 2020	
1. Sustaining and Expanding Guyana's Agro-Diversity Policy and Program.	2. Farming Systems and Techniques, Biotechnology and Precision Agriculture.
3. Water Security and Management (A Modern and Efficient D&I System).	4. Infrastructure Development (other than D&I)
5. Soil Health	6. Plant and Livestock Health and Protection
7. Increased Livestock Production and Diversity	8. Increased Fish Production and Diversity
9. Sustained High Rice production and value-Added for Rice Products and Exports	10. Sugar Production to >450,000tonnes and Value-Added Exports
11. Increased Crop Production and Diversity	12. Increased Agro-Processing and Value Added Products for Local and Export Market
13. Marketing of Agricultural Products Internationally	14. Upgrading of Transportation, Packaging, Storage and Cargo Space.
15. Human Resource Development – Improving Training and Capacity Building for Agriculture	16. Food and Nutrition Security
17. Developing a Agri-Fuel Industry in Guyana	18. Environmental Sustainability
19. Risk Reduction and Disaster Management	20. Hydro-Meteorology
21. Land Availability, Land Zoning, and Land Tenure	22. Long Term Investment in Research and Development
23. Strengthened Organizational Structure	24. Policies and legislative Framework
25. Financing Mechanisms for Agriculture	

The strategy is designed to maximize:

- Productivity and competitiveness
- Rural development, employment and entrepreneurship
- Youth and women participation in agriculture
- Technology Adoption and adaptation

Productivity and competitiveness are key to ensuring strong productivity in the agri-food sector is essential to increase the diversified demands for food and non-food use of agriculture products. Productivity growth contributes to development in agricultural competitiveness. Some factors that add to competitiveness addressed by the strategy includes trade, strategic management measures, institution strengthening, fiscal policy, and technology, infrastructure (logistics and connectivity).

Rural development, employment and entrepreneurship: Rural development is linked to employment and entrepreneurship. Entrepreneurship is essential instrument for farmers to improving farm earnings; and women see it as an employment possibility near their homes which provides a reduced need for social support. Employment and entrepreneurship acts as a vehicle to improve the quality of life for individuals, families and communities and to sustain a healthy economy and environment.

Youth in Agriculture: There will be clear and succinct foci on attracting young people into agriculture, through enterprise and entrepreneurship and technology for aspirations of the new generation of farmers. This will be accomplish through support and training including scholarships in agriculture or business development skills, and training in financial management, including how to access credit. Agriculture will be viewed as a profitable business rather than purely for subsistence, embracing this is key to revitalizing agriculture in the Guyana. With the new generation of farmers will come innovative farming mechanisms.

Chapter 3: Key Elements of the Policy Environment and Strategic Direction

Technology in Agriculture: Closing the current gap in agricultural productivity will require a significant increase in agricultural yields. This will require improved technology; these include seeds that enable crops to withstand environmental and biological stresses, crop protection solutions, modern irrigation practices, mobile technology, fertilizer, and mechanization. For instance, we will increase use of technology in the operation of dairy farmers from artificial insemination to mechanical milking and pasteurization; and NAREI will begin using satellite technology to track and plan farming practices

A SPECIAL PLACE FOR A VALUE-CHAIN APPROACH

The 2013-2020 Agriculture Strategy for Guyana emphasizes the importance of a value-chain approach. This has been identified as one approach to address key binding constraints for Agriculture in CARICOM.



Key Policy Elements

The Agriculture Strategy 2013-2020 takes into consideration a number of documents which outline the ambition and the development goals and directions of the Government of Guyana. The Vision for Agriculture and its strategies 2013-2020 acknowledges that Guyana has already crafted and implemented strategies, plans and policies that have contributed significantly to agriculture and rural life and development overall. This strategy builds on the rich diversity of prudent macroeconomic policies, continued diversification of the productive sector, and substantial progress on catalytic infrastructural projects and strengthening social services.

There are a number of important policy and strategic documents that the Agriculture Strategy 2013-2020 builds on. These include, but not limited to the following:

Data Management and Monitoring and Evaluation capacities represent major weaknesses within the MOA. These areas are significant new areas of focus for the Agriculture Strategy 2013-2020. Significant improvement in data collection and analysis are targeted for the 2013-2020 period. During this time, Service Agreements to drive efficiency and effectiveness within the MOA and its agencies will be introduced.

There is a critical need for **COST OF PRODUCTION** to ensure farmers and agriculture enterprises maximize profitability and enhance wealth generation within the sector. The Ministry of Agriculture has initiated a cost of production capacity building program as an important policy and programmatic direction. This is not only intended to maximize profitability and promote wealth generation among agriculture enterprises, small and large, but it would ensure Guyana is aware of the total agriculture investment.

Sanitary and Phytosanitary measures are important to ensure food safety and the ability to export farming commodities. Guyana is well aware of the new food laws in Europe, North America and other export destinations and the need to prepare for a new round of non-tariff constraints in the trade regimes globally.

International Chemicals Instruments for Sound Chemicals Management: Over the years, the global community has addressed a number of issues regarding the transboundary movement of chemicals and their management, including through negotiated multilateral environmental agreements. Two initiatives that stemmed from the 1992 UN Conference on Environment and Development (UNCED) are the Rotterdam Convention on Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (the “Rotterdam PIC Convention”), adopted in 1998, and the Stockholm Convention on Persistent Organic Pollutants (the “Stockholm POPs Convention”), adopted in 2001. The Rotterdam Convention entered into force on 24 February 2004. As of July 2007, it had 73 signatories and 117 parties. The Stockholm Convention on Persistent Organic Pollutants was adopted and opened for signature on 22 May 2001. As of August 2007, it had 152 signatories and 147 parties. Guyana is a party to both of these two very significant chemical management agreements.

Adopted by the International Conference on Chemicals Management (ICCM) on 6 February 2006 in Dubai, United Arab Emirates, the Strategic Approach to International Chemicals Management (SAICM) is a policy framework to foster the sound management of chemicals. The Strategic Approach to Chemicals Management was developed by a multi-stakeholder and multi-sectoral Preparatory Committee and supports the achievement of the goal agreed at the 2002 Johannesburg World Summit on Sustainable Development of ensuring that, by the year 2020, chemicals are produced and used in ways that minimize significant adverse impacts on the environment and human health.

The **Hydrometeorological Service** is the focal point for the National Ozone Action Unit (NOAU), United Nations Framework Climate Change Convention (UNFCCC), Clean Development Mechanism (CDM), Amazon Cooperation Treaty Organisation

Chapter 3: Key Elements of the Policy Environment and Strategic Direction

(ACTO), Mainstream Adaptation to Climate Change (MACC) Project and the Caribbean Water Initiative Project. The Hydromet Service is governed by multiple international agreements. Two of our major agreements are the Convention on International Civil Aviation and the Vienna convention. The first covers our responsibility as a Meteorological Service for International Air Navigation while the Vienna Convention speaks to the Protection of the Ozone Layer and Montreal Protocol on Substance that Deplete the Ozone Layer in August 1993. In 2008, Guyana phased out the importation of Chorofluorocarbons (CFCs), one of the first groups of substances targeted under the Montreal Protocol. Subsequently, in 2012, Guyana commenced a phase out programme for Hydrochlorofluorocarbons (HCFCs), which is scheduled to be phased out under the Montreal Protocol by 2030. Another ozone depleting substance targeted to be phased out is Methyl Bromine which is used as a fumigant and solvent in the agriculture sectors in Guyana. The National Ozone Action Unit was established as the focal office for the implementation of the Montreal Protocol phase out Programmes in Guyana.

The HUNGER-FREE INITIATIVE OF THE AMERICAS is an important regional initiative in which Guyana is playing a major role. Guyana hosted the HUNGER-FREE INITIATIVE in 2012 and Guyana remains committed to this goal.

Transformation of the Livestock Industry is a major area of focus for the development period 2013-2020. Guyana's livestock industry is undergoing major transformation. Not only is it being positioned to meet local meat and meat product demands, but specific attention is being paid to rearing of animals for purposes other than food products.

The National Agri-Energy Committee will drive the Agri-Fuel Industry as part of the development trajectory of Guyana. Mega farms for the production of bio-fuels will become a new development thrust for Guyana. In this regards, Guyana is developing a new energy policy that includes regulation for transport fuel starting with an E-10 blend of gasoline for vehicles. The bio-ethanol plant at Albion is a pilot initiative to promote bio-fuel in Guyana.

Land Tenure Policies are critical for success in agriculture and to ensure small scale farmers remain as the most important driving force in agriculture in Guyana. The establishment of the Land Use Policy Committee by Cabinet will drive development in small scale and large scale agriculture land access.

The Infra-structure Portfolio 2013-2030 is a list of infra-structure projects that will create a transformation of the landscape of Guyana and that will catalyze agriculture production far beyond its present limits.

In 1997, the **National Development Strategy (NDS)** was developed, which outlined priorities for Guyana's economic and social development. Although dated, the objectives of the NDS remain relevant today and the Agriculture Strategy 2013-2020 takes cognizance of these objectives:

- (i) Achieve sustainable growth rates
- (ii) Reduce poverty
- (iii) Achieve geographical unity
- (iv) Ensure equitable geographical distribution of economic activity
- (v) Diversify the economy.

The Government of Guyana has developed and successfully implemented a number of Poverty Reduction Strategies, which have significantly helped to reduce poverty from about 66 to 87% before 1990 to about 30% today. Guyana's **2011-2015 Poverty Reduction Strategy (PRSP)** is enshrined in the Governments' medium term vision that focuses on six areas of importance including economic policies to stimulate growth, good governance and the business environment, investment in human capital, infrastructure to support services and to support growth and safety nets. Realization of the expected goals of the PRSP hinges on seven key pillars listed below:

- broad-based, jobs-generating economic growth;

- environmental protection;
- stronger institutions and better governance;
- investment in human capital, with emphasis on basic education and primary health;
- investment in physical capital, with emphasis on better and broader provision of safe water and sanitation services, farm-to-market roads, drainage and irrigation systems, and housing;
- improved safety nets; and
- special intervention programs to address regional pockets of poverty

The Jagdeo Initiative (JI) identified and defined the major constraints being faced in agricultural development in the Caribbean region, including Guyana. These aim to develop and implement targeted, focused and practical interventions both at the regional and national levels to remove the nine key binding constraints.

1. Limited financing and inadequate new investments
2. Outdated and inefficient agricultural health and food safety systems
3. Inadequate research and development
4. A fragmented and unorganized private sector
5. Inefficient land and water distribution management systems
6. Deficient and uncoordinated risk management measures
7. Inadequate transportation systems, particularly for agricultural products
8. Market infrastructure, including market information and market linkages
9. Lack of skilled and quality human resources in agriculture.

Guyana's **Low Carbon Development Strategy (LCDS) (2010)** represents one of the innovative models globally to merge forest protection, climate change mitigation and adaptation, and socio-economic growth and development. The strategy puts forward four key areas of actions for driving the low carbon climatic resilient economy, two of which relates directly to the agriculture sector:

- (1) Investing in low carbon infrastructure inclusive of D&I and nurturing investment in high potential, low carbon sectors such as fruits, vegetables and aquaculture.
- (2) In addition the Low Carbon Development Strategy presents various opportunities and challenges for Guyana's agriculture sector, such as investing in strategic economic infrastructure (drainage, irrigation, road construction, and off-grid power). This would improve access and provide infrastructure for agro-industrial investment in currently unused, non-forested land. Such improvements would also facilitate investment in high-potential low-carbon sectors and sustainably managing the forestry sectors. Opportunities for investment and development by the indigenous population would also be created in areas such as cattle rearing and value-added production.

Legislation: With the change in administration in 1992, it was recognized that the agricultural sector required a drastic overhaul for development to take place. The early initiatives focused on an essential paradigm shift. With the support of international financial agencies, the new government used legislation to create new institutions such as the Guyana Forestry Commission (GFC), the Guyana Lands and Surveys Commission (GLSC) and the National Drainage and Irrigation Authority (NDIA). More recently new legislation also brought into being the National Agricultural Research and Extension Institute (NAREI) and the Guyana Livestock Development Authority (GLDA).

The accession of Guyana to the World Trade Organization in 1995 has further propelled the country in the direction of globalisation, and in respect of the agriculture sector the necessity to conform to the requirements of the WTO/SPS

agreement. The creation of an effective and efficient Sanitary and Phytosanitary regime for the development of legislation, policies and strategies in relation to animal and plant health, food safety, quality assurance and inspection services have been progressing satisfactorily.

Legislation already enacted includes the Animal Health Act, the Plant Protection Act, the Fisheries Act, the Veterinarians Act and the Seeds Act.

Legislation is also proposed for several other areas and in many instances the drafts have already been prepared. These include: the Animal Welfare Bill, the Food Security Bill, Fisheries Regulations, Animal and Plant Health Regulations, Traceability Regulations and a Praedial Larceny Bill. Several of these legislations promote the development and use of regional as well as international standards, measures and guidelines.

It must be noted, however, that other areas in agriculture are not being ignored. For example, a Region 2 Conservancies Management Bill has been prepared to facilitate more efficient use of irrigation waters in one region of the country.

Guyana's Food and Nutrition Security 2011-2020 focuses on consolidating food and nutrition security. It places emphasis on factors affecting Guyana's food availability, stability and access. In terms of availability, major concerns are production and marketing constraints; stability relates to natural disasters and climate variability; while access concerns are characterized by those whose livelihoods survive on a very limited income. The Overall goal of FNSS Implementation Plan is to enhance economic growth and poverty reduction by increasing the contribution of the agriculture sector to the national economy.

To enhance agricultural production and productivity and to strategically address issues related the enhancement of agricultural production and productivity and the promotion of the consumption of a healthy and nutritious diet year round, the GOG prepared the Food and Nutrition Security Strategy (FNSS) for 2011-2020. The strategy concentrates on rural smallholder farmers constituting the majority of the poor. The FNSS strategy places emphasis on:

- (1) Enhancing production (quantity and quality) through appropriate technology transfer
- (2) Facilitating marketing through value-added products and market information
- (3) Increasing employment in rural areas and vulnerable groups
- (4) Reduction of risk and vulnerability to natural disaster and economic crisis
- (5) Food safety and quality control
- (6) Hygienic and safe food practices
- (7) Improved dietary and nutritional practices at the household levels
- (8) Increased institutional coordination and functioning for improved food and nutrition security.

Today the **GROW MORE FOOD Campaign 2008-present** builds on the recently completed Agriculture Diversification Program components: (1) Promotion of private sector entrepreneurship in agribusiness; (2) Improving the capabilities of agribusiness export and facilitation services; (3) Strengthening and consolidating agricultural health and food safety services; and (4) Drainage and irrigation rehabilitation. The Grow More Food Campaign continues to focus on the reduction of the food import bill (more than US\$150M or G\$30B annually) and the increase of agricultural export. This is being implemented through the establishment of a Crop Development Unit at NAREI which focuses primarily on the expansion of cultivation of corn and soya bean (for livestock feed), blackeye, soursop and ranbutan. Emphasis is also being placed on new crop types (to reduce importation) such as carrots, onions, chickpeas, potato and culinary herbs and spices. The establishment of the Livestock Development Unit at GLDA further enhances the livestock industry with focus on milk production to satisfy local dairy product demands. One specific area that the GLDA focuses on is small ruminant meat.

Chapter 3: Key Elements of the Policy Environment and Strategic Direction

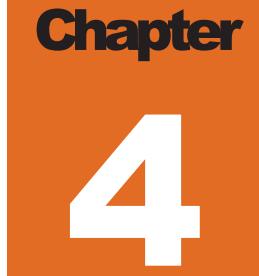
Agriculture Disaster Risk Management Plan (ADRM) 2013-2020 symbolizes the Government of Guyana and Ministry of Agriculture's commitment to risk reduction. The policies and programs described in the ADRM plan demonstrate the GOG's strong belief that disaster risk management is an imperative. In this regards, the Agriculture Strategy 2013-2020 targets the following:

1. Institutional mechanism that fosters optimal coordination and implementation of DRM programmes within the agriculture sector.
2. Innovative and culturally appropriate risk transfer instruments designed and adopted to improve the recovery potential of farmers and fisher-people, with an emphasis on the most vulnerable.
3. Institutional capacities for risk assessment, hazard monitoring and dissemination of early warning information for proactive mitigation, preparedness and response among all end users, especially at the community level.
4. Disaster risk reduction and climate change adaptation policies and programmes designed to strengthen resilience to significant hazards particularly among vulnerable groups.
5. Education, training and public awareness as tools to advance a culture of prevention and safety.
6. Resources for disaster preparedness and response at all levels, especially in high risk communities/regions.
7. Disaster risk reduction and CCA principles and best practices for recovery and rehabilitation policies and programmes in affected communities.

The Flood Prevention and Drought Control Plan 2013-2020 describes actions that are intended to reduce and prevent floods and control and mitigate drought events. These plans are derived from the ADRM and also from the Infra-structure Portfolio 2013-2030.

Development partners: Guyana is fortunate to have country offices of United Nations Food and Agriculture Organization (FAO), Inter-American Institute for Cooperation on Agriculture (IICA) and Caribbean Community (CARICOM) that collaborate closely with the Ministry of Agriculture to fulfill the upward thrust of the agriculture sector. While FAO concentrates its efforts in striving to achieve its vision of achieving food security and eliminating poverty, Guyana's Programme Thematic Areas include: Food Security and Nutrition, Agriculture and Rural Development, Renewable Natural Resources and Climate Change and Agriculture Health and Food Safety. In 2013, Guyana was recognized by FAO as one of 17 countries out of 189 countries that worked on achieving the Millennium Development Goal and improved nutrition.

IICA is the institution of the Inter-American System that provides technical cooperation, innovation and specialized knowledge to contribute to the competitive and sustainable development of agriculture in the Americas and to improve the lives of rural dwellers in the member countries. IICA Programme Thematic Areas include: Strengthening technical capacity in agriculture, Promoting Agriculture Diversification and Provide Support to Disease Monitoring and Surveillance, Capacity Building to Improve Market Access, Modernizing Tertiary Agriculture Education and establishing a Diary Industry. IICA will be implementing two projects in the Caribbean region Sanitary and Phytosanitary Measures Project & Agriculture Policy Programme (APP).



THE ROADMAP

GUYANA'S VISION FOR AGRICULTURE 2020 – TWENTY FIVE PRIORITIES FOR SUCCESS POST 2015

AGRICULTURE AS OUR VEHICLE FOR SUSTAINED ECONOMIC AND SOCIAL PROSPERITY

The Agriculture Strategy 2013-2020 IS AN AMBITIOUS PROGRAM. It is described as a series of activities around 25 priority areas, with specific indicators for all activities.

A NUMBER OF AGENCIES WILL WORK TOGETHER TO IMPLEMENT THE AGRICULTURE STRATEGY 2013-2020. THE MINISTRY OF AGRICULTURE HEADS OF DEPARTMENTS (HOD) WILL MONITOR THE IMPLEMENTATION ON A QUARTERLY BASIS. THE M&E UNIT WILL REPORT QUARTERLY TO THE HOD ON THE IMPLEMENTATION PERFORMANCE.

Each department and or authority will develop annual work plans and will be responsible for its full implementation.

The overall goals will be accomplished via a number of sub-sector strategies. These strategies are not all included in the Roadmap described in this document. Thus, in addition to the activities listed in the Agriculture Strategy, other activities are described in each sub-sector strategy document.

There are 12 overall indicators listed as the indicators that will represent the Monitoring and Evaluation of the Agriculture Strategy and its impact on the overall development of Guyana.

There are twenty-five (25) priority areas for implementation. The table below is a list of activities highlighted in this Strategy and the Indicators. The Roadmap has 494 activities for the period 2013-2020 with 511 indicators.

Each of the indicators will be monitored and an achievement index will be calculated. Where an indicator is outside of the timeline, that indicator will be marked with full points. Thus, at the beginning of 2013, all indicators would have been outside of the 2013 starting timeline and the achievement index would have been 100%. At the end of 2013, certain indicators would have been within their timeline. Non-completion or partial completion would have seen the achievement index being marked down from 100%. Thus, a score of greater than 90% is considered acceptable. A score of less than 90% is ineffective implementation.

The following scoring indices will be in use:

- >95% = A+
- >90% = A
- >85% = B+
- >80% = B
- > 75% = C
- <75% = Unacceptable

Chapter 4: The Roadmap

Table 12: Twenty-Five (25) Priority Areas in the Agriculture Strategy with Activities and Indicators

Priority Areas	# of Activities	# of Indicators
Overall Goals and Indicators	15 Sub-Sector Strategies	17
1. PRIORITY AREA 1: SUSTAINING AND EXPANDING GUYANA'S AGRO-DIVERSITY POLICY AND PROGRAM	13	13
2. PRIORITY AREA 2: REORIENTATION AND MODERNIZATION OF FARMING SYSTEMS, TECHNIQUES BIOTECHNOLOGY AND PRECISION AGRICULTURE	14	14
3. PRIORITY AREA 3: FURTHER ADVANCING WATER SECURITY AND WATER MANAGEMENT - DRAINAGE AND IRRIGATION SYSTEM EXPANSION AND STRENGTHENING	16	16
4. PRIORITY AREA 4: CONTINUED STRENGTHENING OF SUPPORT INFRASTRUCTURE FOR AGRICULTURE - OUTSIDE OF DRAINAGE AND IRRIGATION	12	12
5. PRIORITY AREA 5: STRENGTHENING SOIL HEALTH AS AN IMPORTANT PART OF INCREASED PRODUCTIVITY AND QUALITY	14	
6. PRIORITY AREA 6: EXPANSION AND IMPROVEMENT OF PLANT AND ANIMAL HEALTH TO IMPROVE PRODUCTION – (A) PLANT HEALTH PRIORITY AREA 6: EXPANSION AND IMPROVEMENT OF PLANT AND ANIMAL HEALTH TO IMPROVE PRODUCTION – (B) LIVESTOCK (ANIMAL) HEALTH	52 23	52 23
7. PRIORITY AREA 7: INCREASED PRODUCTION OF LIVESTOCK	28	28
8. PRIORITY AREA 8: INCREASED PRODUCTION OF FISH AND FISH PRODUCTS	49	49
9. PRIORITY AREA 9: SUSTAINED HIGH PRODUCTION OF RICE	7	7
10. PRIORITY AREA 10: INCREASING SUGAR PRODUCTION TO 450,000 TONNES SUGAR BY 2020	6	6
11. PRIORITY AREA 11: INCREASED PRODUCTION AND DIVERSIFICATION OF CROPS, WITH PRIORITY AND NEW CROPS	31	31
12. PRIORITY AREA 12: PROMOTING AGRO-PROCESSING AND VALUE-ADDED PRODUCTS	13	13
13. PRIORITY AREA 13: DEVELOPING A NEW MARKETING APPROACH, OUTSIDE OF SUGAR AND RICE - EXPAND MARKETING AND COMPETITIVE OPPORTUNITIES AT LOCAL AND INTERNATIONAL LEVEL	12	12
14. PRIORITY AREA 14: ENHANCING TRANSPORTATION, STORAGE AND CARGO SPACE FACILITIES	4	4
15. PRIORITY AREA 15: A HUMAN RESOURCE DEVELOPMENT STRATEGY TO SECURE AN AGRICULTURE WORKFORCE	19	19
16. PRIORITY AREA 16: CONSOLIDATING AND IMPROVING FOOD AND NUTRITION SECURITY AS FUNDAMENTAL FOR ECONOMIC GROWTH AND SOCIAL WELFARE DEVELOPMENT	65	65
17. PRIORITY AREA 17: BUILDING A CAPACITY FOR AN AGRO-ENERGY (BIO-FUEL) INDUSTRY	11	11
18. PRIORITY AREA 18: PROMOTING ENVIRONMENTAL SUSTAINABILITY	9	9
19. PRIORITY AREA 19: FURTHER DEVELOP AGRICULTURE DISASTER RISK REDUCTION (ADRR) AND DISASTER RISK MANAGEMENT	27	27
20. PRIORITY AREA 20: ENHANCING HYDROMETEOROLOGY AND WEATHER FORECASTING	30	30
21. PRIORITY AREA 21: IMPROVING SYSTEM FOR LAND AVAILABILITY, LAND ZONING, AND LAND TENURE	8	8
22. PRIORITY ROAD 22: LONG TERM INVESTMENT AND PROMOTION OF	10	10

Chapter 4: The Roadmap

Priority Areas	# of Activities	# of Indicators
RESEARCH AND DEVELOPMENT		
23. PRIORITY AREA 23: STRENGTHEN THE ORGANIZATIONAL STRUCTURE FOR A NEW AGRICULTURE VISION	5	5
24. PRIORITY AREA 24: A POLICY AND LEGISLATIVE AGENDA FOR A MODERN AGRICULTURE SECTOR	9	9
25. PRIORITY AREA 25: DEVELOPING A FINANCING MECHANISM TO SUPPORT AGRICULTURE VISION 2020	5	5
TOTAL	494	511

ROADMAP – AGRICULTURE STRATEGY 2020

OVERALL GOAL		
PRIORITY GOALS	STRATEGIC ACTIVITIES	INDICATOR
<p><i>Overall Goal: Reduce poverty, support wealth generation and employment, increase GDP, consolidate food and nutrition security, increase economic opportunities and entrepreneurship, reduce dependence on fossil fuel</i></p> <p>[The overall goal of the Agriculture Strategy 2013-2020 will be monitored by the indicators listed in column 3. These indicators and others described for each specific Priority Area will be reviewed annually within 60 days of the new year by a National Consensus Meeting. The 1ST National Agriculture Consensus Meeting will be held before March 30th 2014]</p>	<p>The activities described below for the 25 Priority Areas represent the Roadmap to attain the goals of the Agriculture Strategy described in this document.</p> <p>Note that in some instances, there are separate sub-sector strategies. The present Roadmap should be read and implemented together with these sub-sector Strategies. The following sub-sector strategies are available:</p> <ul style="list-style-type: none"> • Food and Nutrition Strategy 2013-2020 • Hydrometeorology Services 2013-2020 • Rice Development Strategy 2013-2020 • Disaster Risk Management and Risk Reduction Strategy 2013-2020 • Livestock Development Strategy 2013-2020 • Inland Fishing Strategy 2013-2020 • Marine Fishing Strategy 2013-2020 • Crops (Non-Sugar, Non-Rice) Expansion Strategy 2013-2020 • NAREI Strategic Research and Development Agenda 2013-2020 • The Pesticide and Toxic Chemical Control Strategy 2013-2020 • The Drainage and Irrigation Strategy 2013-2020 • GUYSUCO 2013-2020 • The Agriculture Sector Marketing and Value-Chain Development Strategy 2013-2020 	<ol style="list-style-type: none"> 1. An overall growth rate averaging no less than 5% annual growth for the agriculture sector and 2020 Agriculture Growth is at least 20% of 2014 base-line 2. An increase of cultivation area by 2020: <ol style="list-style-type: none"> (2.1) An increase of cultivation area of about 5% per year by small farmers (2.2) At least 25,000 ha new land cultivation as mega-farms in Canje Basin by 2020 (2.3) At least 10,000 ha new cultivation area in the Intermediate savannah by 2020 (2.4) At least 20,000ha in mega-farms in Reg. 9 by 2020 3. Commercial scale bio-fuel is produced in Guyana with at least 50,000 liters of bio-fuel produced by 2020 4. A dairy industry is formalized <ol style="list-style-type: none"> (4.1) At least one dairy plant by 2020 (4.2) Dairy plant is producing at least one other value-added product, in addition to pasteurized milk (4.3) Milk import in country reduced 15% by 2020 5. Reduce imports of fresh vegetables/fruits: <ol style="list-style-type: none"> (5.1) Reduce importation of carrots, garlic, cauliflower, broccoli, turmeric, ginger, black pepper by more than 50% by 2020 6. Stabilize sugar production to 450,000 tonnes by 2020 with TCTS of at least 12 and field mechanization >50% 7. Increase rice production to 6tonnes per ha by 2020 and attain production of greater than 600,000 tonnes by 2020 8. Increase export of non-sugar, non-rice agriculture by 25% by 2020 9. Increase agro-processed production by 50% by 2020 10. Reduce losses due to weather-related disasters by 25% by 2020 11. A Bio-Safety Regulatory Framework is being implemented by 2017 12. An Intellectual Property Rights Regulatory Framework developed by 2020, including Plant Breeders Rights (UPOV 78 and UPOV 91), patent laws covering biological

		materials and processes and trademark legislation
PRIORITY AREA 1: SUSTAINING AND EXPANDING GUYANA'S AGRO-DIVERSITY POLICY AND PROGRAM		
1. Sustaining and Promoting an Agro-Diversity Policy and Program [This Priority Area will be monitored by the Guyana Agriculture Research Oversight Committee and specific activities will be implemented mainly by NAREI, GLDA and GRDB]	<ol style="list-style-type: none"> 1. Establish a National Agriculture Research Oversight Committee at MOA 2. Strengthen Germplasm (Gene Bank) – In-House and Field - Facility in Guyana to FAO Germplasm Standards 3. Establish a Crop Development and Diversification Unit at NAREI 4. Establish a Livestock Improvement Committee at GLDA 5. Develop and Sustain a Guyana Crop and Livestock Genetic Compendium 6. Begin the introduction of commercial size corn and soya cultivation in Guyana 7. Develop experimental plot for quinoa 8. Develop a Rubber Plant Nursery at Kairuni 9. Develop new cash crops such as quinoa, carrots, chickpeas , garlic and different varieties of sweet potato 10. Rice Research Center at Burma to computerize records of rice germplasm 11. The Rice Research Center to develop and introduce at least one new variety for commercial production and one new variety for field testing 12. Complete draft of GMO Policy for presentation to Cabinet 13. Establish an Agriculture Mapping Program for Guyana using GIS/GPS technology and techniques 	<ol style="list-style-type: none"> 1. Reports of 4 meetings of GROC-MOA and an Annual Agriculture Research Forum 2. The Germplasm Facility (Gene Bank) is formalized by end of 2015 in accordance with FAO Germplasm Standards and 1st Report (2015) is published in January 2016 3. Reports of 4 meetings of CDU-NAREI with at least one improved and new plant/yr 4. Reports of 4 meetings of LIC – GLDA with at least one improved breed per year 5. (a) 1st Compendium by June 2015 and (b) 1st Compendium endorsed by Dec. 2015 6. Crop production presented for two crops of corn and 1 crop of soya by Dec 2014 7. Quinoa plot data presented by JUNE 2015 8. Rubber Plant Nursery Report by June 31st and Dec 31st 2014 with at least 1,000 plants 9. At least two cash crop farmers producing carrots, chickpeas and garlic and different varieties of sweet potato commercially 10. Software for E-System Germplasm and Research System procured/ in use by 2020 11. One new variety being field tested by 2018 and introduced for commercial production in farms by 2020 and one new variety ready for field testing by 2020 12. Draft GMO Policy discussed at National Forum and Cabinet by December 2014 13. Mapping for at least two Regions completed by December 31st 2014 and at least all coastal Regions by 2020
PRIORITY AREA 2: REORIENTATION AND MODERNIZATION OF FARMING SYSTEMS, TECHNIQUES BIOTECHNOLOGY AND PRECISION AGRICULTURE		
2. Promoting Farming Systems and Techniques, Biotechnology and Precision-Agriculture [This Priority Action will be implemented by all agencies which are part of the MOA. It will be monitored by a	<ol style="list-style-type: none"> 1. HOD will monitor this Priority Action and the PS will be the Focal Point for this Priority Area, with assistance from IICA. The PS will coordinate meeting with all agencies by March each year and prepare a Report for the HOD meeting in April each year 2. Establishment of Biotechnology Laboratory to support tissue-cultured germplasm 3. Production of tissue-cultured plantlets (pineapple and plantains) and 	<ol style="list-style-type: none"> 1. MOU signed with IICA to help Monitor this Priority Area and to prepare Annual Report. PS presents 1st Report for this Priority Area at the April 2014 HOD Meeting. Meeting will be attended by stakeholders including other public sector agencies, Board Members, IICA, FAO, CARDI, CARICOM 2. Biotechnology Laboratory at NAREI functional by June 2014 and a number of tissue-cultured germplasm maintained 3. Tissue-cultured germplasm of pineapples,

Chapter 4: The Roadmap

SUB-COMMITTEE - Farming Systems and Techniques, Biotechnology and Precision-Agriculture Sub-Committee of the HOD on an annual basis]	<p>maintenance of in vitro storage of cassava and sweet potato germplasm</p> <p>4. Establish cassava demonstration plots in Region 9 and at Kairuni to demonstrate improved production techniques</p> <p>5. Use of DNA fingerprinting (molecular markers) characterization and ensuring seed purity</p> <p>6. Conduct an assessment and evaluation of current protected agriculture systems in order to identify constraints affecting greater adoption of protected agriculture methods</p> <p>7. Introduce high tunnel protected agriculture system by June 2014</p> <p>8. Develop macro proration techniques for plantains</p> <p>9. Demonstrate the use of micro-irrigation systems coupled with fertigation</p> <p>10. Promote mechanized systems for planting and harvesting field crops</p> <p>11. Develop suitable nutrient medium for use in hydroponic farms</p> <p>12. Conduct post-harvest studies in crops of economic importance</p> <p>13. Update Farmers Manual</p> <p>14. Develop program to promote knowledge-based sustainable agriculture and improved practices through farmers' participation in research and field schools, focusing on farmers' knowledge and experience</p>	<p>plantains, cassava and sweet potato maintained by June 2015 and 30, 000 plantlets available for farmers by June 2015</p> <p>4. Cassava production data from the Cassava demonstration plot in Region 9 and at Kairuni available in December 2014</p> <p>5. At least one fingerprinting completed by Dec 2014 and two completed in 2015, with at least one fingerprinting annually</p> <p>6. (a) Assessment Report of Protected Agriculture in Guyana ready by April 2014 (b) Manual of Protected Agriculture Methods for Guyana by July 2014 © Annual listing of protected agriculture methods in use</p> <p>7. At least one farmer using system by 2014 and at least 10 farmers by 2020</p> <p>8. At least one such technique in place by end of 2014 and another by end of 2015</p> <p>9. At least 10 farmers using micro-irrigation fertigation by end of 2014 and 100 by 2020</p> <p>10. NAREI has mechanized planters and harvesters and demonstrate use to farmers</p> <p>11. NAREI is using a local hydroponic medium in a hydroponic farm by 2015</p> <p>12. Reports of 4 post-harvest studies presented to HOD by June 2015</p> <p>13. 2nd Edition of Farmers Manual by Jan 2015</p> <p>14. (a) At least 10 farmers engaged in research activities in the Agriculture Sector annually (b) At least one field school session per month is held (C) Annual reports of production comparison between those farmers who attended field schools and those who never attended</p>
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PRIORITY AREA 3: FURTHER ADVANCING WATER SECURITY AND WATER MANAGEMENT DRAINAGE AND IRRIGATION SYSTEM EXPANSION AND STRENGTHENING

3. Advancing Water Security and Water Management [This priority Area will be monitored by the DRM/DRR Oversight Committee and will be	<p>1. The Jagdeo Initiative CARICOM Water and Land Management Action Committee will be the Oversight Body for this Priority Area together with the DRM/DRR Oversight Committee. The two Committees will be merged as one by June 2014</p> <p>2. NDIA to maintain an Annual Register of Pump Stations, Sluices, Canals and</p>	<p>1. (a) The 1st Meeting of the combined committees is held in March 2014. (b) The Committee will issue a 2013 Report for consideration and approval by HOD by May 2014. © There will be Annual Reports which will be considered by HOD each April.</p> <p>2. 1st Edition Register of D&I Structures – Pump Stations, Sluices, Canals/Drains,</p>
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<p>implemented overall by NDIA and MMA with support from RDCs, WUAs, GRDB]</p>	<p>Drains, Dams and Embankments</p> <ul style="list-style-type: none"> 3. Establish an Annual Readiness Audit of all Drainage and Irrigation Structures with detailed GIS information and maintenance needs for each structure to be considered during the 1st Meeting of the NDIA Board each year 4. Develop and begin implementation of a Portfolio of Drainage and Irrigation Infrastructure Development Projects. This inventory will be developed into Works, Service and Goods Packages. 5. Develop and implement a Flood Prevention Strategy 6. Expand pumping capacity for drainage in country by 100% by 2020 through rehabilitation and new pumps 7. Expand pumping capacity for irrigation in country by 50% by 2020 8. Establish a Specialize Unit for Pumps at the NDIA with Regional presence 9. Establish A Warehouse and Routine Equipment Maintenance Department to reduce cost of repairs and maintenance 10. An Annual Report from NDIA to capture all flood situations and analysis for flood losses prepared 11. Strengthen Water Users Association around the country and establish new ones 12. The Community Drainage and Irrigation Program is reorganized for greater effectiveness <p><u>Highlights of Some Special Projects</u></p> <ul style="list-style-type: none"> 13. The CAP 2 Project is conceptualized, developed and approved for implementation 14. The CUNHIA Canal project is approved for implementation in 2014 15. The Northern Relief Channel is completed in 2014 16. Ensure for #s 6 and 7 above, significant progress is recorded in 2014 	<p>Dams etc. is approved by the HOD in 2014</p> <ul style="list-style-type: none"> 3. The Readiness Audit for Regions 2 and 6 considered by the NDIA Board in Jan 2014 and Readiness Audits for all Regions assessed by NDIA Central Engineering Department in 2014. Annual Work Programs are approved by NDIA Board 4. (a) The Portfolio of D&I Projects for 2013-2030 will be presented to the HOD for consideration and approval by March 2014. (b) Inventory include 9 Works Packages, 3 Service Packages and 3 Goods Packages 5. Flood Prevention Strategy 2013-2020 approved by HOD by December 2013 6. Procure new drainage pumps in 2013 and install ten new pumps in 2014. Continue procurement/installation on an annual basis for a 100% increase by 2020 7. New irrigation pumps are procured and installed in 2014, 2016 and 2018 8. Unit for Management of Pumps established in 2014 and a Specialist Engineer hired to provide training and support 9. NDIA Warehouse at Lusignan has Director, relevant staff, computerized and capable of a level of repairs and maintenance by 2016 10. Annual Report approved by NDIA Board, Flood Analysis and Losses presented to Cabinet on an annual basis 11. By-laws, regulations, Standing Orders for WUA harmonized, WUAs allowed to own and manage equipment and 4 new WUAs are established by 2020 12. The reorganized plan for CDIP is completed and approved by Cabinet by June 2014 and implemented in 2nd half of 2014 <p><u>Highlights of Some Special Projects</u></p> <ul style="list-style-type: none"> 13. CAP 2 Project approved by relevant agencies – World Bank, MOF, MOA and Cabinet and implementation begins in 2014 14. CUNHIA is in place and initiated in 2014 with completion date by 2017 15. The Northern Relief Channel is fully functional by September 2014 16. Following pump stations are operationalized in 2014: Rose Hall Town,
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		Canje, #66, Bengal, #19 Village, Pine Ground, Enterprise, Patentia, Canals Polder #1, Windsor Forest, Lima and Three Friends
PRIORITY AREA 4: CONTINUED STRENGTHENING OF SUPPORT INFRASTRUCTURE FOR AGRICULTURE OUTSIDE OF DRAINAGE AND IRRIGATION		
4. Continued Strengthening of Agriculture Infrastructure (support facilities) other than D&I [This Priority Area is implemented by all agencies, with particular focus from NDIA, MMA, GRDB, RDCs, NAREI, GLDA, GMC, Fisheries, Pesticide and Toxic Chemical Board etc. The Focal Point for this coordination will be ASDU]	<ol style="list-style-type: none"> 1. Develop and begin implementation of a Portfolio of Non-D&I Infrastructure Projects 2. Establish a new Tissue Culture Laboratory at NAREI 3. Establish a new Bio-Control Laboratory at NAREI 4. Construct a new Veterinary Laboratory at GLDA 5. Upgrade the GUYSUCO Soil Laboratory as a National Soil Laboratory 6. Rehabilitate the Ebini Complex 7. Build new shade houses at NAREI facilities across the country 8. Upgrade the Hosororo Nursery as an Agriculture Center of Excellence 9. Upgrade the Kairuni Nursery as an Agriculture Center of Excellence 10. Upgrade facilities at GSA – Mon Repos and Essequibo, including a new campus in Essequibo, a computer laboratory at GSA 11. Develop an Incubator Agro-Processing Facility at GSA 12. Construct new MMA Headquarters at Onverwaght 	<ol style="list-style-type: none"> 1. The Portfolio of Non-D&I Infrastructure Projects 2013-2030 approved by HOD and submitted to Cabinet in April 2014 2. The new Tissue Culture Laboratory at NAREI is commissioned by June 2014 3. The new Bio-Control Laboratory at NAREI is commissioned by June 2014 4. The new GLDA Veterinary Laboratory is commissioned by May 2014 5. The National Soil Laboratory at GUYSUCO is launched by September 2014 6. New Ebini Agri Center is opened in 2014 7. New shade houses functional at NAREI, GSA, Kairuni, Ebini, Hosororo, Temehri, #63 and Lethem 8. The Hosororo Agriculture Center of Excellence is opened in 2015 9. The Kairuni Agriculture Center of Excellence is opened in 2014 10. Major improvement of facilities at GSA in Mon Repos in 2015 and 2017 and in Essequibo in 2014 and 2016. A new campus construction will start in Essequibo in 2017 and the computer lab at Mon Repos will be in 2016 11. The GSA Agro-Processing Incubator facility is upgraded and available for use in 2015 12. Design new MMA Headquarters in 2015 and construction in 2016
PRIORITY AREA 5: STRENGTHENING SOIL HEALTH AS AN IMPORTANT PART OF INCREASED PRODUCTIVITY AND QUALITY		
5. Strengthening Soil Health for Increased Productivity and Quality [This priority Area will be implemented mainly by NAREI, GUYSUCO and GRDB. NAREI will be the Focal Point for this Priority]	<ol style="list-style-type: none"> 1. Establish a National Soil Health Oversight Committee 2. Establish a National Soil Health Testing Laboratory [See Priority 2 #4] 3. The soil laboratory provides routine testing for farmers, including rice farmers and cash crop farmers, starting September 2014 4. Awareness and education campaign for farmers on the importance of soil health and soil testing 5. GSA develops short weekend course on 	<ol style="list-style-type: none"> 1. TOR for National Soil Health Committee is approved by HOD by June 2014 2. National Soil Testing Laboratory is launched by September 2014 [See Priority 2 #4] 3. Soil Lab issues results for greater than 1,000 soil tests/yr for farmers, with at least 400 for rice farmers and issue written recommendation for soil treatment 4. At least 200 farmers attending soil health and testing for a in 2014 and an average of

Area]	<ul style="list-style-type: none"> soil health and testing and conduct courses at least 5 times/yr off-campus 6. Develop on-farm fertilizer production system, e.g. vericomposting at GSA and at NAREI as a model on-farm fertilizer system 7. Ensure field/extension personnel equipped with basic soil testing tools 8. Encourage the use of innocula, green manure and mychorrhize in farms 9. Develop liming requirements for agriculture soils 10. Conduct studies to determine nutrient status of soils to promote Integrated Nutrient Management (INM) for soils 11. Investigate the impact of micro-nutrients on crop production 12. Establish weed control measures for field crops such as corn, soya and beans 13. Training and technical awareness programs developed on ISM and IPNM 14. Develop program for GIS mapping of agriculture soil and match soil profile with crop profile 	<ul style="list-style-type: none"> 500 farmers annually from 2015 5. Courses on soil health and testing sponsored by GRDB, GUYSUCO and NAREI and attended by 500 farmers annually 6. On-farm fertilizer production system at GSA by 2014, NAREI has at least two by 2015 and at least 5 are functioning in farmers plots by end of 2015 7. 25% of field personnel equipped for basic soil testing by 2015 and 100% by 2020 8. Innocula used for beans by 2014. Green manure used for sugar cane by Dec 2014 9. Liming requirements for soils in 6 localities established by December 2014 10. Studies completed for 10 soil localities by December 2014 and INM Manual for Soils distributed to farmers by June 2015 11. Studies in 2014, 1st Report in 2015. Crops are sugar cane, rice and horticultural crops 12. SOP for weed control established and in use for new crop season in 2014 13. Training manual completed by June 2014 and in use for training programs in 2014 14. Acquire GIS hardware/software and complete Region 5 by December 2014 and two regions in 2015. There is a recommendation for crop types
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PRIORITY AREA 6: EXPANSION AND IMPROVEMENT OF PLANT AND ANIMAL HEALTH TO IMPROVE PRODUCTION – (A) PLANT HEALTH

(A) Plant Health [Plant Health and Protection is a platform for modern agricultural practices in Guyana. This Priority Area will be the responsibility of NAREI, GUYSUCO, GRDB. CARDI will be asked to support]]	<ul style="list-style-type: none"> 1. Implement Plant Health Act and prepare Plant Health Act Annual Report 2. Establish a Crop Farmers Register by Geographic Location and by Crops Cultivated (Farmers Information System) 3. Develop a Farm Certification and Traceability System for Guyana 4. Develop an Organic Certification System 5. Develop a Seed Regulation Policy 6. NAREI has a short course on Integrated Pest and Disease Management with an emphasis on use of bio-pesticides 7. Further improve Extension Services to farmers with greater accountability and more engagement with farmers <p>Quarantine, Inspection and Certification</p> <ul style="list-style-type: none"> 8. Strengthen the PPQ Unit of NAREI 9. Develop a comprehensive PPQ Strategy 	<ul style="list-style-type: none"> 1. Plant Health Act Regulations enforced by end 2014 and Plant Health Act Annual Report within 60 days after end of year 2. Crop Farmers Register completed for Region 2, 5, 9 by end of 2014, Region 6, 7, 10 by end of 2015 and for Regions 1, 3, 4, 8 by end of 2016 and Farmers Information System fully developed by 2018 3. Farm Certification System functional in 2014 and Traceability legislation in 2015 4. The Organic Certification System by 2015 5. Seed Regulation Policy by Dec 2014 6. NAREI conduct course at least once in each region annually and more than 200 farmers benefit from course each year 7. Farmers benefit from more frequent and focused extension services and weekly reports analyzed and interventions made <p>Quarantine, Inspection and Certification</p> <ul style="list-style-type: none"> 8. A Director of PPQ is appointed by end
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	<p>2013-2020</p> <p>10. Strengthen the functioning of quarantine, inspection and certification services at all ports of entry</p> <p>11. Maintain suitable Plant Quarantine Rooms for each Port of Entry</p> <p>12. Review the Quarantine Laws and Regulations periodically</p> <p>13. Conduct annual PPQ awareness programs</p> <p>14. Conduct at least two Continuing Education Sessions on PPQ for relevant persons – Quarantine Officers, Custom Officers, importers and exporters</p> <p>15. Maintain a list of pests and diseases which require plant quarantine interventions</p> <p>Pesticide and Toxic Chemical Board</p> <p>16. Strengthen staffing of PTCCB</p> <p>17. Improve training of staff of PTCCB through in-house or external training, including distant on-line sources</p> <p>18. Expand outreach and extension services of the PTCCB</p> <p>19. Train staff in inspection for possible pesticide and toxic chemical damage</p> <p>20. Expand Pesticide and Toxic Chemical Public Awareness Programs</p> <p>21. Enhance the PTCCB Laboratory and conduct testing for pesticide and toxic chemical residues on foods and plants</p> <p>22. Implement the Stockholm Convention Rules for Persistent Organic Pollutants (POPs)</p> <p>23. PTCCB regulates chemicals that can be used in agriculture and allowed for import</p> <p>24. All importers of chemicals for agriculture must be registered with PTCCB</p> <p>25. PTCCB must ensure that all suppliers of agriculture chemicals publicly displays license to sell chemicals and lists their source of supplies</p> <p>26. PTCCB conducts training sessions with</p>	<p>2014</p> <p>9. PPQ Strategy 2013-2020 is approved by HOD by end of 2013 and distributed widely</p> <p>10. All quarantine, inspection and certification units at ports of entry with trained staff and SOPs are in use</p> <p>11. Each Port of Entry has access TO CERTIFIED Plant Quarantine Facility</p> <p>12. Quarantine Laws and Regulations revised by end 2015 and review every three years</p> <p>13. At least one TV, radio and newspaper awareness program, and at least two stakeholders and community awareness programs per year</p> <p>14. Continuing Education on PPQ conducted two times per year with at least 100 persons benefiting from the sessions each year</p> <p>15. List of pests and diseases which require quarantine measures published in a publicly available format each January and all staff are familiar with list</p> <p>Pesticide and Toxic Chemical Board</p> <p>16. The staffing requirement is 75% filled by 2015 and greater than 90% filled by 2020</p> <p>17. All staff benefit from short in-house or external training courses and at least one staff from extended training each year</p> <p>18. Conduct at least 50 outreach services/YR and reach more than 500 farmers per year</p> <p>19. At least three staff members received training each year in inspecting for pesticide and toxic chemical damage</p> <p>20. Radio, TV and Newspaper Campaign rolled out by end of 2014 and at least one community outreach per year</p> <p>21. PTCCB Laboratory has capacity to test for main pesticides and a monthly report of food, plant, water and soil testing presented to HOD and M&E Unit of MOA</p> <p>22. Annual Report on POPs for Stockholm Convention approved by HOD within 30 days after end of year.</p> <p>23. List of chemicals that can be imported and used in Agriculture is published each year and list is publicly available in all Regions</p> <p>24. PTCCB publishes list of licensed importers of Agriculture Chemicals and posts such lists in public places across country</p> <p>25. PTCCB inspects and at least 200</p>
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	<p>farmers on the appropriate use of pesticides and chemicals, proper use of chemicals in their farms, the proper storage for farm chemicals</p> <p>Epidemiology/ Surveillance and Monitoring</p> <p>27. NAREI establishes List of Common Plant Pests and Diseases and their enemies and Reviews this List Annually</p> <p>28. NAREI establishes List of Potential Pests and Diseases Risk for Farmers in Guyana</p> <p>29. Strengthen the Plant Pest and Disease Surveillance and Epidemiology System</p> <p>30. Develop a Plant Pest and Disease Surveillance and Epidemiology Manual</p> <p>31. Train staff, including Extension Service Staff, in the use of surveillance and epidemiology methods in accordance with Guyana's Plant Pest and Disease Surveillance and Epidemiology Manual</p> <p>32. Develop an Early Warning System for Plant Pests and Diseases</p> <p>33. Pest Data Management System (PDMS) developed and computerized</p> <p>34. A Pest Risk Assessment (PRA) Program is developed</p> <p>Plant Health Laboratory System</p> <p>35. Strengthening Plant Health, Tissue Culture and Bio-Control Laboratory</p> <p>36. Seek certification of laboratories with Guyana Bureau of Standards</p> <p>37. Develop laboratory methods for common plant pests and diseases</p> <p>Disease Control and Eradication – Black Sigatoka, Paddy Bug, Acoushi Ants, etc.</p> <p>38. Develop a more robust Integrated Pest Management (IPM) System and develop an IPM Manual</p> <p>39. Increase routine control and eradication surveys for key pests and diseases</p>	<p>inspections of premises that sells agriculture chemicals/YR and at least 20 inspections of farmers To trace supply chain</p> <p>26. At least 10 training sessions with at least 100 farmers completed for appropriate pesticides, proper use and storage of farm chemicals each year and 100 farmers with proper storage systems of chemicals by 2020</p> <p>Epidemiology/ Surveillance and Monitoring</p> <p>27. 1st Edition of List of Common Plant Pests and Diseases and their enemies in Guyana published in 2014 and annually after</p> <p>28. List of Common Plant Pests and Diseases in Guyana include chapter on Potential Pests and Diseases</p> <p>29. All staff benefit from Annual training program in Plant Pests and Diseases from 2014. Monthly Reports analyzed.</p> <p>30. Plant Pest and Disease Surveillance and Epidemiology Manual published in 2015 and revised every 3 years</p> <p>31. All staff and extension service personnel will be able to use the Plant Pest and Disease Surveillance and Epidemiology Manual. Each extension staff will be able to recognize common pests and diseases.</p> <p>32. Regular surveillance of farms are conducted with at least 100 farms/month</p> <p>33. PDMS at NAREI computerize by 2015 and each regional office by 2017</p> <p>34. The PRA is conducted at least once per year in each Region and Farmers Pest Risk Advisories are provided</p> <p>Strengthening Plant Health Laboratory System</p> <p>35. Plant Health Laboratory, Tissue Culture, Bio-Control Lab functional by Sept 2014</p> <p>36. The various plant laboratories are certified by the Bureau of Standards by 2015</p> <p>37. Plant Health Laboratory certified and proficient in testing for at least 50% of common pests and diseases</p> <p>Disease Control and Eradication – Black Sigatoka, Paddy Bug, Acoushi Ants, etc.</p> <p>38. An IPM System is functional and an IPM Manual is provided to all extension</p>
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	<p>40. Strengthen the Management of Black Sigatoka Disease in Plantains</p> <p>41. Train all extension professionals in early detection of Black Sigatoka</p> <p>42. Sensitize farmers so that they can detect Black Sigatoka early and teach them how to manage Black Sigatoka without losing their crops</p> <p>43. Establish Farmers Demonstration Farms for the control of Black Sigatoka</p> <p>44. Strengthen Control Program for Paddy Bug</p> <p>45. Strengthen the Red Palm Mite Control and Management Program in the coconut industry</p> <p>46. Develop new approaches to manage Acoushi Ants in hinterland farms</p> <p>47. The Fruit Fly Control Program is resuscitated</p> <p>48. Identify cultural/biological control measures for important pests such as Diamond Back Moth, Sweet Potato Weevil and Red Palm Mite</p> <p>49. Implement prevention measures for spreading of pests and diseases from in-country supply or imported planting material, e.g, white potato</p> <p>50. Conduct study to identify viral diseases affecting solanaceous crops and ensure that extension service personnel are capable of identifying these viral pests</p> <p>51. Implement program of introducing natural enemies for various pests in quarantined area</p> <p>52. Control pests through the use of internationally recommended fumigants</p>	<p>workers and some farmers by June 2015.</p> <p>39. (a) Monthly survey reports for key pests and diseases (b) PFAs routinely maintained (c) Quarantine and phytosanitary interventions in place</p> <p>40. Plantain production increased from 20 lbs to 40 lbs per bunch by 2016 by use of IPM</p> <p>41. 100% extension professionals able to detect early signs of Black Sigatoka and advise farmers on interventions</p> <p>42. At least one session per region is conducted with 50% farmers benefiting in each region annually and farmers are able to detect and intervene when Black Sigatoka attacks their plantain crops</p> <p>43. At least one Demonstration Farm functional in each Region by 2016 with less than 5% losses to Black Sigatoka</p> <p>44. Paddy Bug is controlled with less than 5% damage to rice paddy per crop</p> <p>45. Pest is contained in defined areas, eradication measures imposed and monthly and quarterly reports available</p> <p>46. Acoushi Ants Control rolled out in 2014 and Acoushi damage measured from 2015</p> <p>47. New Fruit Fly Program in 2014 and Fruit Fly Laboratory functional by 2015</p> <p>48. Natural enemies list chemical and biological control measures prepared and available for widespread distribution and use by December 2014</p> <p>49. (a) Conditional NO Objection stamp on PQ import permits from February 2014 (b) Pest-Free Import Protocols strengthened and enforced by Feb 2014</p> <p>50. Study completed by December 2014 and a 2015 List of Common Viral Pests is available and all extension workers trained to identify these viral pests</p> <p>51. Quarantined Area Report reviewed monthly, natural enemies identified and sourced by December 2014 and routinely used in 2015, especially for RPM.</p> <p>52. A list of fumigants and SPs for their use is maintained by NAREI/PTCCB and personnel are trained in their use</p>
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PRIORITY AREA 6: EXPANSION AND IMPROVEMENT OF PLANT AND ANIMAL HEALTH TO IMPROVE PRODUCTION – (B)LIVESTOCK (ANIMAL) HEALTH

(B) Livestock Health	Quarantine, Inspection and Certification for Animals	Quarantine, Inspection and Certification for Animals
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<p>[Livestock Health and Protection is a platform for modern agricultural practices in Guyana. This Priority Area will be the responsibility of the GLDA with support from FAO].</p>	<ol style="list-style-type: none"> 1. Conduct training of Camp Attendants in Region 9 2. Strengthen functioning of Animal Quarantine Station at Cheddi Jagan International Airport (Timehri) <p>Epidemiology/ Surveillance and Monitoring</p> <ol style="list-style-type: none"> 3. Strengthen surveillance program with Regional Surveillance Plans developed 4. Improve Collection of blood samples and testing for key diseases 5. Bat trapping exercises 6. Develop list of priority diseases <p>Veterinary Diagnostic and Laboratory Support Services</p> <ol style="list-style-type: none"> 7. Develop a programme of testing for priority diseases 8. Process samples for Brucellosis testing 9. Training of staff at overseas locations in laboratory procedures and management 10. Sourcing/ procuring laboratory supplies <p>Disease Control and Eradication</p> <ol style="list-style-type: none"> 11. Develop Programme for the control of Botulism and Blackleg in Region 9 12. Develop Programme for control of IBH/HH 13. Conduct public awareness campaigns to control of Rabies, Blackleg and Botulism 14. Vaccination of animals against Rabies, Botulism, Blackleg and Equine Encephalitis 15. Conduct FMD Simulation at least two times before 2020 as part of maintaining FMD-Free Status 16. Begin the OIE process of attaining Brucellosis-Free Status 17. Develop a control and eradication program for CSF <p>Species specific animal health planning and sustainable livestock production</p> <ol style="list-style-type: none"> 18. Create a network of Core Farmers in each economic species 19. Increased number of farm visits to promote good animal health 	<ol style="list-style-type: none"> 1. Number of Camp Attendants in Region 9 trained 2. Annual Report of the Quarantine Station at Cheddi Jagan International Airport (Timehri) <p>Epidemiology/ Surveillance and Monitoring</p> <ol style="list-style-type: none"> 3. Surveillance plans developed and utilized in all Regions by end of 2015 4. Increased Blood Samples analyzed for key diseases over 2013 base year 5. At least 1 exercise completed per year 6. Disease list developed by end of 2014 <p>Veterinary Diagnostic and Laboratory Support Services</p> <ol style="list-style-type: none"> 7. Testing or priority diseases implemented and more than 500 tests completed in 2014 8. 200 Samples tested for Brucellosis in 2014 9. Staff trained in short and long courses in laboratory procedures and management in and out of Guyana 10. Adequate Laboratory supplies available <p>Disease Control and Eradication</p> <ol style="list-style-type: none"> 11. Veterinarians and Animal Health Assistants able to diagnose and treat Botulism and Blackleg in animals and control these diseases in Region 9 12. Programme developed and implemented by 2015 13. Community Public Awareness Campaign in place by 2015 and TV and Radio Campaign in place by 2016 14. Routine vaccination program in place with an Annual Vaccination Campaign. Annual report of numbers of vaccination done 15. Simulation exercise for FMD conducted in 2015 and 2018, annual surveillance for FMD conducted and laboratory capacity for FMD testing developed 16. Testing capacity for Brucellosis available in Guyana and OIE certification process initiated in 2014 17. Guyana has a robust CSF surveillance system and obtains CSF-Free certification from OIE by 2018 <p>Species specific animal health planning and sustainable livestock production</p> <ol style="list-style-type: none"> 18. Core farmers list developed and animal health work started by Dec 2014 19. Annual Report showing increased
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	<p>20. Strengthen Emergency Animal Health Care program 21. Train farmers in animal health 22. Formalize system to Register and license Animal Assistants and Veterinarians 23. Effective implementation of various Sections of the Animal Health Law</p>	<p>numbers of farm visits and more healthy animals 20. Report on number of animals treated through the Emergency Animal Care Prog 21. Number of Farmers trained 22. Annual Register of Animal Health Assistants and Veterinarians published under rules of Veterinary Board 23. All Sections of the Animal Health Act and regulations implemented by 2020</p>
PRIORITY AREA 7: INCREASED PRODUCTION OF LIVESTOCK		
<p>7. Increased Production of Livestock Livestock Production is an important area towards strengthening and diversification of agriculture. This Priority Area will be implemented by the GLDA and the FAO will support the GLDA in monitoring this Priority Area]</p>	<p>Service to the livestock sector</p> <p>1. Organize farmers' groups 2. Promote the production of local feeds by producing local feed inputs such as corn, soya and other inputs and production of baled feed 3. Establish Feed standards and develop capacity to test feed 4. Establish international standard abattoir 5. Establish and manage pastures in selected regions</p> <p>Duck Egg Hatchery</p> <p>6. Establish a new duck egg hatchery 7. Import superior breeds of ducks to help improve breeds available for farmers</p> <p>Poultry Meat and Egg Production</p> <p>8. Develop strategic actions to reduce production losses, especially by reducing bird mortality 9. Reduce imported feed ingredients through substitution with domestically produced alternatives 10. Increase local production of hatching eggs</p> <p>Beef and Dairy</p> <p>11. Strengthen embryo transfer and artificial insemination programme 12. Establish a beef nucleus breeding station at Ebini 13. Establish a dairy farm at Mon Repos with</p>	<p>Service to the livestock sector</p> <p>1. Number of farmers in registered groups 2. Feed production is increased by 25% by 2016, 30% reduction in imports such as corn and soya. Cassava and rice are used more extensively in feed production and local grass and other feed stock are produced as bales 3. A Standard for Mixed Feed is implemented by 2016 and capacity is developed at Vet Lab for feed testing 4. Abattoir established by 2017 in Region 5 5. At least three Improved Pastures established by 2020 in Regions 3, 5 and 6</p> <p>Duck Egg Hatchery</p> <p>6. Number of duck eggs hatched from 2014 7. # of ducks of improved breeds available and 25% annual increase of improved breed ducklings in farmers' stock</p> <p>Poultry Meat and Egg Production</p> <p>8. GLDA farm audits show >80% poultry farmers implement good husbandry practices that reduce losses due to heat stress and infectious and non-infectious diseases 9. Local feed producers utilizing locally grown corn and soya beans for feed production and reduce their imports of corn and soya by 30% by 2020 10. Locally produced hatching eggs contribute to 15% of hatching eggs demand by 2020</p> <p>Beef and Dairy</p> <p>11. 10% annual increase in number of genetically improved calves from AI and ET 12. Ebini Beef Breeding Station established by end of 2014 and annual number of</p>

	<p>imported milk breed</p> <p>14. Accelerate harvesting and cryo-conservation of beef semen</p> <p>15. Establish at least one public-private partnership milk processing plant</p> <p>16. Increase beef production to meet local demand and beef export</p> <p>17. Increase milk production per cow and establish dairy plant</p> <p>18. Diversify the production of cattle commodities</p> <p>Pig (Swine) Production</p> <p>19. Establishment of pig breeding unit at GLDA Mon Repos Livestock Farm</p> <p>20. Increase pork production to meet local demand</p> <p>Small Ruminants</p> <p>21. Maintenance of Small Ruminant Nucleus Stock at Ebini and Mon Repos breeding centre</p> <p>22. Increased number of small ruminants among farmers' stock</p> <p>23. Meet local demand for mutton and goat meat</p> <p>Utility Animals</p> <p>24. Support the development of a new industry for production of animals for horse racing, companion animals, pets</p> <p>25. Animal Welfare Bill is developed to ensure that animals are not abused</p> <p>Apiculture</p> <p>26. Develop a Apiculture Bill</p> <p>27. Organize beekeepers into an Association to promote apiculture</p> <p>28. Increase the production of honey and value-added honey products</p>	<p>animals</p> <p>13. Dairy herd at Mon Repos established by end of 2014 with imported nucleus breed</p> <p>14. Quarterly report of Beef semen cryo-conserved showing increases from 4th quarter 2014 through 2020</p> <p>15. Milk plant established by third quarter 2014 and available and milk in supermarkets</p> <p>16. Beef production is increased by 50% by 2020 and beef export is 5% of production</p> <p>17. Dairy Plant is supplying markets by 2017 and milk production is >25% of local demand</p> <p>18. Hides, skins and other cattle products contribute >5% of income for farmers</p> <p>Pig (Swine) Production</p> <p>19. Number of improved weaned pigs distributed to farmers and weaned litter size increased</p> <p>20. Pork production is increased by 25% by 2018 and 50% by 2020</p> <p>Small Ruminants</p> <p>21. Number of small ruminants improved breeds maintained at breeding centers and distributed to farmers with at least 500 sheep and goats from Mon Repos and Ebini</p> <p>22. Small ruminant census is completed in 2015 and 2018 and demonstrate 25% increase</p> <p>23. Mutton and goat meat production is increased by 30% by 2017 and production is able to support export by 2020</p> <p>Utility Animals</p> <p>24. Regulations are implemented for the production and care of utility animals such as horses for traffic control and racing, dogs as pets and companion animals, cats and rabbits as pets</p> <p>25. The Animal Welfare Act is enacted and implemented by 2015</p> <p>Apiculture</p> <p>26. First draft of Apiculture Bill by 2015</p> <p>27. The Guyana Association of Beekeepers hold at least 3 meetings a year and there is an annual beekeeper forum</p> <p>28. There is a 25% increase in honey sales and there are at least two commercial value-</p>
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		added products by 2016
PRIORITY AREA 8: INCREASED PRODUCTION OF FISH AND FISH PRODUCTS		
<p>8. Fisheries – Increased Production of Fishing Products</p> <p>[This Priority Area is the responsibility of the Fisheries Department of the MOA. CRFM, The Fishing Advisory Committee, The Trawler Association, the Aquaculture Producers Association and the Artisanal Coops will be made a part of the Monitoring and Coordinating Committee for this Priority Area]</p>	<p>Cross Cutting Programs for Fishing</p> <ol style="list-style-type: none"> 1. Establish the Fishing Advisory Committee 2. At least 4 meetings of FAC annually 3. Develop system for sharing database of licensed vessels with Coast Guard 4. Hold twice yearly meetings with Coast Guard and fishers representatives to keep all stakeholders informed of at-sea enforcement priorities <p>Promote Sustainable Development of Inland Fishing</p> <ol style="list-style-type: none"> 5. Form and train organization of sports fishing and ornamental fish gatherers 6. Develop Guidelines for Responsible Recreational Fishing 7. Develop market supply chain for ornamental fish 8. Develop Better Practices in Ornamental Fish Collection and Handling Guidelines 9. The North Rupununi experiences in fisheries resources management are mainstreamed into national fisheries management and regulations 10. An assessment of the effects of mining on inland fisheries is conducted 11. Regulations for responsible introductions and transfers of live aquatic animals developed and enforced 12. Develop Inland fisheries regulations <p>Promote Sustainable Development of Aquaculture</p> <ol style="list-style-type: none"> 13. Form a National Aquaculture Association 14. Strengthen the Sash Shaw Aquaculture Nursery Farm at Mon Repos 15. Maintain a number of indigenous stocks at the SSA 16. Certify privately owned nurseries for the production of fingerlings 17. Increase the local market availability of aquaculture fish in markets 18. Increase export of aquaculture fish 	<p>Cross Cutting Programs for Fishing</p> <ol style="list-style-type: none"> 1. FAC formed and appointed by July 2014 2. Minutes of all FAC Meetings are lodged with MOA 3. Coast Guard obtains list of all licensed vessels of current year. 4. At least two meetings held with Coast Guard and Fisher Representatives <p>Promote Sustainable Development of Inland Fishing</p> <ol style="list-style-type: none"> 5. Minutes for 3 meetings per year of the organization of inland fishing stakeholders and ornamental fish gatherers 6. Guidelines published and at least 2 awareness and training programs conducted per year 7. Database of ornamental fish with 5% increase in export sales per year 8. Guideline published and at least 2 awareness and training workshops conducted 9. Government promotes and supports the co-management approach in inland communities 10. A regulation is implemented that is informed by the results of the assessment 11. A regulation has been developed that meets international standards and best practices. It is implemented by 2015 12. Regulations enacted in 2015 <p>Promote Sustainable Development of Aquaculture</p> <ol style="list-style-type: none"> 13. Minutes of at least 3 meetings annually of organ. 14. Increased number and training of staff and increased fingerling sales by 5% per year 15. Maintain at least 3 fingerling ponds with different local species and at least 1 experimental pond 16. At least 1 new privately owned fingerling pond certified per year 17. Database showing increase amount of

	<p><u>Feasible Community enterprises developed</u></p> <p>19. Develop business feasibility studies and Pilot projects, including eco-tourism fishing projects, in selected communities</p> <p style="text-align: center;">Artisanal Fishing</p> <p><u>Maintain and Improve the data collection system</u></p> <p>20. Target data collection at key landing sites where the largest amount of data can be obtained for the least cost</p> <p>21. Establish contacts at key landing sites to provide information on when and where fishermen will be landing</p> <p>22. Ensure that all data collection staff have appropriate training</p> <p>23. Carry out a boat count every two years</p> <p style="text-align: center;">Simplify the license system</p> <p>24. Review the current licensing process</p> <p>25. Ensure that license can be obtained in decentralized local offices</p> <p><u>Develop options for designated landing sites</u></p> <p>26. Establish list of designated landing sites for each Region and encourage fishermen to start landing at these sites</p> <p><u>Communication with fishermen and other stakeholders</u></p> <p>27. Develop posters and radio and TV programs and meet regularly with stakeholders</p> <p><u>Support fishermen in rebuilding cooperatives</u></p> <p>28. Review key issues with existing cooperatives, revise leases, provide training for fishermen who wish to revive or create cooperatives and Form National Fisherfolk Organisation</p> <p><u>Cross-border dialogue with Suriname</u></p> <p>29. Work with Suriname on way forward for licensing of Guyanese fisherfolks</p>	<p>aquaculture fish in local supermarkets and community markets</p> <p>18. Database shows at least 5% increase per yr</p> <p><u>Feasible Community enterprises developed</u></p> <p>19. At least 2 business feasibility studies and plans developed by 2015 and successful pilot projects are packaged and promoted to suitable and interested communities</p> <p style="text-align: center;">Artisanal Fishing</p> <p><u>Maintain and Improve the data collection system</u></p> <p>20. Weekly, monthly, quarterly and annual reports from key landing sites are reported to M&E Unit</p> <p>21. At least one contact per landing site established and available and list of landing sites with contact is regularly reviewed</p> <p>22. At least two training sessions per year and 100% data collection staff has had one training session per year</p> <p>23. Annual boat count is available and revised</p> <p style="text-align: center;">Simplify the license system</p> <p>24. A review is done during the first half of current year</p> <p>25. Number of Licenses issued and % obtained through decentralized local offices</p> <p><u>Develop options for designated landing sites</u></p> <p>26. List of designated landing sites is published in 2014, meetings are held with Fisherfolks at each landing site and mechanisms put in place to facilitate use</p> <p><u>Communication with fishermen and other stakeholders</u></p> <p>27. At least one radio and TV program per quarter developed. Posters affixed at landing sites and at least one meeting per quarter with stakeholders</p> <p><u>Support fishermen in rebuilding cooperatives</u></p> <p>28. Consult with existing Fishing Cooperatives during the year, revise at least two leases in 2014 and two annually, create one new coop by 2017, hold at least one training programme per quarter and form National</p>
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	<p>Seabob Management Plan</p> <p><u>Obtain Marine Stewardship Council(MSC) certification of the fishery</u></p> <p>30. Review FD resources requirements for obtaining and maintaining MSC certification of the seabob fishery, and identify, the way forward.</p> <p>31. A Seabob Working Group is established</p> <p>32. Implement Harvest Control Rules</p> <p>33. Establish Fathom line</p> <p>34. Work with CRFM on stock assessments</p> <p><u>Implement BRD, VMS, TED Requirements</u></p> <p>35. Create and develop Regulations for By-Catch Reduction Device (BRD) and Vessel Monitoring Systems(VMS)</p> <p>36. Monitor and issue TED certificates</p> <p>37. Ensure that BRD and VMS are in use</p> <p><u>Develop and policy on finfish trawling</u></p> <p>38. In discussion with stakeholders, develop a policy on licensing of trawlers to target finfish</p> <p>39. Ensure accurate data collection</p> <p><u>Prawn Management Plan</u></p> <p>40. Redesign log sheets, promote awareness of license conditions, provide training and enforce requirement</p> <p>41. Contact relevant partners (Suriname Fisheries Dept., Ifremer and CRPMEM in French Guiana, CRFM) to conduct stock assessment by 2018</p> <p>42. Discuss and agree to a programme for management action with the industry, including formalizing existing informal closed season, and/or other measures</p> <p><u>Red Snapper Management Plan</u></p> <p>43. Ensure all vessels are completing log sheets as a license condition</p> <p>44. Review log sheets to ensure that data on effort and on all species are provided</p> <p>45. Liaise with CRFM to conduct a stock assessment of red snapper in 2015 and revise management measures after stock assessment</p>	<p>Fisherfolk Organization by 2015</p> <p><u>Cross-border dialogue with Suriname</u></p> <p>29. Meeting with Surinamese counterpart at least once per year</p> <p>Seabob Management Plan</p> <p><u>Obtain Marine Stewardship Council(MSC) certification of the fishery</u></p> <p>30. The MSC requirements are available and known to relevant staff of the FD, and a strategy and way forward towards MSC certification is agreed to between the MOA and stakeholders.</p> <p>31. Minutes of meetings of the Seabob Working Group</p> <p>32. HCR agreed upon and implemented in 2014</p> <p>33. Fathom line established in first half of 2014</p> <p>34. Staff attend CRFM Scientific meeting annually</p> <p><u>Implement BRD, VMS and TED Requirements</u></p> <p>35. Regulations for BRD and VMS developed in 2014 and distributed to stakeholders</p> <p>36. Number of TED certificates issued to boats</p> <p>37. Monthly report on VMS and BRD use</p> <p><u>Develop and policy on finfish trawling</u></p> <p>38. Policy and regulations in place to control total finfish catch by trawlers by the end of 2018</p> <p>39. Data collection system is revised and weekly reports available</p> <p><u>Prawn Management Plan</u></p> <p>40. Redesigned log sheets are used and meetings with Companies at least once per quarter</p> <p>41. Regional and national stock assessment project agreed to and conducted by end of 2018</p> <p>42. Management actions for the Prawn Industry in place and Closed season and other measures implemented</p> <p><u>Red Snapper Management Plan</u></p>
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	<p><u>Shark Management Plan</u></p> <p>46. Work with external experts to identify shark species from landing sites and processors, evaluate the proportions of different species in landings from different fisheries and define stocks</p> <p>47. With the Wildlife Authority, external experts and other agencies as required, develop a CITES shark management plan</p> <p>48. Work with external experts and organizations to quantify all trade in CITES species from these stocks</p> <p>49. Develop National Plan of Action for Sharks.</p>	<p>43. Report on number of ships complying with log sheet requirements</p> <p>44. Catch and effort data sufficient for robust stock assessment</p> <p>45. Stock assessment on red snapper by CRFM done in 2015 and Revised Management measures implemented post-stock assessment</p> <p><u>Shark Management Plan</u></p> <p>46. Staff trained in identification of Shark species and maintaining logs from landing sites with specie identification</p> <p>47. Cites Shark Management plan developed by end of 2020</p> <p>48. Trade in Shark products broken down in species.</p> <p>49. NPOA for sharks being implemented by 2017</p>
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PRIORITY AREA 9: SUSTAINED HIGH PRODUCTION OF RICE

<p>9. Sustained High Production of Rice</p> <p>[This activity will be monitored by the GRDB Board]</p>	<p>See various activities described in GRDB's Rice Strategy 2012-2020. The following activities are some selected ones from the strategy</p> <ol style="list-style-type: none"> Maintain cultivation at average of 80,000 ha per to maintain production of average above 500,000 tonnes annually Continue to improve paddy yield per ha Promote the use of precision farming methods for the rice industry, focusing on agronomic practices, including soil testing and balanced nutrition with mixed fertilizers Promote packaged rice sales for Guyana's rice Encouraged value-added rice products, including flour, cereal and rice snacks Promote the use of agro-energy technology to produce power for the rice industry Review the Rice Factory Act to more effectively meet the needs of the rice 	<p>See indicators in GRDB's Rice Strategy 2012-2020. The following are some of the indicators taken from the Rice Strategy 2012-2010</p> <ol style="list-style-type: none"> Maintain average rice production greater than 500,000 tonnes of rice throughout the period to 2020 and cultivation of about 80,000ha per crop Attain paddy yield of at least 6 tonnes per ha by 2020 with no region less than 5.5 tonnes (a) More than 40% by 2015 and 80% by 2020 farmers using the 6-point practice promoted by GRDB (b) Rice farms conduct soil testing at least once per year (c) fertilizers matching soil test results Increase packaged rice sale to about 20% of Guyana's rice sales by 2020 At least 20,000 tonnes of rice are utilized for value-added products by 2020, with an export component in place At least three rice factories utilizing energy conversion technology and reducing cost of power by at least 10% per year by 2020
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	industry	7. The Rice Factory Act is reviewed and recommendations for amendments made to HOD by end of 2014 and relevant action by 2016
PRIORITY AREA 10: INCREASING SUGAR PRODUCTION TO 450,000 TONNES SUGAR BY 2020		
10. Increasing Sugar Production to 450,000 tonnes [This activity will be monitored by the GUYSUCO Board]	See various activities described in the GUYSUCO Strategy	<ol style="list-style-type: none"> 1. Attain production of 450,000 tonnes by 2020 2. Attain TC/TS of no greater than 12 3. Reaching TC/TS under 10 for at least two factories 4. Reaching 75 tonnes of sugar cane per ha 5. Reaching at least overall 60% of mechanization in harvesting by 2020 6. Reaching 85% in mechanized cane loading
PRIORITY AREA 11: INCREASED PRODUCTION AND DIVERSIFICATION OF CROPS, WITH PRIORITY AND NEW CROPS		
11. INCREASED PRODUCTION AND DIVERSIFICATION OF CROPS, WITH PRIORITY AND NEW CROPS	<p>ENABLING ENVIRONMENT</p> <ol style="list-style-type: none"> 1. Establish a Crop Development and Diversification Unit at NAREI 2. Review import and other policies for fresh fruits and vegetables and ensure enabling policies are in place to support import substitution and export expansion 3. Establish a network of farmers and farmers' organizations to promote greater collaboration and to ensure workers interests are protected and promoted <p>NEW CROPS</p> <ol style="list-style-type: none"> 4. Develop and implement a NEW CROPS Policy and identify New Crops Priority 5. Introduce quinoa as a pilot crop 6. Acquire and field test improved/higher yielding varieties of corn, soyabean and cassava, and other relevant crops 7. Consolidate the pilot projects for corn, soya, chickpeas and promote as commercial crops for farmers 8. Develop a new variety of sweet potato to target export market 9. Develop carrots and garlic in commercial size farms 	<p>ENABLING ENVIRONMENT</p> <ol style="list-style-type: none"> 1. See Priority Area 1 (#3). Unit is launched with TOR in March 2014. (Previously established in 2011) 2. (a) NAREI hosts Import and Other Policies Review Forum for Fresh Fruits and vegetables in 2014. (b) Import and other policy changes recommendations for fresh fruits and vegetables are proposed to Cabinet 3. The Guyana Agricultural Producers Association –Farmers Group (GAPA-FG) is resuscitated in 2014. Its membership is increased by 25% in 2015 and 50% by 2020. It has obtained at least one grant by 2014 and at least three grants by 2020 <p>NEW CROPS</p> <ol style="list-style-type: none"> 4. NEW CROPS Policy approved by HOD in 2014 and at least one new commercial crop in 2014 and annually after 5. A quinoa plot is established 6. At least 2 varieties of relevant crops are field tested in 2013/2014 and varieties are released to farmers 2014/2015 and subsequent years 7. Corn, Soya, chickpeas pilot reports analyzed in 2014 and production by at least 2 farmers with 50 acres in 2014 and 200 acres in 2015 and 3,000 acres by 2020 8. Farmers organized to cultivate 50 acre new variety sweet potato to test market in 2014 9. Pilot farms are producing carrots and

	<p>10. Consolidate the production of spices – ginger, black pepper and turmeric to meet local market demands</p> <p>11. Demonstrate production of culinary spices and herbs for the hospitality industry and promote these systems to farmers to diversify their production</p> <p>12. Develop a pilot White Potato plot in order to reduce imports of White Potato</p> <p>13. Develop commercial plots for Butternut Squash</p> <p>14. Increase cultivation and export of sweet pepper</p> <p>15. Introduce certain specialty fruits as new commercial crops e.g rambutan</p> <p>PRODUCTION AND DIVERSITY OF TRADITIONAL CROPS</p> <p>16. Identify Traditional Crops for focused attention and appoint leaders at NAREI to promote production for these crops</p> <p>17. Appoint a Coconut Focal Point to provide leadership for the industry</p> <p>18. Reinvigorate and expand the coconut industry by promoting new plants for old coconut plantations and promote new coconut plantations</p> <p>19. Acquire high yielding coconut varieties from other countries, particularly for coconut water, virgin coconut oil and other value-added products</p> <p>20. Establish a coconut oversight committee to ensure the coconut industry is expanded through public/private partnerships</p> <p>21. Develop a strategy for a new cassava industry in Guyana that meets Food Security needs of our people and is commercialize for value-added products</p>	<p>garlic for local markets by end of 2014 and at least 10tonnes by 2016</p> <p>10. Production of ginger, black pepper and turmeric increased by 50% in 2014, 100% by 2016 and 200% by 2020, reducing imports by at least 25% by 2020</p> <p>11. Pilot farms of herbs and spices such as cilantro, beet and parsley are developed and seedlings provided for farmers by 2015 with at least 5 farmers engaged in commercial production by 2018</p> <p>12. A White Potato Farm is producing enough potato for GSA Kitchen in 2015 and at least two farmers start plots</p> <p>13. Increase butternut squash production to 25 tonnes and export 20 tonnes per year by 2018</p> <p>14. Sweet pepper cultivation and export is increased by 100% by 2016</p> <p>15. Production of 2000 seedlings (8 acres) annually from 2014 and at least 50 acres of rambutan by 2020</p> <p>PRODUCTION AND DIVERSITY OF TRADITIONAL CROPS</p> <p>16. Traditional Crops for Priority Attention is agreed to by HOD and include coconut, cassava, plantains, citrus, pineapples, broccoli and cauliflower</p> <p>17. A Coconut Focal Point is appointed and provided with training in Mexico under an IICA-funded program</p> <p>18. (a) A Coconut Industry Strategy is approved in 2014 (b) At least 4,000 new plants in existing fields by 2015 ©At least three new coconut plantations by 2016</p> <p>19. (a) 30% increase in coconut production by 2020 (b) MOUs with Centers of Excellence in Mexico and South Pacific with the aim of acquiring improved coconut cultivars commencing in 2014 and protocols are developed for importation by 2015</p> <p>20. (a) National Coconut Oversight Committee established and 1st meet in 2013. (b) Minutes for four meetings in 2014 available © Hosts Coconut Forum in 2014</p> <p>21. (a) A Cassava Industry Focal Point is appointed (b) Strategy for Cassava industry approved</p>
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	<p>22. Increase production of plantains and bananas to meet demands of the agro-processing industry and for exports with sigatoka-resistant plantain and banana cultivars</p> <p>23. Expand production of citrus products – oranges and lime for export</p> <p>24. Establish list of commercial peppers and promote their cultivation</p> <p>PRODUCTION OF HEALTH FOODS [FOCUS WILL BE PLACED ON PRODUCTION OF CROPS THAT HAVE BECOME POPULAR AS HEALTH FOODS]</p> <p>25. Promote commercial production and export of soursop</p> <p>26. Promote the use of and cultivation of avocado (pears)</p> <p>27. Promote the use, production and export of saigan as a health product</p> <p>HORTICULTURE</p> <p>28. Complete an assessment of the existing horticulture industry in Guyana</p> <p>29. Develop a plan to increase horticulture production in Guyana</p> <p>30. Develop new horticulture crops</p> <p>31. Promote an export industry for horticulture products from Guyana</p>	<p>© Cassava yield per acre is increased by 100% by 2020 (d) Cassava production is increased by 150% by 2020</p> <p>22. Sigatoka-resistant plantain and banana acreage increased by 25% by 2016 and production of plantains and bananas increased by 50% by 2018, export increase by 100% by 2020 and agro-processing demand increased by 100% by 2020</p> <p>23. Export of orange and lime products increase by 100% by 2020. A Focal Point for Citrus Production is appointed</p> <p>24. A list of commercial peppers is approved and revised annually and cultivation is increased by 100% by 2017</p> <p>PRODUCTION OF HEALTH FOODS [A TECH PACK WILL BE DEVELOPED FOR PRODUCTION PRACTICES FOR THESE CROPS AND IT IS EXPECTED THAT A COMMUNICATION STRATEGY WILL BE DEVELOPED]</p> <p>25. Soursop production increased by 25% in 2015, 100% in 2020 and export at least 5 tonnes by 2020</p> <p>26. Avocado production is increased by 10% in 2014, 30% in 2016 and 100% in 2020</p> <p>27. Saigan production and use increased, and at least 2 tonnes exported by 2020</p> <p>HORTICULTURE</p> <p>28. A Report of the Horticulture Industry and its potential is available by 2015</p> <p>29. Horticulture production is increased by 50% by 2020 in Guyana</p> <p>30. At least two new horticulture crops are grown in Guyana</p> <p>31. At least five persons are exporting horticulture products from Guyana and exports amount to \$US1M by 2020</p>
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PRIORITY AREA 12: PROMOTING AGRO-PROCESSING AND VALUE-ADDED PRODUCTS

12. PROMOTING AGRO-PROCESSING AND VALUE-ADDED PRODUCTS [This Priority Area will be coordinated by GMC.NAREI will hire the SPS Specialist and	<p>1. Develop a Code of Practice for Agro-Processing Industry</p> <p>2. Provide technical support to agro-processors to meet national and international standards by acquiring the services of a SPS specialist</p> <p>3. Provide technical support to agro-processors to develop present and new</p>	<p>1. Code of Practice and awareness program continuous from May 2015</p> <p>2. A SPS Technical Specialist is hired by the MOA by September 2014 to train and facilitate agro-processors to meet standards, with at least one agro-processor attaining national standards by 2014 and one agro-processor attaining international certification by 2016</p> <p>3. The MOA hires a Food Specialist by September 2014, provides initial</p>
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GSA will coordinate capacity building]	products by hiring a Food Scientist	assessment of the needs of the agro-processors by December 2014 and a work program approved for 2015
	4. Build capacity to support Agro-Processing Plants by training technician level staff	4. Introduce a Certificate Course in Agro-Processing at the GSA with first class inaugurated by September 2013 and work with UG for a BSc in Food Science
	5. Ensure compliance with manufacturing standards for local and international markets, including labeling, packaging and food safety and the use of acceptable processes such as HACCP and ISO Standards	5. (a) >50% agro-processors FDD approved by end of 2014 and 100% by 2016. (b) At least 1 facility with ISO standards by 2017 (c) All Manufacturers using global best practices like HACCP by 2018. (d) Guyana Shop deals with only FDD approved suppliers
	6. Promote the development of new, innovative and diversified products	6. List of Agro-Processed Products published annually with 5 new products introduced by end of 2015
	7. Increase the volume of manufacturing of agro-processed products	7. There is a 15% increase in volume of Agro-processed products by 2015 and an overall 100% increase between 2014 and 2020
	8. GMC develops a GROUP PURCHASING system to procure packaging materials and other relevant supplies in bulk for cost-recovery to the agro-processing industry	8. (a) List of supplies agreed to by stakeholders (b) 1 st bulk order is placed by end of 2014 (c) At least 20 Agro-Processors are part of program (d) Report by 2015 of cost-effectiveness of program
	9. Develop and promote a system for CONTRACT FARMING	9. GMC to develop a model Contract Farming Agreement and at least 5 farmers are contracted
	10. GMC to work with Agro-Energy Unit at NAREI to facilitate the energy cost reduction for Agro-Processors	10. An Energy Audit is completed for at least 1 facility in 2014 and at least 5 in 2015 and at least 2 Agro-Processors have implemented recommendations
	11. Host an Annual Agro-Processors Forum	11. Action sheet from Agro-Processors Annual Forum incorporated in sector work plan
	12. Strengthen the Guyana Agro-Processors Association (GAPA)	12. GAPA holds 6 meetings annually, > 75% Agro-Processors are members by 2018.
	13. GMC to meet regularly with GAPA to discuss issues affecting agro-processors	13. At least 4 Minutes of meetings between GMC and GAPA per year
PRIORITY AREA 13: DEVELOPING A NEW MARKETING APPROACH, OUTSIDE OF SUGAR AND RICE EXPAND MARKETING AND COMPETITIVE OPPORTUNITIES AT LOCAL AND INTERNATIONAL LEVEL		
13. Expand Marketing and Competitive Opportunities at local and international levels	<ol style="list-style-type: none"> Develop a program to market Guyana's Non-Sugar, Non-Rice products locally, including fresh produce, regionally and internationally Maintain List of Non-Tariff and Tariff Barriers for Trade between Guyana and CARICOM Countries and Other Countries 	<ol style="list-style-type: none"> Guyana's exports of Non-Sugar, Non-Rice agriculture products increase by an average of 10% per year to 2020 and the number of countries increased by 25%. Fresh produce export increase by 100% by 2020 List of Non-tariff and Tariff Barriers is prepared by MOA and approved by HOD

<p>[This Priority Area will be coordinated by GMC. GUYSUCO will coordinate sugar and its products and GRDB will coordinate rice and its products]</p>	<p>and document with Ministry of Foreign Trade</p> <ol style="list-style-type: none"> 3. The MOA lobbies with Guyana's COTED Representative for representation on the trade barrier issues at relevant for a and there is also bilateral representation to reduce and eliminate barriers 4. Finalize and implement production data collection methodology 5. Promote an Agriculture Business Information System (ABIS) as the premiere agriculture information system 6. Design and implement an Export Management Information System (EMIS) 7. Develop a Marketing Communications Plan for the Agro-Business Sector 8. Convene regular meetings between Exporters of Guyana's Agricultural fresh and processed products and Guyana Revenue Authority to ensure bottlenecks and barriers for export are reduced and eliminated 9. Expand GUYANA SHOP into other Regions of Guyana and expand into other countries 10. Host at least 3 Agro-Processing Promotional Fairs 11. Guyana Shop to host promotional exhibitions throughout the country featuring specific lines of products, e.g. coconut products, pineapple products, honey products etc. 12. Improve the utilization of the Packaging Houses at Parika and Sophia 	<p>by April 2014 and this is communicated to Ministry of Foreign Trade. This list is subjected to regular review, at least once per year or as needed.</p> <ol style="list-style-type: none"> 3. The MOA monitors COTED Meetings to ensure Guyana's Agriculture Trade issues are fully represented and notes of COTED actions are maintained and examined to assess changes in barrier regimes. At least 2 bilateral meetings are held by year 4. A Market Information System and Production Data System functional for 2014 5. Disseminate 8 brochure (priority crops, GMC's services), flyers, quarterly newsletters and ABIS Special Reports to stakeholders, customers, consumers, visitors to Guyana 6. MOU with GRA to use EMIS as a pilot by end of 2014 and piloting an E-transaction model for export with traditional paper-based system computerized 7. The Marketing Communications Plan launched in September 2014 8. (a) First meeting convened before March 2014 and subsequently annual meeting. (b) Action sheet of interventions are monitored by GMC to ensure progress. (c) Processing time is reduced by 25% in 2014 and by 50% by 2016. 9. GUYANA SHOP located in supermarkets in Regions 2,3,5, 6 by end 2014 and Toronto, London, New York and Miami by 2020 10. 3 Agro-Processing Fairs held annually with an average 50 processors and 100 products 11. Guyana Shop hosts at least one street exhibition/month and at least three per year in other parts of the country and these exhibitions promote specific lines like products of coconut, pineapples, plantains, cassava etc. 12. Packaging Plant at Parika and Sophia increases utilization by 100% in 2014
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PRIORITY AREA 14: ENHANCING TRANSPORTATION, STORAGE AND CARGO SPACE FACILITIES

<p>14. Increased Focus on Transportation, Storage and Cargo Space Facilities</p>	<ol style="list-style-type: none"> 1. Develop and promote a Code of Practice to enhance the supply chain of fresh fruits and vegetables from farm to market 2. Facilitate discussion with air and sea 	<ol style="list-style-type: none"> 1. 1st Edition of Code of Practice for Packaging, Handling and Transportation and Storage of Fresh Fruits and Vegetables launched in 2015 and awareness program starting in May 2015 2. At least three Joint Meetings held
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<p>[This Priority Area will be coordinated by GMC]</p>	<p>freight operators to provide adequate cargo space at competitive rates</p> <p>3. Refrigerated trucks are used for transporting farmers goods</p> <p>4. Promote and coordinate through GMC's brokerage services for break bulk shipments</p>	<p>between GMC, exporters, Agro-Processors (GAPA) and air and sea freight operators in 2014</p> <p>3. >25 tonnes farmers goods transported in 2014 and increased 100% in 2015</p> <p>4. At least two(2) 20ft containers of break bulk shipments done for 2014</p>
PRIORITY AREA 15: A HUMAN RESOURCE DEVELOPMENT STRATEGY TO SECURE AN AGRICULTURE WORKFORCE		
<p>15. Human Resources Development- Building and Securing HR Capacity for the Agriculture Sector</p> <p>[This Priority Area will be implemented by all agencies, but coordination will be by the HR Focal Point – GSA. The Head of HR at MOA will work along with GSA to monitor this Priority Area]]</p>	<p>1. Formulate a Human Resource Development Strategy for the Agriculture Sector</p> <p>2. Establish a Regular Curriculum Review for GSA</p> <p>3. Establish a routine MOA-GSA-UG consultation</p> <p>4. GSA and UG to collaborate on GSA offering BSc in Agriculture by 2020</p> <p>5. GSA to develop a curriculum and establish a Food Science Course</p> <p>6. Introduction of Agro-Processing Course in 2013</p> <p>7. Introduce new short course – Operation and Maintenance of Small Equipment and Urban Agriculture</p> <p>8. Introduce Tractor Operator Course for all students</p> <p>9. Develop and Conduct Online Courses at GSA</p> <p>10. Establish MOU between GSA and Private Agro-Processors for apprenticeship of students</p> <p>11. Upgrade skills of staff and technical officers through short, medium and long term local/overseas training</p> <p>12. Establish an Agriculture In-Service training program by December 2015</p> <p>13. Construction of a semi-automated green house to be used as demonstration for students and farmers</p> <p>14. Conduct community training in product development</p> <p>15. Participate in the Caribbean Council for Higher Education (CACHE) events</p> <p>16. Upgrading of the GSA's Science laboratory, Computer laboratory and recreational facilities.</p>	<p>1. A Human Recourse Development Strategy approved by the MOA by December 2014.</p> <p>2. SOP for Regular Curriculum Review at GSA with at least one course/yr being reviewed</p> <p>3. At least two meetings/yr, chaired by Minister of Agriculture with Action Memorandum for each meeting</p> <p>4. Progress Report by CEO of GSA to Board every 6 months reporting on progress towards a GSA awarded BSc</p> <p>5. Course starting in September 2014</p> <p>6. Number of students registered for course each year and number of graduates yearly</p> <p>7. GSA Annual Report – Number of Students Completing Course each year</p> <p>8. GSA Annual Report – Number of students completing Course each year</p> <p>9. First Online Course at GSA conducted by September 2015 and new GSA website in place by end of March 2015</p> <p>10. MOU in place by end of 2014 and first assignments of students by September 2015. GSA Annual Report – Number of Students assigned as Apprentice</p> <p>11. Annual Report - 5 MSc., 3PhD. and twenty short term specialized training in place or completed by 2020.</p> <p>12. Annual Number of Agriculture In-Service trainees</p> <p>13. Semi-automated greenhouse at GSA fully operational by December 2014.</p> <p>14. Five hundred persons trained in product development by 2020.</p> <p>15. Attendance at least three annual meetings by 2020</p> <p>16. GSA's science laboratory, computer laboratory and recreational facilities upgraded by 2020.</p>

	<p>17. NAREI/GLDA/GRDB/Fisheries/PTCCB/GSA collaborate to create a special Continuing Education In-House/On-Line Courses for Extension Workers</p> <p>18. Establish collaboration with regional and international higher education and vocational training colleges</p> <p>19. Agree with IICA to support human resource development for agriculture</p>	<p>17. Curriculum for In-House and On-Line Courses by Sept. 2014 and conducted annually and 100% Extension Service Officers successfully completing CE Courses</p> <p>18. At least 5 collaboration agreement established by 2020 and staff and student exchanges developed with at least one such arrangement in place by end of 2014</p> <p>19. MOU with IICA to support HR development for and ten persons access training in Mexico in 2014</p>
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PRIORITY AREA 16: CONSOLIDATING AND IMPROVING FOOD AND NUTRITION SECURITY AS FUNDAMENTAL FOR ECONOMIC GROWTH AND SOCIAL WELFARE DEVELOPMENT

<p>16.Consolidating and Enhancing Food and Nutrition Security and Safety</p> <p>[This Priority Area will be monitored by the M&E Unit and the National Nutrition Council, with support from FAO, IICA and CARDI]</p>	<p>Goal 1: Facilitate sustainable employment, increasing availability and accessibility to food, especially among vulnerable groups.</p> <p>1.0 Increase the capacity of farmers to efficiently and effectively produce non-traditional commodities.</p> <p>1.1 Increase the availability and selection of cultivars and planting material.</p> <p>1.2 Provide training to farmers on appropriate crop husbandry practices using the Farmers Field School</p> <p>1.3 Establish demonstration farm to promote improved technologies.</p> <p>1.4 Demonstrate year round production of fruits and vegetable in shaded farms.</p> <p>1.5 Provide training on appropriate technologies including small/medium scale hydroponics and aquaponics</p> <p>1.6 Provide training on appropriate technologies and support services in livestock production</p> <p>1.7 Develop and expand draining and irrigation infrastructure.</p> <p>2. Provide training to farmers on appropriate pre- and post-harvest treatments of perishable commodities.</p> <p>2.1 Train farmers on the importance of the appropriate time to harvest and methods of harvesting.</p> <p>2.2 Demonstrate technologies such as the use of bunch covers (plantains) and field storage conditions (cassava, eddo, etc).</p>	<p>Goal 1: Annual Ministerial Report on Food Production, Number of Jobs and Number of Job-Creating Opportunities</p> <p>1. Annual Listing of non-traditional commodities and Register of Farmers Producing Non-Traditional Commodities</p> <p>1.1 Overall 10% annual increase of selection and cultivars and planting materials</p> <p>1.2 At least one monthly Field School Session conducted in appropriate crop husbandry, with 3,000 farmers benefiting by 2020</p> <p>1.3 Number of demonstration farms, crops grown and numbers of farmers visiting</p> <p>1.4 Number of shaded/greenhouse farms in Guyana and production data of these farms vs. non-shaded farms</p> <p>1.5 Number of training sessions on small and medium scale hydroponics and aquaponics and number of farmers attending these sessions</p> <p>1.6 Number of training sessions on appropriate technologies and support services for livestock, and numbers of farmers trained annually practicing GAP</p> <p>1.7 Annual Report on Draining and Irrigation Infrastructure in Guyana</p> <p>2. Annual Inventory of Pre- and PostHarvest Treatments of Perishable Commodities available</p> <p>2.1 Number of farmers trained in appropriate timing and harvesting methods and at least 10% increase in yield for trained farmers</p> <p>2.2 10% reduction in post-harvest losses for farms utilizing technologies such as bunch-covering and introduction of field</p>
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	<p>2.3 Train farmers on appropriate storage (including solar drying) and transportation methods.</p> <p>2.4 Promote research/ development and capacity in households for methods of food handling, preservation, value addition and storage.</p> <p>2.5 Ensure that good agriculture practices are utilized by farmers.</p> <p>3. Promote appropriate post-harvest, storage, transport and distribution practices and development of value added production.</p> <p>3.1 Provide training to farmers, handlers (transporters, laborers) and exporters on appropriate post-harvest practices, to minimize postharvest losses.</p> <p>3.2 Promote use of plastic/field crates for transport of fresh produce from farm-gate to packaging facility/market.</p> <p>3.3 Promote the use of refrigerated trucks for transport from field to packaging facility and to port of exit.</p> <p>3.4 Support capacity of agro-processors to meet international safety standards [CARIFORUM Agriculture Research and Training Fund (CARTF model)]</p> <p>3.5 Facilitate youth, women (and relevant vulnerable groups) to access funding to promote value-added, cottage type industries and agro-processing.</p> <p>3.6 Provide tax incentives to promote value addition and agro-processing industries in both rural and urban areas.</p> <p>3.7 Develop/expand farm-to-market access roads and transport infrastructure.</p> <p>4. Increase availability of quality market information to stakeholders and facilitate market linkages.</p>	<p>storage conditions</p> <p>2.3 Annual 10% increase in utilization of crates container boxes for the transport of fruits and vegetables</p> <p>2.4 Number of persons trained in appropriate methods of food handling, preservation, value-added and storage increased by 5% annually to 2020 using 2014 as base year</p> <p>2.5 Numbers of Persons utilizing GAP and analysis of improved food product quality</p> <p>3. Annual Report on Post-Harvest, Storage, Transport, Distribution and Value-Added Practices in Agriculture in Guyana, with first report presented in 2014 and annually thereafter</p> <p>3.1 Number of farmers, handlers, transporters, laborers and exporters trained in appropriate post-harvest practices and amount of post-harvest losses decreased by 5% annually between 2014 and 2020</p> <p>3.2 Annual Report showing reduced post-harvest losses of at least 5% annually and increased farm income for farmers with first report presented in 2014</p> <p>3.3 Volume of fruits/vegetables transported with refrigerated trucks increased by 5% per year to 2020 and reduction of transport losses of 10% per year</p> <p>3.4 Number of Agro-Processors trained to meet international standards and number of enterprises certified by Bureau of Standards, FDD and monitoring SMEs which are pursuing ISO-Certification</p> <p>3.5 A 5% annual increase in number of women, youth and persons from other vulnerable groups involved in value-added, cottage-type industries and agro-processing between 2014 and 2020</p> <p>3.6 Tax incentives available in Agro-Processing and SMEs in Agro-Processing increased by 15% by 2020 with 2014 as base year</p> <p>3.7 Annual Report on Improved, Rehabilitated and New Far-to-Market Roads in Each Region</p> <p>4. The Market Information System is operational by 2014</p>
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	<p>6.4 Promote expansion and use of recent aquaculture industry interventions including aquaponics.</p> <p>6.5 Promote consumption of aquaculture species in domestic and regional market including marketing opportunities for less-known commercial species.</p> <p>7. Rehabilitate, expand and promote the hinterland organic product export base.</p> <p>7.1 Identify products with market potentials (cocoa, coconut and honey industries, medicinal products, etc.)</p> <p>7.2 Promote the adoption of appropriate production technology systems.</p> <p>7.3 Establish links with and international partners for information sharing, investing and marketing collaboration (e.g. Suriname, Belize and international NGOs and educational institutions).</p> <p>7.4 Identify and access support to enter to enter niche market opportunities.</p> <p>8. Improve and expand Rural, Urban and Peri-Urban Training and Employment</p> <p>8.1 Assess existing safety net and development (training) programs for impact and scope for improvement.</p> <p>8.2 Support capacity building to enhance small businesses/entrepreneurial skills.</p> <p>8.3 Provide legal/institutional support to small rural enterprise, with regard to training, business development, marketing and information.</p> <p>8.4 Support measures that improve access to basic needs in rural and marginal urban areas.</p> <p>8.5 Assist small agriculture enterprises to access affordable financial resources.</p> <p>8.6 Enhance the income generation capacity</p>	<p>improved security measures per year</p> <p>6.4 At least 20% increase of inland fishing production by 2020 using 2014 as baseline and at least two aquaponic farms by 2020</p> <p>6.5 Production for tilapia, tambakqui, hassar and at least one other domestic specie and at least 5% annual increase in overall aqua-culture production and for each specie by 2020</p> <p>7. Annual 5% increase in overall organic produce export from hinterland farms</p> <p>7.1 List of organic products for hinterland agriculture to 2020 agreed to and adopted at stakeholders meeting in 2014</p> <p>7.2 Train at least 100 persons per year in appropriate production technology</p> <p>7.3 MOUs with FAO, IICA, CARDI, CAFAN, Price Chares Foundation and other Regional and International partners to support organic production of food in Guyana, particularly in the hinterland communities and identify marketing opportunities for these products</p> <p>7.4 At least three niche markets indentified and are accessed by farmers</p> <p>8. Each MOA agency and department is implementing an entrepreneurial training and employment program</p> <p>8.1 MOA has completed an assessment of agriculture safety nets and training programs and has identified areas for strengthening by end of 2014</p> <p>8.2 Training for at least 100 persons per year in capacity building for small business and entrepreneurial skills</p> <p>8.3 At least 5 rural enterprise benefiting from training in legal and institutional strengthening, marketing and information and in other areas each year with at least 30 enterprises benefiting by 2020</p> <p>8.4 Establish 2014 baseline of measures that improve access to basic needs in rural areas and achieve a 5% annual increase to 2020</p> <p>8.5 At least 25 persons/groups benefit per year from access to affordable financial and other resources</p> <p>8.6 At least one vulnerable person or group</p>
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	<p>of people with special needs and disadvantages e.g. physically challenged, elderly and indigent.</p> <p>9. To enable food insecure and vulnerable groups to adjust to effects of natural disasters and other 'shocks'</p> <p>9.1 Develop effective EWS.</p> <p>9.2 Ensure effective functioning of disaster preparedness management authorities.</p> <p>9.3 Train municipal and village level emergency management committee members in administration of contingency planning, including distribution of supplies during emergencies (food, shelter and health).</p> <p>9.4 Coordinate with Collection, Control and Distribution of Food and Materials Committee to guarantee the availability of food during emergencies/disasters.</p> <p>9.5 Assess existing safety net programs and the implementation of targeted and effective programs.</p> <p>9.6 Design and implement safety nets programs (feeding programs, children education incentives, improved diet and health practices, tax relief, etc) to protect the food insecure populations.</p> <p>Goal 2 Promote systems (information, Education and Communication/ Dissemination) for consumption of healthy foods for NS</p> <p>[MOH is LEAD AGENCY. Please see details in F&S Strategy for #10, 11 and 12]</p> <p>10. Harmonize food safety/quality regulatory/institutional framework to improve coordination and enforcement</p> <p>11. To ensure that food made available to</p>	<p>is able to generate income from farming or other agricultural activities or obtain employment in an agricultural enterprise on the coast and in the hinterland</p> <p>9. Safety nets in place for an agreed set of natural disasters like floods and droughts or price shocks for vulnerable groups</p> <p>9.1 EWS for floods and droughts and price shocks by 2015</p> <p>9.2 See Priority Action #14</p> <p>9.3 At least 1 training session conducted per year from 2014 with local authorities and other stakeholders in disaster management and in distribution of supplies during emergencies such as flood and droughts and during other food-stressed emergencies with a Manual that is distributed to all officials</p> <p>9.4 Establish a Collection, Control and Distribution of Food and Materials Committee and maintain a list of food and material for emergencies and disasters at the CDC</p> <p>9.5 DRR Focal Point at MOA maintains working relations with safety net agencies and organizations for quick responses</p> <p>9.6 DRR Focal Point at MOA a) maintains an inventory of safety net initiatives, b) after consultations with broad stakeholder group identify areas for strengthening and c) provide an annual report of numbers of vulnerable persons who benefit from safety net programs for FS</p> <p>Goal 2: MOA has a Nutrition Security Partnership with MOH, PAHO/WHO, FAO and IICA with an established annual work plan</p> <p>[MOH is LEAD AGENCY. Please see details in F&S Strategy for #10, 11 and 12]</p> <p>10. Agree with partners on an inventory of actions to be implemented by 2020 and that the MOA will issue State of Nutrition Security Report annually from 2015</p> <p>11. Promotional campaign in place to</p>
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	<p>consumers is safe and wholesome.</p> <p>12. Support the development and dissemination of information, education and communication material on appropriate diets and lifestyles.</p> <p>Sections 13 to 17 are implemented by MOH and MOE</p> <p>13. To reduce the incidence and prevalence of diet related NCDs and enhance their control and management.</p> <p>14. To promote Micronutrient Deficiency Prevention and Control</p> <p>15. To improve nutritional status of school children</p> <p>16. To provide appropriate knowledge to school children for good nutrition for a healthy and active life.</p> <p>17. Strengthen the provision of nutrition education and counseling</p> <p><i>Goal 3 Promote increased institutional coordination and functioning for improved food and nutrition security.</i></p> <p>18. To establish effective mechanism to facilitate inter-sectoral dialogue on critical issues impacting on F&NS</p> <p>18.1 Prepare legislation to establish a Food Security and Nutrition Council, including a technical working group to monitor implementation.</p> <p>18.3 Establish a consultation system for wide participation of the all stakeholders in informing the work of the Council, especially among national, regional, local governments.</p> <p>19. Training in food security concepts and processes at all public, private sector</p>	<p>encourage consumers to procure safe and wholesome food</p> <p>12. With the MOH, diet and nutrition campaign using pamphlets, radio and TV and other means are in place by 2015 – focus on iron-rich food, reduced salt, sugar and fats</p> <p>Sections 13 to 17 are implemented by MOH and MOE</p> <p>13. MOA will meet quarterly and the two Ministries will publish an Annual Report starting with the First Joint Report in 2015</p> <p>14. The MOA will provide full support to the MOH to implement this activity</p> <p>15. MOA will support MOH and MOE in the implementation of these activities (15, 16 and 17)</p> <p><i>Goal 3: There is an MOU between MOA, MOH, MOF, MOFA, Ministry of Commerce, Ministry of Human Services, MCYS, PAHO/WHO, UNICEF, UNDP, UNFPA, CARICOM on implementation of Guyana's Food and Nutrition Security</i></p> <p>18 1st Meeting of the National Food and Nutrition Security Council will be held before April 2014 and Report June 2014</p> <p>18.1 National Food and Nutrition Security Council will have Annual Report from 2015. The Council will have technical committees and will include civil society</p> <p>18.3 National Food and Security Council will hold at least one Regional Consultation per year from 2014 to 2020 and at least two National Consultations by 2020. These Reports will become part of the Annual Report of the Council.</p> <p>19. MOA conduct at least one training session per year and reaching at least</p>
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	<p>and community levels.</p> <p>19.1 Preparation of training and communication materials on food security concepts and goals for all stakeholders.</p> <p>19.2 Implementation of food security planning and training at national/local levels.</p> <p>19.3 Development of local capacity to participate in the food and nutrition security planning and implementation.</p> <p>20. To establish effective coordinating of programs and monitoring mechanisms</p> <p>20.1 Foster co-operation among GOG, donor agencies, private sector and NGO's</p> <p>20.2 Enable co-ordination among departments at national and regional levels.</p> <p>20.3 Prepare a list of (FNS) process and outcome indicators to be utilized.</p> <p>20.4 Establish a system of collection, analysis and reporting on FNS indicators.</p> <p>20.5 Establish linkages with an institution of higher learning to implement food and nutrition security evaluations to.</p>	<p>200 persons per year and a total of at least 1,200 by 2020</p> <p>19.1 There is at least one Manual for Training and Communication for Food Security by end of 2014 and regular reviews on an annual basis</p> <p>19.2 There is a work plan endorsed by the HOD of the MOA and this is being implemented by July 2014</p> <p>19.3 At least 10 persons trained in each region at least two times between 2014 and 2020 with 200 persons at least trained by 2020</p> <p>20. The M&E for Food and Nutrition Security approved by the HOD by September 2014</p> <p>20.1 An MOU for cooperation between stakeholders is agreed to and has at least 10 organizations participating</p> <p>20.2 A Regional Food and Nutrition Security Forum in each Region from 2015</p> <p>20.3 The M&E for FNS is part of MOA M&E and implemented by September 2014</p> <p>20.4 This system is developed, agreed on and implemented for M&E by September 2014</p> <p>20.5 Support from IICA, FAO to partner with an international institution in a partnership agreement to serve as a technical support and external evaluator for FNS M&E</p>
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PRIORITY AREA 17: BUILDING A CAPACITY FOR AN AGRO-ENERGY (BIO-FUEL) INDUSTRY		
<p>20. Introduce Agro-Fuel Industry as an important component of Guyana's Agriculture Sector</p> <p>[This Priority Area will be implemented by partners coordinated by the Agro-Fuel Unit at NAREI. Overall monitoring will be by the National Agro-Fuel Oversight Committee</p>	<ol style="list-style-type: none"> Construction and installation of Bio-Ethanol Plant at Albion Sugar Factory Training of Agency Technicians for/and the commercialization of Bio-ethanol production Prepare Draft Policy on Agro-Energy (Bioenergy) . Introductory use of bio-ethanol blended fuel for vehicle use by March 2014 and full-use by August 2014. Establishment (with IICA support) of Bio energy facility for training at GSA. Diversify the use of GUYSUCO molasses 	<ol style="list-style-type: none"> Bio-Ethanol Plant commissioned by December 2013 (a) Operationalisation of 1000 l/day commercial pilot bio-fuel plant by April 2014. (b) Data on cost returns recorded and accumulated for 2014. (C) Storage facility provided for excess fuel by July 2014 Cabinet adopts Agro-Energy Policy by April 2014. Initial indicator data on fuel use recorded and accumulated by August-September for 20-25 MOA vehicles. Curriculum for Bio-energy Course approved by June 2014. First Course started by September 2014 Feasibility study of other substrates like

of the MOA]	<p>and explore the capability of other sources as substrate (cassava, sweet potato, rice) for bio-ethanol production.</p> <ol style="list-style-type: none"> 7. Bio-gas production and utilization on large farms to reduce dependency on fossil fuel source generators 8. GEA prepares concept paper for bio – gas production in Guyana 9. Commercialization of bio-gas production by the private sector. 10. Promote mega-farms for production of Bio-Fuel in Guyana, using sugar cane, palm oil and other crops 11. Commercial quantities of bio-ethanol and biodiesel produced 	<p>cassava completed by Dec. 2014. Expansion of acreage of crops capable of use in bio-fuel production from 2015.</p> <ol style="list-style-type: none"> 7. At least 2 Homesteads/farms successfully producing bio-gas energy by end 2014 and adding an average of 2 per year to 2020, with measured reduction of fossil fuel use. 8. GEA receives feedback from targeted stakeholders and plan approved July 2014. 9. At least 12 entities submit proposals for Bio-Gas Production by December 2014 10. At least one mega-farm feasibility studies initiated in 2014 and MOUs signed with two private investors for mega-farms in Canje Basin and Intermediate Savannahs 11. At least 50,000 liters of bio-ethanol /biodiesel produced per year by 2020
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PRIORITY AREA 18: PROMOTING ENVIRONMENTAL SUSTAINABILITY		
21. Promote Environmental Sustainability/ Climate-Smart Agriculture [Sector will develop strategies to reduce emissions and adapt for climate change. This will be implemented by various agencies and will be monitored by the DRM/DRR Oversight Committee]	<ol style="list-style-type: none"> 1. Develop a RIO+20 Agriculture Agenda 2. Establish a Climate Change Committee at MOA to ensure all departments and agencies are catering for climate change 3. Establish a Compendium of Agriculture Practices that reduce emissions 4. Establish a Compendium of Agriculture Practices to adapt the sector for climate change [See Table 3.17 in2nd National Communication to the UNFCC 2012] 5. Develop a Manual of Techniques and Technology for Soil Nutrient Management and Carbon Sequestration promoting techniques. 6. Conduct awareness and training programs among farmers to encourage adoption of farming techniques that will support environmental sustainability 7. Introduce methodologies to reduce GHG Emissions in the livestock industry 8. Develop a National System to Certify Farms as Environmentally Sustainable 9. Develop Curriculum by June 2014 and Conduct Training Workshops in Environmental Sustainability In Agriculture for Extension Workers 	<ol style="list-style-type: none"> 1. Launch the RIO+20 Agriculture Agenda by August 2014 2. Minutes of at least 3 meetings of the Climate Change Oversight Committee 3. Annual Compendium of Agriculture Practices that Reduce Carbon Emissions Published starting with 2014 4. Annual Compendium of Agriculture Practices that Adapt the Agriculture Sector for Climate Change starting with a 2014 Edition. [See Table 3.17 in2nd National Communication to the UNFCC 2012] 5. Publish Manual of Techniques , Technology and Practices for Soil Nutrient Management and Carbon Sequestration [See also #3 and #4 above] 6. At least one awareness and training workshop/yr each in Regions 2,3,4,5,6, 10 and at least 1/yr for Regions 1,7,8, 9 and at least 300 farmers benefit per year 7. Annual Report on the Use of GHG Emission Reduction Methodologies Among Farmers 8. At least 2 farms certified each year 9. (a) Curriculum available for Short Course on Environmental Sustainability in Agriculture by June 2014 (b) At least 50 Extension Workers complete Environmental Sustainability workshop/yr

PRIORITY AREA 19: FURTHER DEVELOP AGRICULTURE DISASTER RISK REDUCTION (ADRM) AND DISASTER RISK MANAGEMENT		
<p>22. Strengthen Risk Reduction and Disaster Management</p> <p>[Detailed Plan is available in Publication: Disaster Risk Management Plan for the Agriculture Sector 2013-2020. This Priority Area will be monitored by the DRM/DRR Oversight Committee and CDC. Implementation will be by all agencies]</p>	<p>1. Develop and Promote Institutional mechanism to coordinate and implement DRM at the Ministry of Agriculture</p> <p>(1.1) Appoint an Agriculture DRM Coordinator at the MOA</p> <p>(1.2) Establish budget for ADRM Sec.</p> <p>(1.3) Appoint an ADRM Focal Point in each MOA Agency and Department</p> <p>(1.4) Establish an ADRM Oversight Committee</p> <p>(1.5) ADRM Coordinator appointed as Agriculture Focal Point on the CDC</p> <p>(1.6) Strengthen research collaboration with international organizations</p> <p>2. Design and implement risk transfer instruments to improve the recovery potential of farmers and fisher-folk</p> <p>(2.1) Include a budget line in MOA Annual Budget Estimates to support farmers during recovery from disasters</p> <p>(2.2) Develop an MOU with financial institutions for loans and grants to support recovery after disasters</p> <p>(2.3) Establish a Fisher-Folk Fund to support losses due to piracy and natural disasters</p> <p>3. Develop and implement EWS for proactive mitigation and responses</p> <p>(3.1) Develop a standardized methodology for conducting Vulnerability and Risk Assessment (VRA)</p> <p>(3.2) Establish a Unit for Agro-meteorology</p> <p>(3.3) Train engineers and technicians in using hydrology and hydraulics software to assist in development of EWS for Floods</p> <p>(3.4) Develop methodology for EWS for people and agencies to respond to changing weather patterns and unusual ocean activity</p> <p>4. Develop policies and programs on DRR and Climate Change designed to promote resilience to hazards</p> <p>(4.1) Develop and implement a Public Awareness Campaign on Land Use Policy (LUP) relating to DRM</p>	<p>1. (a) Quarterly Reports and Annual Reports prepared (b) ADRM Cabinet Report containing Annual ADRM Recommendations Note</p> <p>(1.1) ADRM Coordinator appointed by January 1, 2014</p> <p>(1.2) Budget for ADRM in 2014 Budget Estimates</p> <p>(1.3) ADRM Focal Points functional by January 1, 2014</p> <p>(1.4) Minutes of Quarterly meetings of the ADRM Oversight Committee</p> <p>(1.5) ADRM Coordinator submits reports of meetings attended at CDC</p> <p>(1.6) Annual Reports on research partnerships</p> <p>2. Annual Progress Report to demonstrate impact of the various instruments</p> <p>(2.1) Budget for ADRM Farmers Recovery Program in place in 2014 MOA Budget Estimates and subsequent years</p> <p>(2.2) MOU with financial institutions for loans to famers following disasters available</p> <p>(2.3) The Fisher Folk Fund proposal approved by December 2014 and operationalized by December 2015</p> <p>3. Quarterly and Annual Early Warning Reports</p> <p>(3.1) First VRA conducted in 2014 and at least one VRA annually</p> <p>(3.2) Monthly and weekly Agro-Meteorology Bulletin and Forecasts</p> <p>(3.3) At least one workshop held annually</p> <p>(3.4) Timely advisories on weather patterns and ocean activity issued</p> <p>4. Annual Report on Policies and Programs for mitigation and adaptation for DRR and Climate Change</p> <p>(4.1) Public awareness campaign on LUP and DRM starting in September 2014</p>

	<p>(4.2) Develop Policies for Codes and Standards for Infrastructure to promote infrastructure resiliency</p> <p>(4.3) Develop a National Drought Management Plan</p> <p>(4.4) Develop a package of climate smart agriculture methods and technology and promote its use in country</p> <p>(4.5) Develop a bio-control facility for pest and disease control</p> <p>(4.6) Expand existing gene bank for crops</p> <p>(4.7) Develop the Pesticide and Toxic Chemical Emergency Response Plan [See Plan for details]</p> <p>(4.8) Conduct simulation exercises in disaster responses</p> <p>(4.9) Conduct pesticide cleanup and remediation training programs</p> <p>(4.10) Upgrade Pesticide Board Laboratory</p> <p>(4.11) Implement the NDIA Drainage and Irrigation Plan 2013-2020</p> <p>5. Implement education, awareness and training programs as tools to advance a culture of prevention and safety</p> <p>6. Develop resources for DRM</p> <p>7. Develop DRR and CCA Guidelines for use at community levels</p>	<p>(4.2) Publish Standards and Codes for Infrastructure by end of December 2015</p> <p>(4.3) See Water Management in Priority Area 3</p> <p>(4.4) Package is prepared and published as a Climate Smart Agriculture Guideline and distributed among farmers by June 2015</p> <p>(4.5) Bio-Control Laboratory constructed and functional by December 2014</p> <p>(4.6) See Priority Area 1 – Gene Bank</p> <p>(4.7) This Plan was developed by the Pesticides and Toxic Chemical Board and is being implemented by that Authority. [See Plan for details]</p> <p>(4.8) At least two simulation exercises are conducted before 2017</p> <p>(4.9) At least three training programs are completed by 2020 with one being completed before end of 2014</p> <p>(4.10) Annual Report on Pesticide Laboratory with a statement issued on annual improvement of laboratory</p> <p>(4.11) Please see NDIA D and I Plan 2013 -2020</p> <p>5. Ensure inclusion of DRR and DRM and CC in all courses, training, awareness programs [Please see ADRM Strategy 2013 -2020]</p> <p>6. See ADRM Strategy 2013-2020 for details</p> <p>7. See ADRM Strategy 2013-2010 for detail</p>
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PRIORITY AREA 20: ENHANCING HYDROMETEOROLOGY AND WEATHER FORECASTING

20. Enhance Hydrometeorology and Agriculture [There is a detailed Strategic Development Plan for the HydroMet Services of Guyana 2013-2020. Please refer to the detailed strategy. Implementation will be by HydroMet Services of Guyana. Agree for the CMO/WHO to monitor this Priority Area]	<p>Overall: <i>To make Hydromet a more prominent service in Guyana</i></p> <p>Goal 1: <i>Enable Hydromet to work effectively and benefit from Regional and International context of weather and climate</i></p> <p>1. Maximize use of technologies, models, data from regional and global sources</p> <p>(1.1) Work closely with CMO and WMO to develop EWS for DRR program</p> <p>(1.2) Collaborate with WMO to mobilize resources (funds, equipment and technical) from donor organizations</p> <p>(1.3) Strengthen the Ozone Monitoring</p>	<p>Overall: <i>Annual budget increased, more professional staff and improved client satisfaction</i></p> <p>Goal 1: <i>There is an annual work plan for collaboration between CMO, WMO, CIMH, 5Cs and benefits are documented annually and consensus report is available</i></p> <p>1. Annual Report showing Hydromet using more technologies, models and data from global sources</p> <p>(1.1) Develop EWS as part of DRR with clear indicators for 2014 and 2015</p> <p>(1.2) Increase donor support for equipment, and technical support etc. contributing to overall enhancement of services.</p> <p>(1.3) Annual Report of the Ozone</p>
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	Unit as part of the global network	Monitoring Unit
	<p>2. Collaborate with services within the CMO to maintain centers of expertise</p> <p>(2.1) Enhance participation with CIHM</p> <p>(2.2) Strengthen continuous training to meet ICAO standards for aviation meteorology</p> <p>3. Strengthen overall recruitment and training strategy for staff</p> <p>(3.1) Review current policies to improve staff retention at the Hydromet Services</p> <p><i>Goal 2: Informing the public, special users, such as aviation and marine communities, of short term weather conditions and warn them of potential bad weather</i></p> <p>4. Maximize use of new technology and science to improve services, particularly warnings of storms and high seas</p> <p>(4.1) Add a scientific expert to the forecast team to develop techniques to maximize the use of the Doppler Radar and smaller scale models to predict localize storms in Guyana.</p> <p>(4.2) Work closely with the CDC to develop and enhance EWS as part of a larger natural disaster response capacity.</p> <p>5. Enhance current Aviation Meteorology Program to provide more client-oriented service and ensure legal compliance for ICAO etc.</p> <p>(5.1) Establish linkages with Authorities at major airports in Guyana to better understand their needs and to enter into formal agreements to meet these needs.</p> <p>(5.2) Through government-funded and cost-recovery services, establish and enhance presence at larger airports to provide the needs of local and regional aviation needs.</p> <p>(5.3). Ensure continuous training of staff on quality standards so as to be able to maintain international LCAO QMS standards</p> <p>6. Establish Marine Meteorological and Oceanographic Monitoring and Forecast</p>	<p>2. Work plan to show increased collaboration with CMO</p> <p>(2.1) Increased staff number benefitting from CIMH training</p> <p>(2.2) Increased number of staff trained to ICAO standards for aviation meteorology</p> <p>3. HOD of MOA approved Hydromet's Strategy for Recruitment and Training of Professional Staff</p> <p>(3.1) Implement at least one recommendation to improve staff retention by end of 2014 and full proposal by 2020</p> <p><i>Goal 2: Monthly report showing enhanced capacity of providing short term forecasts of weather conditions to the general population and to special users such as aviation and marine communities and rice farmers</i></p> <p>4. Annual Report showing how new technology has improved quality of short term warnings to special users, like aviation and marine communities</p> <p>(4.1) Person with advanced training included in staff complement to assist in enhanced use of Doppler and other technologies to predict localized storms</p> <p>(4.2) Integrated plan for EWS agreed to and implemented with CDC</p> <p>5. Guyana is fully compliant with ICAO standards by end of 2015</p> <p>(5.1) Agreements with Airport Authorities at CJIA and Ogle agreed to and implemented by end of 2014</p> <p>(5.2) Amount of cost recovery from aviation services increased by 5% per year</p> <p>(5.3). QMS implemented by end of 2014 and ICAO certification for QMS obtained by end of 2015</p> <p>6. Daily Marine and Oceanographic Monitoring and Forecast starting 4th</p>

	<p>and Warning Service to meet needs of the marine community and legal requirements</p> <p>(6.1) Establish linkages to the fishing and marine organizations and associations to better document their needs. Also meet with insurance companies and fishing associations to record statistics about losses due to hazardous weather and sea conditions.</p> <p><i>Goal 3. Development and provision of clear and precise, user targeted information on weather, climate and water, and awareness of farmers and other user groups to the benefits of using weather and climate forecast in decision making</i></p> <p>7. Establish close collaboration with main agriculture agencies such as NAREI, GRDB, and GLDA to develop weekly and seasonal products on weather and climate and to distribute to the farming community.</p> <p>(7.1) Weekly and seasonal forecasts are provided, as well monthly weather bulletins relative to various key crops</p> <p>(7.2) Staff develops forecasts and bulletins tailored to seasonal agriculture activities.</p> <p>8. Strengthen the Agrometeorological section to meet the needs of the farming community.</p> <p>(8.1) Strengthen the specialized training in Agrometeorology for staff in the Service.</p> <p>(8.2) Provide seasonal rainfall and dry season forecast through analysis of long-term climate data and predictive models.</p> <p>(8.3) Through a new balance between government-funded services and cost recovery services, establish an enhanced presence at extension offices for the needs of local and regional farming needs.</p> <p>(8.4) Provide educational material for better use of weather and climate information, and for interactive sessions with farmers at conferences, and training sessions.</p> <p>9. In collaboration with stakeholders, develop a weather monitoring and reporting program required to meet the requirements of the Ministry. (This should be funded by industry).</p>	<p>quarter 2014</p> <p>(6.1) Quarterly meetings are held with fishing organizations beginning 2015 to discuss their needs and inform them of advances in forecasting for the marine community</p> <p><i>Goal 3: Monthly Agricultural Bulletin published from January 2014</i></p> <p>7. Distribute Agriculture Weekly and Monthly Bulletins through NAREI, GLDA, GRDB, RPA, MMA etc. beginning April 2014</p> <p>(7.1) Crop-specific forecast prepared by June 2014 and distributed through relevant organizations</p> <p>(7.2) National GIS map available for crop and livestock activities by end of 2016</p> <p>8. There is a Director and a Unit for Agriculture Meteorology Unit at Hydromet by January 2014</p> <p>(8.1) At least three Hydromet staff with training in Agro-Meteorology by 2015</p> <p>(8.2) Provide three-month rainfall and dry season prediction for special users such as rice farmers, the sugar cane industry, etc.</p> <p>(8.3) Revenues from Services in specific areas with historical long term or short term weather conditions with services available at Regional and National Level</p> <p>(8.4) Training and awareness material provided to the public and special users and at least 5 interactive sessions per year to promote better utilization of weather and climate data</p> <p>9. Both a formal and informal weather and flood reporting system is operating by June 2014. The formal system reports to Hydromet and NDIA and the informal system is a National Weather Watchers Volunteers. There are at least 100 Weather Watchers Volunteers</p>
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	<p>(9.1) Establish linkages to Crop Insurance Companies to document their needs and for monitoring requirements to record statistics about losses due to weather conditions.</p> <p>(9.2) Develop a program to assist the Ministry in its efforts to have enhanced pest control and safe and effective pesticide use.</p> <p><i>Goal 4: Enhanced Capacity to monitor climate conditions of Guyana and associated changes by filling gaps in network data and employing scientific staff to undertake analysis.</i></p> <p>10. Develop and implement a compressive climate services strategy</p> <p>(10.1) Develop and implement a recruitment strategy to enhance the capacity to undertake climate analyses trends.</p> <p>11. Develop a more effective network maintenance program.</p> <p>(11.1) Establish training and materials for local operators of climate station to conduct a first level of maintenance on equipment.</p> <p><i>Goal 5: The GOG and specific users are informed on the quality and quantity of Guyana's rivers and ground water.</i></p> <p>12. Rationalize the Hydromet Services as specified in the Water and Sewerage Act of 2002 and programs delivered within the resources allocated by GOG.</p> <p>13. Enhance Capacity of Hydrology Unit so that staff is able to undertake activities to fulfill the mission of organization.</p> <p>(13.1) A staffing and recruiting plan needs to be developed for Hydrology.</p> <p>(13.2) The forecasting and hydrology unit develops a plan for the prediction of potential floods and associated warning system and liaison with the Civil Defense Office.</p> <p>(13.3) Pending decisions on mandate and funding available through the Climate Change Office, an expert needs to be retained to develop scenarios on impacts on river levels of changing climate conditions.</p> <p>14. Develop capacity to monitor river levels</p>	<p>(9.1) Hydromet and NDIA jointly reporting Monthly inventory of Weather-Related Losses at HOD Meeting starting April 2014</p> <p>(9.2) Regular report correlating weather conditions and presence and damage caused by pests and diseases</p> <p><i>Goal 4: An Analytical Unit is established at Hydromet to monitor climate changes in Guyana. Annual Climate Change Analysis will be published with 1st Edition being in 2014</i></p> <p>10. Publish and distribute the National Climate Services Strategy</p> <p>(10.1) All staff of Analytical Unit are trained in Climate analysis and in reporting climate change by end of 2015 and a continuous staff development program is in place</p> <p>11. A Routine Network Maintenance Program implemented by June 2014</p> <p>(11.1) All relevant staff trained in routine first-level maintenance of equipment with 20% by end of 2014, 40% by end of 2015 and 100% by end of 2016</p> <p><i>Goal 5: An Annual Report on Quality and Quantity of Guyana's River and Ground Water is presented starting from 2014.</i></p> <p>12. Cabinet Report before end 2014 on the Hydrometeorological Services today vs the Services Specified in the Water and Sewerage Act 2002 presented</p> <p>13. Staffing of Hydrology Unit is increased by end of 2014 and increased by 100% by end of 2015</p> <p>(13.1) Staffing and Recruitment Plan for the Hydrology Unit endorsed by MOA by April 2014</p> <p>(13.2) A Flood Prediction Program is functioning and its prediction is provided to public from June 2015. This unit has active collaboration with CDC and its meetings are documented quarterly with its first quarterly report published at end of September 2014</p> <p>(13.3) In collaboration with Climate Change Unit, a specialist is included in the staffing of Hydromet to develop models for impacts on river levels due to short, medium and long term climate change</p> <p>14. Prepare River Level and Flows from Trans-</p>
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	<p>and flow in Tran-boundary Rivers.</p> <p>(14.1) An agreement on river flow into the Amazon River Basin needs to be negotiated.</p> <p>Goal 6. To ensure that Hydromet has the equipment and technological support to carry out operations in-house and in field.</p> <p>15. Maximize use of new technologies and equipment to improve service quality.</p> <p>(15.1) Ensure that the unit has the capability to maintain operation of forecast center and the Doppler radar 24 hours every day.</p> <p>(15.2) Ensure installation, operation and maintenance of the upcoming new weather satellite receiving station.</p> <p>16. Maintain the Service's Web Site and implement a state-of-the-art web delivery system.</p> <p>(16.1) Develop a plan to ensure the products and services are accessible on the web and that the site is updated on a regular basis.</p>	<p>Boundary Rivers Report by end of 2015</p> <p>(14.1) An MOU on River Flow in the Amazon Basin is in place by 2020</p> <p>Goal 6: A Gap Analysis is presented to HOD on the Technology and Equipment for Optimal Hydrometeorology Services in Guyana</p> <p>15. Gap is reduced by 10% annually</p> <p>(15.1) The Forecast Center and the Doppler Radar System are fully equipped and maintained 24 and 7</p> <p>(15.2) At least one additional weather satellite receiving station established annually with at least 10 new station established by 2020</p> <p>16. Web Site for the Hydromet Services improved by end of 2014 and continuous upgrading till 2020</p> <p>(16.1) The web site is updated each week and all relevant non-confidential information and non-cost recovery information are downloaded on the web site.</p>
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PRIORITY AREA 21: IMPROVING SYSTEM FOR LAND AVAILABILITY, LAND ZONING, AND LAND TENURE

21. Land Availability, Land Zoning and Land Tenure to increase Access to Farm lands by Farmers and Entrepreneurs	Cross-Cutting Issues	Cross-Cutting Issues
	Land Tenure	Land Tenure
[This priority area seeks to make land availability, zoning, land-tenure easier for farmers and entrepreneurs. NAREI, GLDA, MMA, GRDB are main implementers. This Priority Area will be coordinated by a Committee led by Mr. Seepersaud]	<p>1. Develop specific policies for new housing schemes and ensure that there is no conflict between housing needs of people and agriculture development</p> <p>Land Tenure</p> <p>2. Computerize land zoning and tenure system</p> <p>3. Support the MMA/ADA and the Lands and Surveys Commission in simplifying procedures to access land</p> <p>4. Collaborate with MMA/ADA and GLSC in the development of land tenure policies that are responsive to livestock farmers</p> <p>5. Complete land use plans and zoning recognizing needs of livestock farmers</p> <p>Land Availability</p> <p>6. Identification of land available for agriculture purposes for distribution</p> <p>7. Determine the suitability of new land for agriculture purposes</p>	<p>1. MOA and Ministry of Housing meet to discuss areas of interest and these recommendation are forwarded to Cabinet for its consideration</p> <p>Land Tenure</p> <p>2. MMA system fully computerize by 2017</p> <p>3. Procedures at MMA/ADA simplified and time for processing reduced by 20% by end of 2017 and 40% by 2020</p> <p>4. Policies developed to increase acreage for pastures and access of farmers to pasture land</p> <p>5. Land use plans done for Regions 2,3, 5 and 6 by 2020</p> <p>Land Availability</p> <p>6. Available land for distribution or allocation identified by end of 2014</p> <p>7. Soil physical and chemical properties determined and mapping done for new agriculture land with at least 5,000 acres</p>

	8. Complete planning for and establish the Aurora Agriculture Scheme	completed by 2016 8. Aurora Agriculture Scheme established by 2016
PRIORITY ROAD 22: LONG TERM INVESTMENT AND PROMOTION OF RESEARCH AND DEVELOPMENT		
22. Build Capacity for Research and Agricultural Development [This Priority Area will be implemented by all agencies. Coordination and Oversight will be provided by the GAROC]	<ol style="list-style-type: none"> 1. Establish a Guyana Agriculture Research Oversight Committee (GAROC) at MOA 2. Establish an Agriculture Research Agenda for 2013-2020 and establish a priority agenda for research 3. Complete an inventory of all current agriculture research in Guyana 4. Monitor progress on the implementation of the Agriculture Research Agenda 5. Organize Annual Research Forum to be held during Agriculture Month (October) annually 6. Publish an Annual Guyana Agriculture Research Journal, appoint an Editor and a management Team 7. Encourage our agriculture researchers to publish in international journals 8. Establish formal links with regional and international R&D institutions 9. Develop project proposals for funding through international grants 10. Build capacity through post-graduate studies by Guyanese agriculturalists 	<ol style="list-style-type: none"> 1. GROC meet for 1st meeting in February 2014, adopt TOR and Minutes for at least 4 meetings annually 2. GROC approves Agriculture Research Agenda 2013-2020 and establishes short, medium and long term research timelines 3. Summary Report of all current agriculture research done in Guyana ready by December 2020 4. Quarterly and Annual Reports on Research being done and correlation with National Agriculture Research Agenda 5. 1st Agriculture Research Forum held in October 2014. Organizing Committee established by GROC by April 2014 and widespread dissemination of results 6. 1st Guyana Agriculture Research Journal published in October 2014. Editor and Management Team identified by GROC by May 2014 7. At least two publications in international journals each year by Guyanese agricultural researchers 8. MOUs with EMBRAPA, CIAT, UWI, Earth University, PANOFFOZA, CARDI, St. Georges etc with 2 by 2014 9. At least two grant proposals are submitted per year 10. At least once scholarship per year for post-graduate studies
PRIORITY AREA 23: STRENGTHEN THE ORGANIZATIONAL STRUCTURE FOR A NEW AGRICULTURE VISION		
23. Strengthen Organizational Structure for the Agricultural Sector [This Priority Area will be implemented by all agencies and coordination will be through the Office of the PS with Oversight from the Minister of	<ol style="list-style-type: none"> 1. Establish a broad-based multi-sector Agriculture Oversight (Thematic) Committee to monitor, assess and advise agriculture development in Guyana. The HOD will be supported by other stakeholders as the Agriculture Oversight Committee. These will include FAO, IICA, UG, Farmers Groups and Private Sector. 2. Establish a number of Oversight Committees to promote development in specific areas of agricultural. These include the National Agriculture Oversight Committee (Agriculture 	<ol style="list-style-type: none"> 1. At least two meetings per year with a clear agenda and with an Annual Report on Agriculture with 2013 Agriculture Report being the 1st. FAO, IICA, CARDI, UG, CARICOM, World Bank, IDB, EU, RPA, GAPA, Private Sector will be invited to HOD Meeting in July and February when a Half-Year Review and an Annual Review are presented. 2. The various oversight committees are established and each have at least the 1st meetings by end of April 2014. TORs are endorsed by HOD and documented in

Agriculture and the HOD]	<p>Thematic Group), the Agriculture Research Oversight Committee, The Agro-Energy Oversight Committee, the DRM/DRR Oversight Committee, the National F&S Oversight Committee etc.</p> <ul style="list-style-type: none"> 3. Establish MOUs between the MOA and the semi-autonomous bodies defining their relationships with MOA 4. Develop and implement Service Agreements between the MOA and the various Agriculture agencies 5. Establish an M&E Unit at MOA to monitor the Agriculture Sector as a whole 	<p>Decision Points of the HOD. Minutes of Meetings are available.</p> <ul style="list-style-type: none"> 3. Signed MOUs available by June 31st 2014. MOU will be signed by Board, CEO and the MOA. 4. Service Agreements signed by April 2014 and implemented by July 1st 2014 with at least three entities assessed and reviewed for the 2nd quarter 5. The M&E Unit fully operational by February 1st 2014 and the first Agriculture M&E Indicators agreed to by March 15th 2014
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PRIORITY AREA 24: A POLICY AND LEGISLATIVE AGENDA FOR A MODERN AGRICULTURE SECTOR

24. Continuous Review of Policies and Legislative Framework [This Priority Area will be implemented across the Agriculture Sector. It will be monitored and coordinated by the HOD]	<ul style="list-style-type: none"> 1. MOA to establish an inventory of policies, legislations, and regulations to be addressed by 2020 2. Enact Food Safety Legislation 3. Enact Animal Welfare Legislation 4. Develop a Traceability Legislation 5. Fisheries Regulation completed 6. A land tenure proposal developed for Cabinet to consider 7. The MOA working with GRDB, RPA and other stakeholders conduct review of the Rice Factories Act 8. Develop and implement through the Bureau of Standards a Guyana Standard for Rice Trading on local markets 9. Enforce the Veterinarian Act by establishing the Veterinary Board and enact regulations under the Veterinarian Act 	<ul style="list-style-type: none"> 1. The List of policies, legislations and regulations to be addressed endorsed by HOD before June 2014 2. Bill Read for the 1st time before June 2014 3. Bill Read for the 1st time before May 2014 4. Bill approved by Cabinet before Sept 2014 5. Fisheries Regulation Gazetted by April 2014 6. MOA presents land tenure white paper for Cabinet to consider before end of 2014 7. Stakeholders Review of the Rice Factories Act Report is completed by December 2014 and submitted to Cabinet by end of 2014 8. The Guyana Bureau of Standards enforce a Guyana Rice Standard for the local market and the Consumers Affairs Division develop a surveillance of the rice market 9. The Veterinary Board appointed in 2013 and 1st licensing for Veterinarians and Animal health Assistants in 2014. First Regulations under the Veterinary Act approved by the Minister by 2015
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PRIORITY AREA 25: DEVELOPING A FINANCING MECHANISM TO SUPPORT AGRICULTURE VISION 2020

25. Securing Financing Mechanism for Agriculture [This Priority Area is the responsibility of the Minister of Agriculture and will be	<ul style="list-style-type: none"> 1. Develop a crop insurance proposal for farmers 2. Develop a crop financing model for small farmers 3. Develop a model Group Purchasing for Farming Commodities for farmers, e.g. fertilizers, aquaculture supplies etc. 4. Ministry of Agriculture to propose to 	<ul style="list-style-type: none"> 1. National consultations completed in 2014 and a proposal for crop insurance presented to Cabinet by March 2015 2. National Consultation on Crop Financing Report available by December 2014 3. List of commodities available to farmers at affordable prices published every January and July. The 1st published list by July 2014 4. MOA completes proposal for small
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Chapter 4: The Roadmap

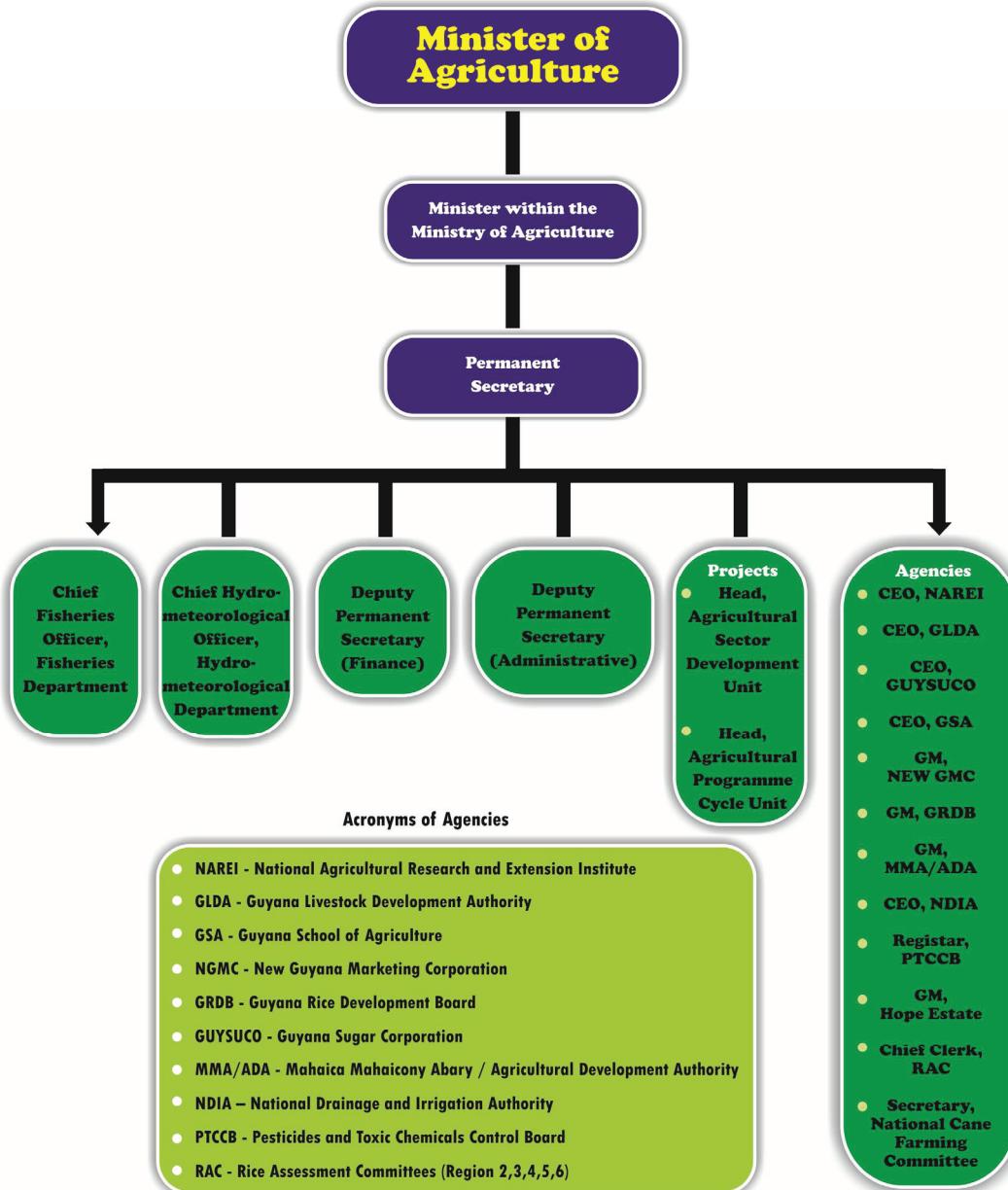
implemented with various agencies. It will be monitored through the HOD]	Cabinet a financing scheme for small farmers to be handled through banks 5. MOA develops a Contract Farming Proposal and promote use of contract farming as a means of financing for farmers and sharing risk	farmers financing scheme and presents to Cabinet by January 2015 5. A Contract Farming Proposal is approved by HOD. MOA brings together at least 20 farmers & 5 agro-processors to pilot granting financing to farmers to produce crops for agro-processors
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ABOUT THE MINISTRY OF AGRICULTURE

Mission Statement

To ensure the formulation and implementation of policies and programmes which facilitate the development of agriculture (including fisheries) in Guyana, thereby contributing to the enhancement of rural life, the sustainable improvement of incomes of producers and other participants in the agricultural production and marketing chain; and the maintenance of a sound physical and institutional environment for present and future productive activities.

MINISTRY OF AGRICULTURE ORGANIZATION STRUCTURE



About the Ministry of Agriculture

The Ministry of Agriculture's mission is addressed through four programme areas, two committees and ten agencies, which are as follow:-

Program Areas

Ministry Administration (including Finance)

This department is responsible for effective and efficiently managing and coordinating human, financial, physical and material resources necessary for the successful implementation and administration of the Ministry's programmes and operations.

Crops and Livestock Support Services

This department promotes and supports the development of agriculture in Guyana through the provision of a range of technical and regulatory services to the sector. [Currently carried out by NAREI and GLDA]

Fisheries Department



The Fisheries Department is responsible for managing, regulating and promoting the sustainable development of the nation's fishery resources for the benefit of the participants in the sector and the national economy. The Fisheries sector is made up of three primary components: Marine Fishery, Aquaculture and Inland Fishery. The department achieves its mission through the following divisions:

Administration: To provide the relevant support services necessary for the development and maintenance of fisheries programmes and activities.

Statistical Unit: To collect and analyze data and conduct surveys to provide scientific and social-economic information for policy determination, planning and resource management. The key responsibilities include: Market Survey Activity, Management of Data Entry and Storage, Production and Management of Individual Export Licences forms.

Legal and Inspectorate Unit: To ensure the observance of all legal and administrative requirements by all entities in the fishery sub-sector and recommended appropriate charges to existing regulations which govern the Sector. The key responsibilities include: Registration and Licencing of fishing vessels, License and inspect fish processing plant, Conduct enforcement and surveillance activities of fishing vessels, Monitor the industrial fleet/artisanal compliance with licence conditions, Monitor and conciliate complaints and disputes at the centre and the regions, Issue export licences for fish and fish products, Ensure the collection of revenue under the Fisheries Act 2002 and Maritime Act of 1977, etc.

Aquaculture: To ensure that aquaculture is developed in a sustainable and controlled manner optimising economic and environmental benefits.

Hydrometeorological Services



The Hydromet Department is responsible for observing, archiving and understanding Guyana's weather and climate. It provides meteorological, hydrological, and oceanographic services in support of Guyana's national needs and international obligations.

The Hydrometeorological Service's general responsibility is to monitor and evaluate the weather and water resources in Guyana and to actively support the government in disaster risk management and aeronautical, water, agriculture, engineering and other agencies for the

About the Ministry of Agriculture

socio-economic development of the country. It is the official provider of weather, water and climate information and related products and services for Guyana. The overall mission of the Hydrometeorological Service evolves from separate basic activities:

Monitoring: Observation and data collection to meet the needs of future generations for reliable, homogeneous national climatological, hydrological and oceanographic data;

Research: Research directed to the advancement of hydrological, oceanographic and meteorological sciences and the development of a comprehensive description and scientific understanding of Guyana's weather, climate and water resources;

Services: Provision of hydrological, meteorological, oceanographic and related data, information, forecasts, warnings, investigation and advisory services on a national, as well as international bases; and

International: Coordination of Guyana's involvement in regional and international hydrology, meteorology, oceanography and related conventions.

Committees

Rice Assessment Committee (RAC)

There are Rice Assessment Committee in all major rice growing regions, these are, Regions 2, 3, 4, 5 and 6. Each committee is represented by Land Lords, tenants, technical staff of the Ministry and a Chairman who has legal training. The committee investigates disputes on land matters in the rice farming areas. It operates at a Magistrate Court Level.

National Cane Farming Committee (NCFC)

The NCFC has representatives from private cane farmers, government including GUYSUCO and representative from the banking sector. These are appointed by the Minister of Agriculture. The focus of the committee is to make representation on behalf of the private cane farmers to government and GUYSUCO on various issues.

Agencies

National Agricultural Research and Extension Institute (NAREI)



"The Premier Research and Extension Organisation"

The National Agricultural Research & Extension Institute (NAREI) is the premier organisation responsible for spearheading agricultural research and extension activities for productivity enhancement and diversification of the non-traditional crops sector (fruits and vegetables), bio fuel development as well as for plant quarantine services. NAREI's vision is ***"to ensure food security, prosperity and livelihoods of all, using technological innovations in agriculture."***

The Institute is actively engaged in adaptive research that focuses on improving crop production/ productivity for enhanced food security and rural development. Emphasis is placed on crop diversification from high volume- low income to low volume- high income crops such as spices and other cash crops, new vegetables (cauliflower, broccoli, red cabbage and sweet pepper), IPM approach to managing biotic stresses, procurement and evaluation of exotic germplasm (black eye, corn and soybean) of field crops, bio fuel crops, coconut and cassava revitalisation, and technology dissemination through

About the Ministry of Agriculture

the extension services. The promotion of Climate Smart Agricultural Practices inclusive of protected agricultural systems for year round vegetable production, hydroponics and drip irrigation is also given prominence.

NAREI's Strategic Plan (2013- 2020) envisions the Institute as being the major facilitator for a prosperous, food secure and environmentally sustainable Guyana. This will be achieved through enhancing agricultural productivity and quality of produce through generation and dissemination of newer and efficient technologies and services reduced import of agri produce and products, reduced malnutrition and environmental degradation and enhanced exports taking into consideration the changing global and business environments.

Guyana Livestock Development Authority (GLDA)



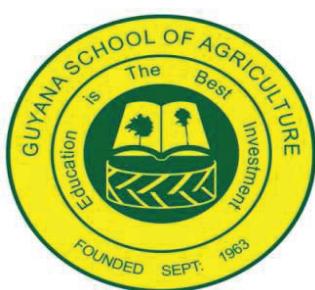
In an era where pathogens from animals are entering the oceanic as well as human internal ecosystem, a clear picture has emerged regarding emerging diseases. Man is becoming increasingly concerned about accessing safe, wholesome and affordable food, particularly food emanating from livestock. In an effort to develop the architecture that will support our drive to satisfy this need, several entities in livestock were unified under one new arms-length or semi-autonomous agency, the Guyana Livestock Development Authority.

The thrust of the agency is to ***"promote greater efficiency in the livestock product industry and to provide enhanced services in livestock husbandry, livestock health and research so as to make provision for effective administration and regulation of trade, commerce and export of livestock or livestock products and for matters related and incidental."***

As one of the newest agencies under the Ministry of Agriculture, it delivers public services related to animal production, animal health, animal genetics, marketing, training and extension services as well as regulatory services.

Several programmes are planned and implemented under GLDA's mandate. One involves protecting the gains of animal production and genetics through the provision of timely veterinary interventions and minimizing the threat of disease from internal and external sources. Veterinary drugs and the importation of animals are also regulated under this programme. Another programme involves infusing local animal stock with new genetics to enable our farmers to benefit from higher productivity. Techniques of artificial insemination and embryo transfer form part of our regular strategies. Superior genetics is supported by another programme designed to catapult our farmers into higher levels of animal husbandry through better nutrition, housing and access to authentic and validated information.

Guyana School of Agriculture (GSA)



"GSA repositioning itself for agriculture 20/20"

Guyana School of Agriculture (GSA) was established in the year 1963 by former President Dr. Cheddi Jagan and became a state corporation in 1964 offering the Diploma in Agriculture and the Certificate in Agriculture Programmes, and graduated the first batch of 15 students in 1966.

In 1994 the Certificate in Forestry Programme was introduced, followed by the introduction of the Animal Health and Veterinary Public Health Programme in 2007 and the Certificate in

Fisheries Studies Programme in 2008. In 2013 the Food Science and Technology programme was introduced. Over the years, the school graduated 3,060 professionals in different fields of agriculture and forestry thereby addressing technical capacity building through the development of skills and capacities, as well as enhanced knowledge and information exchange between, the actors involved in innovation, including farmers and their organizations, agricultural research, education and training institutions, extension and advisory services institutions, and the researchers and professionals working in the agricultural sector of Guyana and the Caribbean.

New Guyana Marketing Corporation (NGMC)



Mission Statement: *"Coordinate and facilitate the development and marketing of quality agricultural produce and product".*

Guyana Marketing Corporation (GMC) is a government corporation established under section 46 of the Public Corporations Act, Cap 19:05 of the Laws of Guyana.

Guyana Marketing Corporation is sometimes referred to as the "New" Guyana Marketing Corporation (New GMC). This is because, in 1985, the policy of the Guyana Marketing Corporation was changed. There was a total cessation of all buying and selling operations, and the corporation was charged with the responsibility of providing *marketing services* to stakeholders (farmers, agro-processors, exporters) of the non-traditional agricultural sector. The corporation achieves its mandate through the following departments:

Marketing Information Centre:

- Provides market and marketing information on market opportunities Locally, Regionally and Internationally;
- Provides a match-making service linking buyers and sellers;
- Advises on the availability of produce, freight and other marketing matters;
- Provides a one-stop desk for export documentation of non-traditional agricultural produce
- Conducts market studies for local and overseas markets;
- Participates in trade fairs, and expositions to promote Guyana's fresh fruits and vegetables, and agro-processed products;
- Assists exporters with registering with the US Food and Drugs Administration (FDA) Bioterrorism Legislation;
- Conducts training for farmers, exporters & other stakeholders;
- Monitors daily wholesale and retail prices from local markets;
- Conducts analyses of data on prices, export volumes, etc;

Guyana Shop:

- Promotes the sale and consumption of locally produced and manufactured non-traditional agricultural produce and products;
- Supports the development of micro and small agri-businesses.

Packaging Facilities:

- Provides facilities for the preparation of fresh produce for export;
- Provides facilities for the transportation of fresh produce from farm to packhouse, and from packhouse to ports of export;
- Provides cold storage facilities;
- Provides advice on the methods of preparation for fresh fruits and vegetables for export.

Guyana Rice Development Board (GRDB)



Mission Statement: *"To efficiently utilize the resources of Guyana to produce and market high quality rice and rice by-products as a staple food for local and international markets, while providing employment and foreign exchange earnings."*

The Guyana Rice Development Board Act of 1994 established the GRDB as a corporate body. The general functions of the GRDB are to (1) develop the rice industry and promote the exportation of rice, (2) establish facilities and undertake research on rice production for the benefit of farmers, and (3) engage in other promotional and development activities to develop the rice industry.

GRDB is managed by a Board of Directors (BOD) and a General Manager. The BOD is appointed by the Minister of Agriculture and must include Farmers, Rice Millers, a Consumer Representative, other Stakeholders of the Industry, etc.

The establishment of the GRDB was designed be involved in the policy making and regulatory role. As established, the GRDB is also a facilitator of selected activities within the rice industry that is now owned, and operated by the private sector. In addition to its regulatory activities; GRDB work along with stakeholders in the following area:

Export and Trade Facilitation: This department is solely responsible for the preparation of all relevant documentation for the exporting of rice from Guyana. They also assist in the facilitation of Foreign Investors in the purchase of Guyana's rice or other rice products where necessary.

Quality Control: This department is responsible for ensuring that the quality of rice for both local consumption and exports meets the requisite specifications. They also train Farmers, Millers Workers and Exporters in areas of Quality Management.

Research: The unit is based at the Rice Research Station at Burma, Mahaicony, where new varieties and strains are developed, so that farmers can have access to plants that are more conducive to providing a better quality and higher volumes of grain.

Extension (Technology Transfer): This department is responsible for the transfer of technology from the Research Station to the farmer. Extension Officers, based in all the regions, regularly meet with farmers and serve as an advisory body to assist the farmers in the acquisition of inputs, the retooling with new technology available, and/or information dissemination of pertinent data that could lead to improved and more productive husbandry practices. Where demonstrations are needed the Extension Officers provide this service, thus also acting as educators/facilitators/enablers to the farmers.

Guyana Sugar Corporation (GUYSUCO)



The Guyana Sugar Corporation is the home of the renowned Genuine Demerara Sugar. The Corporation owns eight cultivations on which it grows canes and produces sugar from those canes in seven factories which are located from the extreme east of the country to the west. A small amount of canes are bought from private farmers but it is anticipated that private farmers' canes will increase in the coming years. In addition to

About the Ministry of Agriculture

sugar, the Corporation molasses is produced as a byproduct which is sold to distilleries who produce some world famous rums using the molasses as a feedstock.

It is fully owned by the Government of Guyana and currently contributes about 9.5% to the country's GDP. It is major foreign exchange earner for the country. It plays a major role in the sugar communities around the plantations providing sporting facilities, medical facilities and also the drainage of those communities.

GUYSUCO employs around 18,000 persons and currently the average annual production is 250,000 sugar but it is looking to grow this production level to at least 400,000 sugar.

The main export market is in the United Kingdom where there is an agreement to sell 195,000 sugar annually. It also exports to the Caribbean and the United States. GUYSUCO is also able to satisfy the local demand for brown sugar.

Mahaica Mahaicony Abarry/Agriculture Development Authority (MMA/ADA)

Mission Statement: *"To promote, facilitate and enhance sustainable agricultural development in the Region through the efficient management of the land resource".*



The MMA/ADA is a semi-autonomous agency under the Ministry of Agriculture, governed by a Board of Directors. The Board is responsible for the formulation of policies for the efficient functioning and operations of the MMA/ADA.

The MMA/ADA was established in 1978 by Act No. 77 of 1977. The Authority was formed as the executing agency for the construction of all drainage and irrigation works in Region No. 5, Mahaica/Berbice on the north-eastern Atlantic seacoast of Guyana. The agency is also responsible for the allocation of State Lands between the Berbice and Mahaica Rivers.

The MMA/ADA was to provide water control for the coastal lands up to a distance of some 30 miles inland, by impounding the flood waters in surface reservoirs (conservancies) located in the upper reaches of the rivers, and through the construction of appropriate civil engineering infrastructure, provide drainage and irrigation (D & I) services to the areas nearer the coast.

Primary goals of the MMA/ADA are to manage, operate and maintain all drainage and irrigation works in Region No. 5, Mahaica/Berbice and to administer all State and Government lands for the benefit of farmers/residents and National Development. Overall, the MMA/ADA supports nearly half of the national rice production, about 30-35% of all livestock (most cattle) production and 10-15% of national sugar production.

National Drainage & Irrigation Authority (NDIA)



The National Drainage and Irrigation Authority (NDIA) functions as Guyana's apex organization dealing with all public matters pertaining to management, improvement, extension and provision of drainage, irrigation and flood control infrastructure and services in declared areas of the country. Established in 2006 by an Act of Parliament, No.10 of 2004, the Drainage and Irrigation Act, the Authority has developed an institutional structure in terms of water resources management strategy and water use planning for the primary purpose of locating, evaluating, conserving and distributing

About the Ministry of Agriculture

water resources of the country for agricultural purposes. In meeting its mandate, the NDIA has focused on improving and upgrading drainage and irrigation services countywide, thereby enhancing the competitiveness of the various sectors and improving productivity. Through the work of the NDIA, the Ministry of Agriculture is ensuring that agricultural land is better protected against adverse weather related events.

Over the years, the NDIA has been building its capacity, resulting in a significant number of pieces of equipment being acquired, inclusive of mobile and fixed pumps, long reach excavators, bulldozers and other machinery. The NDIA has adopted a policy of constructing and rehabilitating sluices that are found to be functional through suitable foreshore conditions along the coast and riverine areas, aimed at upgrading and expanding the drainage system. These works allow for expanded acreage of agricultural activities and to better cope with extreme rainfall events associated with climate change. All improved and rehabilitated sluices are now serving areas to withstand in excess of 2.5" of rainfall in 24 hours as compared to 1.5" in 24 hours before.

The NDIA's implementation of an aggressive plan for upgrading and rehabilitation of drainage and irrigation infrastructure to ensure optimum capacity has continued. Rehabilitation of drainage structures have been undertaken in Regions 2 to 10. The NDIA, through its Community Drainage and Irrigation Project (CDIP) has also been supporting vulnerable residential areas by clearing critical drains and canals. About 900 miles of canals and drains are cleared by CDIP workers monthly. In addition, over the last five years, over 900 miles of drains and canals were maintained yearly in Regions 2, 3,4,5,6 and 10 by the NDIA. The Water Users Association has also assisted with the maintenance of the secondary drainage and irrigation systems in key farming areas.

The Pesticides and Toxic Chemicals Control Board



**Pesticides and
Toxic Chemicals
Control Board**

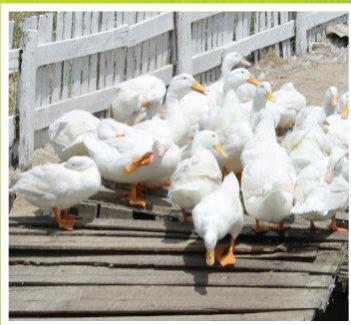
The Pesticides and Toxic Chemicals Control Board was established for the management of pesticides and toxic chemicals in Guyana. The Board is tasked with responsibility for licensing, registration, training, inspection and enforcement and executes these activities with the aim of ensuring sound chemicals management in Guyana; reduce human health and environment risk, and food safety in agriculture production.

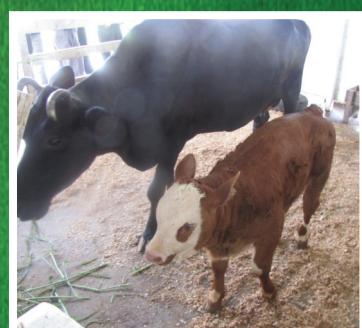
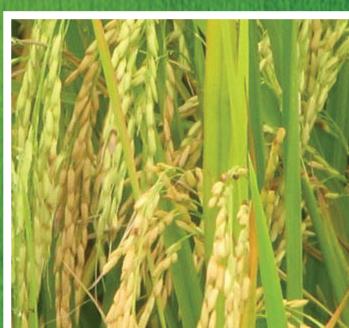
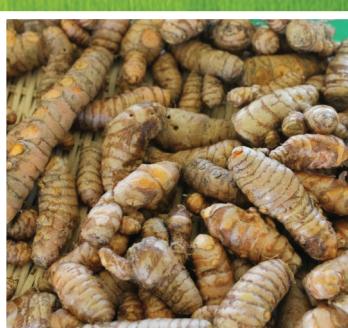
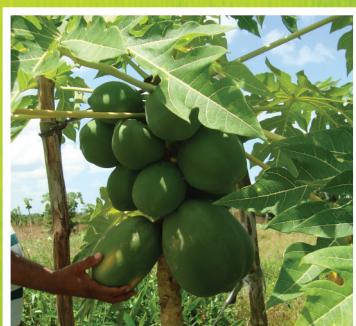
All chemicals used in Guyana must be registered by the Board ensuring that all pesticides used in agriculture production are of minimum risk to human health and environment. This also plays an important role in the international trade of agricultural produce from Guyana ensuring that produce are safe for consumption. The PTCCB has a well equipped laboratory which plays a vital role in food safety carrying out formulated pesticides analyses and residual analyses.

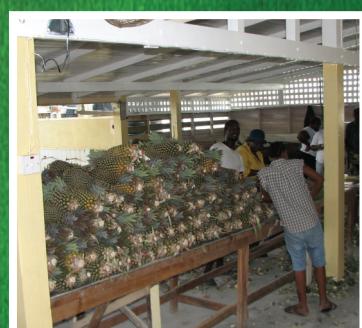
The PTCCB is active in the training of farmers, extension agents, vendors, students, pest control operators and Customs and Trade Administration Officers throughout Guyana. In so doing, focus is centered on pesticide related topics with relevance to agricultural practices. The Board also raises public awareness through the development and distribution of training manuals and the publication of a quarterly newsletter. Further, the Board participates frequently at national exhibitions and television programmes featuring agriculture issues, in addition to hosting website with a comprehensive range of topics pertinent to its mandate.

Hope Coconut Industries Limited (Hope Estate)

Hope Estate is located at Plantain, Hope with approximately 3,000 acres. It accommodates cash crop, cattle rearing and rice. It functions as a link between farmers and Ministry of Agriculture; it is used as one of NAREI's demonstration site for shade house, drip irrigation and other agriculture technological innovation. The estate is sustained by revenue from tenants and subvention from government.









For more information on the strategy contact:
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www.agriculture.gov gy