**DRAFT Report on Assessment of the Agricultural Statistical System Guyana**

**27th April to 1st May 2015**

# Introduction

The assessment examines the state of the agriculture statistical system at the current time. It serves as a benchmark to strengthen support to the agricultural statistical capacity building programme by setting out the user satisfaction with current statistics, the system’s potential to meet future needs for statistics and existing data gaps . The assessment covers the stakeholders listed in section 2, and meetings were held with each of the listed agencies to identify the agricultural data produced and to identify and prioritize the capacity development needs of the agency and the agricultural statistical system as a whole.

National Statistics in Guyana are produced using administrative data of the agencies. In discussing data and statistics a clear distinction must be made between the data produced for conducting the business of the agency and the ‘national statistics’ - the data compiled to provide information on the outcomes and outputs of the agricultural sector at national and sub-national level. In addition, in discussions the final data outputs must be distinguished from the inputs - the administrative data used to produce the statistics. The statistics and data items produced should also be listed separately from the dissemination products.

**Figure 1: Administrative Regions of Guyana by number and Name**

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The starting point of the assessment is the identification of the data needed by users: the ability to meet users’ needs is the basis for identifying what data should be produced by the agricultural statistical system in order to understand and report on the agricultural sector in Guyana. Key stakeholders are summarized in section 2. The assessment outlines the agricultural statistics produced by the system with an overview of the methodology used in section 3. Identification of gaps and assessment of capacity are based on an identification of the match between data demanded by users and supply by producers . The overview examines the quality of available data and service provided. The SWOT analysis in section 4 provides an overview summary of the findings, and identifies the internal and external strengths and weaknesses against the ability of the agricultural statistics system to meet users needs.

# Overview of Agricultural Statistical System and Data Producers

## Legal and Institutional Framework and Coordination

The production of agricultural statistics is governed by the Statistics Act 1998, Chapter 19:09. This places responsibility for production of statistics on agriculture under the Bureau of Statistics with powers of delegation to authorized officers.

Under this provision the collection of agriculture statistics is delegated to agencies within the Ministry of Agriculture, and is moreover completely decentralized. The data collections (discussed in Section 4) are managed by each agency independently. Decisions on the data collected, methods for collection and analysis, and dissemination are made by each agency. Statistical producers report to the heads of their respective agency.

The Monitoring and Evaluation (M and E) Unit of the Ministry of Agriculture established in 2013 overseas the monitoring of the Service Level Agreements (SLAs) of the Ministry of Agriculture with each Agency. It also manages the monitoring of the main agricultural policies: the National Strategy for Agriculture, the Food and Nutrition Strategy, and the Risk Management and Disaster Strategy. The data required to assess progress made against the monitoring and evaluation matrices of each of the SLAs and policies is compiled by the unit and used to assess progress on the relevant indicators.

The M and E Unit has recently been performing a coordinating role, and there is currently a limited coordination function, with the M and E unit liasing with focal points in each agency who provide data to the unit. A Committee of Focal Points has also been active, with monthly meetings of the focal points and M and E unit to discuss statistical issues.

*Issues Arising*

In the past the lack of a clear focal point has led to delays in provision of statistics to the Bureau of Statistics for national accounts and in meeting obligations in data reporting to international agencies.

The decentralized nature of the statistical collections, without having an overarching coordinating unit, has also contributed to issues in review and updating of relevant statistical methodologies, in assessing data quality, and in ensuring timely distribution of statistics. In the instance of NAREI and HydroMet agencies, there are complementary areas of work and it is necessary to have a mechanism to share information and if necessary to coordinate on these particular activities.

The lack of coordination has also contributed to the lack of a recent Agricultural Census. The last Agricultural Census held in Guyana was in 1950 – the Census cuts across the area of responsibility of several agencies and as it is not covered by the remit of ay one agency, there has been difficulty in mobilizing a lead for the Census. Issues relating to each statistical operation are discussed in section 2.3.

Recommendations Legal and Institutional

It is recommended to strengthen the coordinating functions of the M and E Unit. The M and E Unit should provide a stronger role in:

* Setting standards: advising on the statistical work programmes, in setting quality standards for the data and statistical procedures used to produce the data ; and in establishing appropriate classifications and definitions.
* Monitoring, Assessing and Aiding: in addition to the current M and E function which monitors the outputs of work of each agency, the unit should play a role in ensuring that the statistics produced by the agricultural statistics system meet a set standard and that the statistical production follows good practice, making use of up to date methods and new technologies which can provide efficiencies. This would cover both keeping up to date on the statistical processes within agencies but also serving a function to assist agencies in improving their statistical procedures.

The current institutional structure can be utilized. Focal points are already embedded in each agency, and it is recommended to re-start the previously existing Committee, for instance through monthly meetings of the focal points with the M and E unit to provide updates on statistical work, to manage arising issues with statistical production and to share information on areas of work.

* In order to enable a more active role of the M and E unit in providing advice to the agencies, it is recommended that an M and E officer rotates among agencies, working with each one for example one day a week. This would enable an in depth knowledge of the statistical processes and therefore enhance an understanding of challenges faced and appropriate solutions. To fill this role it is recommended to provide an additional staff member, who has statistical training or can be trained, be appointed to the M and E unit.
* The understanding of evidence based policy and benefits of statistics is growing among policy users. However, to strengthen this and to ensure appropriate support needed for statistical data collection and analysis it is recommended that statistics be included as an item on the agenda of the Heads of Agency meetings.

## Human Resource Capacity

The statistics in each agency are produced by technical officers within the agency. While the numbers appear sufficient for the tasks, the officers are not trained statisticians, and particularly within NAREI and Livestock Development Authority, because estimates need to be produced from what is not a complete coverage of production, an understanding of the nature of statistical inference is necessary. The officers producing statistics have either a bachelors or diploma level at the minimum, with some at Masters and PhD level. Most have the capacity to implement new methods and show a willingness to incorporate new technologies into statistical processes.

There is a need for further training of officers within agencies, not only on specific methods, but also on the basic procedures and codes of practice which should be followed when producing official statistics. The presence of an M and E officer working more closely with each unit would be suitable for this purpose.

Recommendations Human Resources

* Ongoing on the job assistance from an M and E officer to agencies in order to implement procedures to improve statistical standards and methods.
* In the absence of available trained statisticians, particularly for NAREI and GLDA, further training is necessary on statistical procedures, validation etc.

## Statistical Operations and Processes and Dissemination and Technical Assistance Assessment

### Monitoring and Evaluation (M and E) Unit, Ministry of Agriculture

The Monitoring and Evaluation (M and E) Unit of the Ministry of Agriculture, monitors the Service Level Agreements (SLAs) with the agencies; for 2015 agreements are held with Fisheries, GLDA, GMC, GRDB, NAREI and PTCCB. The agreements set out the agreed performance indicators between agencies and Ministry of Agriculture.

The Unit also monitors the indicators of the National Agriculture Strategy 2013-2020, the Risk Management Strategy and the Food and Nutrition Security Strategy. The indicators of the SLAs nest within those of the National Agriculture Strategy.

The Unit is also compiling an Annual Agriculture Statistics Bulletin for 2014. The data has been compiled and further commentary describing tables and highlight the key message about the sector is planned. Training assistance for agencies to contribute to the data analysis for written aspects of report has been requested.

For 2015 the Unit is coordinating the completion of the FAO questionnaires with the agencies. Other coordination functions are discussed in Section 2.1

The unit consists of four officers, with two trained with the Bureau of Statistics.

Recommendations M and E Unit

* Institutional recommendations for coordination and oversight are covered under Section 2.1.
* As recommended in Section 2.1 the unit requires an additional officer to assist agencies in implementing statistical methods and standards.
* A one stop site is recommended for dissemination on the Ministry of Agriculture’s web site. The site should indicate what data and variables are available but can provide links to individual agencies web sites if the agency wishes to retain data ownership. The quarterly meetings of the M and E focal points with the unit can provide an opportunity to coordinate and agree on data published, where multiple agencies produces the similar data.
* In order to prioritize necessary improvements, the M and E Unit is recommended to set out a work programme for 2015 for actions this year, outlining the statistical standards to be implemented by agencies.

### Bureau of Statistics

The National Bureau of Statistics uses the agricultural statistics as inputs into national accounts. The inputs are the quarterly crop and livestock production, exports of crops and consumer prices. These are currently supplied through contacts in the M and E unit which serves as focal point for the Bureau with the agencies. Previously each agency would report individually to Bureau of Statistics.

The Bureau serves as coordinator for the national statistical system set up under the 2005-2009 IDB project. The project included the Ministries of Education, Health, Labour and Home Affairs. As part of this the DevInfo platform was set up for data dissemination. However, data has not been regularly submitted to the Bureau for upload to the data base. The national statistical system set up did not include Ministry of Agriculture.

In terms of data useful for food security statistics the Household Budget Survey 2006 was collected and tabulated.

### Guyana Marketing Corporation (GMC)

GMC produces statistics on agricultural prices and exports.

*Prices*

Retail and producer prices are provided for 11 markets, published daily, weekly, monthly and quarterly. The products covered are comprehensive across the non-traditional crops sold in the markets, covering fruits, ground provisions, legumes, meat, seasoning and vegetables.

The main markets covered are:

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|  | Region |
| Bourda | 4 |
| Stabroek | 4 |
| Anna Regina | 2 |
| Black Bush Polder Farmgate | 6 |
| Charity | 2 |
| Kumaca | 1 |
| Mc Kenzie | 10 |
| New Amsterdam | 6 |
| Parika Farmgate | 3 |
| Parika Opengate | 3 |
| Rosignol | 5 |

Retail and producer prices are regularly reported for the main markets and for approximately half the markets in total, and a very good time series is available from 2010. In some regions, the producer markets are ‘ad hoc’ in that farmers arrange with buyers a time and date for purchase and transport the produce via canals leading to the farms to sites along the main roads where they are met by the buyers. This increases the difficulty of collection of producer prices as there is not a regular, fixed market and buying times may take place outside of regular working hours or on weekends. There is a shortage of staff for data collection in the interior regions and additional staff would be required to increase the number of markets collected. The cost of data collection is also higher in the areas without fixed markets, as collectors would require over time payments.

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| --- | --- | --- | --- |
| **11 markets** | **Region** | **Wholesale** | **Retail** |
| Bourda | 4 |  |  |
| Stabroek | 4 |  |  |
| Anna Regina | 2 |  |  |
| Black Bush Polder Farmgate | 6 |  |  |
| Charity | 2 |  |  |
| Kumaca | 1 |  |  |
| Mc Kenzie | 10 |  |  |
| New Amsterdam | 6 |  |  |
| Parika Farmgate | 3 |  | NA |
| Parika Opengate | 3 |  | NA |
| Rosignol | 5 |  |  |

Data is collected using paper forms and entered at the GMC head office. Regional collectors call in their prices to head office. Collection at city markets (Bourda and Stabroek) takes place 3 times a week; and other markets once a week. The price collectors should cover 4 vendors, although this is sometimes limited to 1-2 vendors due to difficulties in cooperation. The standard method sets out an initial random selection of vendors with subsequent collection from the initially selected vendors for continuity. It has been reported that there is sometimes difficulty with cooperation. For City Markets prices are received by HQ at the time of collection and for other markets either weekly or monthly.

Conversions sheet from local units to standard units are the national average, these have been recently updated 2 years ago.

The agency has 7 data collectors and 3 analysts at the GMC headquarters (BA and diploma levels).

*Export Statistics*

Export data for commodities against the Harmonized System Classification giving quantities (weight) and value is produced monthly, quarterly and annually. The export data is compiled from three administrative sources. Data coming from the Guyana Revenue Authority, National Plant Protection agency, the exporters and the Caribbean Airlines. The GMC makes good use of the various sources to cross-check the data. Data is readily available for primary products but there is difficulty in obtaining data on agro processed products from non-traditional crops.

*Quantities:* Data from the GRA is used to identify the list of producers intending to export in that month. The GRA data is reported against the Common External Tariff of the Caribbean Community which uses the classification of the Harmonised Commodity Description and Coding System of the WTO. The data reports only the intention to export which may vary from actual exports. Used alone it can overestimate levels of export. The GMC verifies the final exports through the Caribbean Airlines airway bills, exports using the GMC packaging facility (packaging is mandatory for all exports to Caribbean and US) and the plant quarantine certificates (although these later can also show intention to export). These sources provide the quantities of actual exports for each commodity. Exporters not on one of the other lists for the month may be called to verify their exports for the month. An extensive range of additional data sources is used for validation and cross-checking of final export quantities.

The GRA list is comprehensive in terms of potential exporters and the names listed are matched against the other data sources. The description of products can be aggregated in the airway bills in which case the breakdown is obtained from the exporter or from the packaging facility data. The GMC processes approximately 30-40 exporters per month out of a total of 75 exporters. Matches are identified manually from the names but in the context this is feasible as the number of exporters is manageable and well known.

*Values:* While the weight is identified directly from the data sources. The value is estimated using a free onboard value formula developed by GMC. The formula takes the average farmgate price per month for fresh produce plus costs for the exporter, multiplied by quantities to give the value. This is checked against the value given in the GRA export list.

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| **Administrative sources used to produce export data items** | **Administrative data used to produce national statistics** |
| GRA  Source: Exports by defined commodity list | Exporter name, weight, customs value, value per kg, destination  Classification: Common External Tariff of the Caribbean Community |
| National Plant Protection | Commodity and weight |
| Caribbean Airlines Airway Bill | Commodity and weight |
| GMC packaging facility | Commodity and weight |
|  |  |

*Dissemination*: The agency has a wide range of dissemination products. A monthly bulletin is prepared which is included in the monthly and annual reports to the Ministry. The bulletin provides for each product, a graph of the trends, and a description of the trend from month to month and compared to the previous year for exports and prices . The price data is disseminated on the GMC website, and is up to date up to 2015. A range of reporting is available through the web based data base. The Stabroek News newspaper provides a free weekly report and an SMS service is also available for a number of crops. The agency has highlighted that policy makers frequently request projections of process and explanations for the trends in exports.

A wide range of data products is available and these could be further communicated, for example, the monthly bulletins could also be published on the website. Further outreach is also needed to inform farmers of the products available (“communication for development”) and to identify the best dissemination method for reaching the farmers.

The agency has a well documented guide to the procedures used for producing statistics and could consider publishing a summary of the methodology to assist users with interpretation of the data, particularly for price data collection where mis-understanding of price collection dates and times can affect user perception.

*Production*

The GMC held responsibility for agricultural production data in 2014. A pilot method for a statistical survey on production of non-traditional crops was held with the technical assistance of FAO. At the time of the assessment the results were still pending. From 2015 the responsibility for production statistics has been transferred to NAREI.

Recommendations GMC

* Additional field staff and budget is required to improve collection in the regions.
* Greater dissemination of data products to the farmers and communication of the data products available
* Preparation and publication of metadata for public understanding

**National Agricultural Research and Extension Institute (NAREI)**

NAREI has been responsible for providing statistics on non-traditional crop production from 2015. Estimates are calculated for non-traditional crops: fruits, vegetables, root crops. Derived products are not estimated. Internal estimates are produced monthly and a quarterly report on production is sent to the Ministry giving acreage, yield and production. National data is available and regional data is available internally as part of the data compilation process. There is no public dissemination of the data. The estimates are for each individual crop, there is no classification in use for aggregate groupings.

The data is collected by field extension officers who are intended to cover their entire regions comprehensively. During the field visits for extension work, the officers collect data based on what is seen on the ground: crops grown, acreage under each crops (or number of plants), variety, stages of growth, issues and total acreage of farm and total area cultivated. Acreage is collected not final harvested production quantities. Officers are intended to cover their entire region at least every 3 months and ideally 1 time a month.

Data is submitted in paper forms and entered by a data entry clerk in the Agency to a SQL database. Extracts are produced in excel for working on the crop production estimates. The method for deriving the final crop production estimates is not well recorded. There is known to be an undercoverage by extension officers but the methodology for deriving the acreage of farmers not enumerated by the officers was not established during the mission. For vegetables and root crops, acreage is calculated directly or using a factor applied to the number of plants. Yield is intended to be estimated from a quarterly sample of 100 farmers to estimate the yield per crop – taking the weight and spacing of number of plants. These usually are taken between January to July. The method of selection for farmers is ad hoc and the farms selected are decided by the extension officers. However, it was mentioned that yield estimates are also based on the variety and estimate of the number of harvests over the month or period of the visit. In those cases is not known the extent to which other factors which reduce yield are accounted for such as rainfall, pests, fertilization. Fruit production is difficult to collect from the field and data from fruit processors is used.

There is known to be an under coverage with the directly collected data not reflecting the full acreage, although coastal areas are better covered than hinterland, particularly main coverage gaps are in regions 1, 7, 8 and 9. Very small (acres??) farmers are also known to be less well covered. The vegetable crops are of short duration and the visits by extension officers will miss those crops harvested between visits. The extent of the under coverage is not precisely known: the frequency of visits to districts by the extension officers can provide some indication of which districts were visited but not of the number of farmers visited per district. It is known that a substantial portion of fruit produced for sale is grown as scattered backyard fruit trees. This source is not covered by the extension reporting. In addition, use of data from fruit processors would not cover fruit sold directly.

The acreage recorded covers crops which are ready for harvest and those that are still in growth stage. It is not clear how the methodology differentiates between these stages in making the final production estimates.

There are two coordinators: the coastal and hinterland. Under these are sub-district officers and there are 69 extension agents covering the 10 regions. The number of extension officers is adequate to cover the extension work of the districts.

The regional offices are all equipped with a PC but not all have access to the internet. The extension reports are compiled into excel in the regions and sent to head quarters, with the hard copies sent later. Where internet is not available a call centre is used. NAREI would like to record the GPS coordinates of the farms and GPS equipment is needed for the 69 extension officers.

There is no data produced on post harvest losses, costs of production and data on uses of agricultural inputs (fertilizers, pesticides), farm sanitary practices is also lacking.

**Registers**: A list of certified farmers for export is available. Certification is required for export to Barbados, Antigua and St. Lucia.

NAREI also compiles a database of farmers visited by extension officers since 2012. There are 16,000 farmers listed in the database with the variables, Name, Address, contact number, location of farm, no of workers, total acreage and acreage cultivated as well as date of field visit and field personnel. The dataset is not culled for farmers no longer in operation.

Recommendations NAREI

* Given the difficulties in obtaining a 100% coverage of farms by extension officers, who also have to fulfill other duties, it is recommended to pilot test a sample based method such as the Non-Traditional Crops Survey Pilot conducted with FAO Technical Assistance in 2014.
* A comprehensive set of basic data is lacking such as on agricultural inputs, number of farmers and holdings, number of trees, numbers of farmers producing crop types. Best use is made of extension officers to collect this information but the coverage is not systematic. As such an Agricultural Census is recommended which would provide a comprehensive view of the agricultural structure. This would also allow for better validation of the monthly reporting of extension officers.

**Guyana Livestock Development Authority (GLDA)**

The agency produces monthly production statistics on fresh meats (chicken, pork, beef, mutton and goat); milk and eggs (table and hatching eggs). A quarterly report is produced on animal production for internal use within the Ministry.

Chicken meat – virtually all hatching eggs are imported therefore the numbers are fairly well known. The chicken meat production is calculated by applying coefficients to the number of hatching eggs for meat which include parameters for mortality, weight and growth rate to maturity.

Chicken eggs – likewise the no of layers are derived from the number of hatching eggs used for layers, and an applied coefficient for lifespan of the chicken and no of eggs per day/week.

The number of duck eggs and duck meat is not well known but is thought to be relatively small.

Beef – Cattle breeds in Guyana are primarily Creole. Beef production figures are obtained from slaughter points in regions 4, 9 and 6. There are 30-40 slaughter points. Legally cattle must be inspected and certified before slaughter. A coefficient is applied for body weight and killing out percentage (the amount of live animal that ends up as carcass). The number of cattle by sex and age are not estimated. Some slaughter takes place outside of the official slaughter points and this is not captured.

Pork – pork meat production is collected from abatoirs and from reports from extension officers.

Mutton – meat production is reported by extension officers

Milk – extension officers report on numbers of cows in milk cycle and coefficients are applied to give milk production.

There is no data available on processed meats or dairy products.

A 2013 Survey was carried out to determine livestock numbers and included demographic details, socio-economic variables and land ownership. However, it was not conducted using a statistical sampling scheme and the required coverage was not achieved.

The estimates are produced by the Head of Agency. There are also ten regional coordinators who compile the basic reports from extension officers.

The use of technical conversion factors, for example meat per slaughtered animal, off take rate, milk production per cow/day, eggs per hen, dry matter intake/day per animal, weight gain per kg of dry matter intake, is a valid methodology when the technical conversion factors are verified by a technical conversion factor survey. These have been shown to over estimate production if not valiated (Longin and Pica Cammara. Technical conversion factors can become obsolete and may not reflect improvements in animal productivity or policy interventions by the Ministry to improve production.

To be useful, such conversion factors need to be applied to accurate numbers of stock by animal type, age and sex. These are not currently available in Guyana, and are usually available from an Agricultural Census.

Recommendations GLDA

* For the livestock sector, an agricultural census is required to obtain up to date numbers of livestock by type, age and sex.
* After stock numbers are obtained it would be recommended to conduct a technical factor survey to update the technical conversion factors.
* The method for generating estimates should be documented.
* Efficiencies in time can be obtained by setting up excel templates which the relevant officer (s) can use to calculate the estimates.

**Pesticides and Toxic Chemical Control Board (PTCCB)**

The Board provides data on imports of pesticides . Toxic chemicals are both imported and manufactured in Guyana. The data is compiled to the WHO Classification of Pesticides by Hazard 2009. The data is provided to the Ministry in an Annual Report and is also of value to importers.

The industry is highly regulated and any production, import or export must be licenced. Pesticides are entirely imported and the PTCCB therefore has oversight of all pesticides entering the country. The importer must first be registered as authorized to import such products; and each import shipment must receive a licence for import. On arrival, the shipment is checked by customs officers against the Import Licence granted.

The list of importers is thus known and the amount entering the country is also known. The licence is given only for the exact quantity being imported, therefore the amount licenced is equal to the amount entering the country. The quantity and values are collected from the import licences. It is assumed that use and imports are equal, with low levels of stocks. Illegal imports were not reported to be a major issue.

There are four persons in the team, the Registrar, Head of Unit and two Inspectors. The data is manually entered from the licences onto excel sheets. Given that only a few variables are required and the data is obtained directly from the licences the system appears to work well.

Recommendations PTCCB

* Aggregate data should be published
* Data production officers should receive training on basic statistical procedures

**Guyana School of Agriculture (GSA)**

GSA is a tertiary education institution. The Food and Nutrition Focal Point for the Ministry of Agriculture is a GSA staff member. The institution is primarily a user of data with main interest in 1. weather data for use on the AgroMeterology courses, Water Management, Soil Science and Crop Husbandry courses. 2. Price data – which is used in the farm practical by students to calculate business models for agro processing. The models use seasonality, supply of production and pricing to justify the agro processing models. This is combined with financial data on credit, loan availability and interest to identify business opportunities 3. Cost of production analysis and projections for animal husbandry and crop production courses.

Although not all the data needs of the GSA are met, where data has been available, the GSA has experienced difficulty in accessing the data that is available. There is also evidence of some misunderstanding of certain data sources.

Recommendations Guyana School of Agriculture

* This highlights the need for a consolidated platform for data distribution discussed in section 3.1 and for publication of metadata to guide the user in the understanding and appropriate uses of the data which is available.

**National Drainage and Irrigation Authority (NDIA)**

The NDIA records water levels of reservoirs and rainfall data. These are recorded daily. The agency also tracks levels of salinity for monitoring effects on crop yields. The NDIA data is focused mainly on the tasks of monitoring drainage and reservoir levels for overall water supply.

The agency has piloted a GIS project to digitally map the drainage network. Drainage is the purview of several agencies and the current mapping and information on the network is scattered. A listing of the Drainage Network Infrastructure has been initiated but remains to be completed.

There is a lack of data on water and irrigation use at farmer level, such as type of irrigation used, amount of water, area of crops irrigated by type etc.

Recommendations NDIA

* Lack of data on irrigation by farmers is a major gap for the agricultural sector. Such data is necessary to understand impacts on yields and production – looking at yields of irrigated and non-irrigated crops, and to plan interventions for improving access to irrigation or use of modern irrigation methods by farmers.

**Hydrometerological Department**

The hydrometerological department supplies meterological data, agrometerological research, data on water flow and aviation data.

A network of meterological stations is in operation and was reported as being in good working order. There appear to be a sufficient number of staff for monitoring the manual stations and in more remote locations automated stations are in place. Meterological data is recorded daily on rainfall, and synoptic data on sunshine, wind speed and temperature.

Water data is collected on discharge, flow from rivers and canals, water quality and water level from rivers and canals

The agrometerology section has been piloting an AgroMet Survey with farmers in the Buxton Friendship Area. The survey has only been run once so far, on a limited number of farmers up to 12, and the aim is to identify areas for developing advice on crops based on weather patterns, particularly regarding pests. Types of questions asked are type of farm, main crops, main pests, weather, yields and seasonal forecasts. The section has recently been re-instated in 2013 and operates with four staff members. Further support is needed to strengthen the unit and enable further research activities.

Recommendations Hydromet

* Further strengthening of the agromet unit and coordination with NAREI

**Guyana Rice Development Board (GRDB)**

The rice crop in Guyana is produced primarily by small farmers but regulated by GRDB. The GRDB produces national statistics on production and export of rice. The export data source is the rice export documents which are approved by GRDB. These record the product (paddy or white rice), quantity and value for sale, and buyer. The reports are produced monthly and data is captured from export forms within 1 week.

There are 10 staff who prepare the invoices and 1 staff who compiles the statistical database.

Production Data – is collected by extension agents in regions 9, 2, 3, 4, 5 and 6. There are 14,000 agents who cover weekly the farms. The District Rice Extension Officer is from the area.

Additional data is obtained from the rice mills on quantity of paddy, millers, and sellers. All rice sold domestically for food consumption or exported as white rice is milled would capture all rice production except feed, seed and paddy exports.

A SQL database - farmers database is being compiled with Farmers name, Last name, cell phone and farm address. As well as a loan database with 207 farmers.

Recommendations GRDB

* An agricultural census would assist in verifying the registry of rice farmers. This would aid the work of extension officers and in assessing the completeness of the officers weekly coverage of farms.

**Fisheries Department**

The fisheries department collects data on aquaculture and marine production. Aquaculture is collected for region 6 and as the industry is small and of recent development, the aquaculture producers are known. Data is collected monthly from the producers on weight of Tilapia, Tambaqui, Rockhead Basher, Blackstripe, Mullet and and Hassar. In addition, a quarterly report is produced and circulated to Chief Fisheries Officer. Some aquaculture takes place in other parts of the country but is not collected.

Fingerling production and sales is reported from the two government hatcheries giving number of sales and total value. There are some private hatcheries which are not reported.

Marine production from artisanal fishing– is collected from a sample of landing sites in regions 2, 5 and 6 twice a week. Data on catch and effort is collected, including the weight and length is taken for a major species by gear type. The raising factor used was determined in the 1990’s when the system was set up. The raising factor which reflects the total number of boats and is needed to determine the total catch from the sample is provided by the Frame Survey. The use of the Frame Survey in updating the raising factor has not been stated and in general the procedure for creating the estimates is not well documented.

Industrial fishing of prawns and seabob is collected from processing forms of processing plants which are sent monthly. All trawlers for prawn and red snapper are licenced so the number are known. For Marine Stewardship Council certification the Vessel Monitoring System using logbooks is essential, and certification is required for the export market of seabob.

Exports are obtained from export licence data which reflects intention to export. This gives weight, value and destination per species but as discussed with other agencies the licences reflect the intention to export and may not match the final shipment.

Inland fishing is not monitored and is not on a large scale

A frame survey was conducted 3-4 years ago recording boat and gear types by landing sites. This would have recorded artisanal vessels and industrial trawlers operating at those landing sites. Artisanal fishing vessels are not required to be licenced. However, all industrial trawlers are licenced.

Market sampling is also conducted at four major fish markets twice a week in regions 2, 4, 5 and 6 and two supermarkets. A retail and wholesale species list is compiled and sent weekly to the Senior Fisheries Officer.

There are 2 field officers in regions 2 and 6 and 1 in region 5. At head office there are 3 junior staff and 2 fisheries officers who check the data, although estimates are produced by only 1 officer.

The data system is based on a survey method established during the 1990sThe data is held on excel sheets with the various officers involved. Although data is reported to be collected regularly, it is scattered with various officeres and procedures for estimation, and other metadata are not well documented. This inhibits the use of the data for policy and research analysis.

Recommendations Fisheries Department

* The system is designed to cover the majority of fish production. However, the total extent of aquaculture and fingerling producers is not known. This information could be collected in the listing of an agriculture census.
* The methodology used was developed with technical assistance and the data collection from the landing sites is reported to occur regularly as per sampling design. The raising factors should be reviewed based on the recent frame survey.

**Guyana Lands and Surveys Commission**

The Lands and Survey Commission holds the National Land Use Plan. In terms of data sets relevant to statistics, all administrative boundaries are digitized as vector files. The census Enumeration Areas have not been digitized. A 5m RapidEye satellite imagery from 2012 is held but is not entirely cloud free.

Land use Land cover mapping is held produced in 2013 for most of the coastal area; and another data set from a 2001-2002 DFID funded field study. Land tenure is held solely for urban areas. The purpose of the study was for classification of terrestrial land, and as a land cover classification contains detail in the classes for non-managed areas, particularly forest.

The Land Cover/Land Use Classification Classes used in the existing data set are:

|  |  |
| --- | --- |
| Built up Area | Residential, commercial and industrial development |
| Bare land | Includes bare soils and bare previously cultivated land |
| Cropland | Agricultural land (rice, sugar, cash crops etc) including fallow land |
| Inland water-body | Freshwater lakes, rivers, streams |
| Plantation | Tree crops |
| Grassland | Hebaceous ecosystems formed by grasses and non-grass plants less than 5m tall. Woody elements may be present either singly or clumped but do not form a continuous canopy |
| Shrubland | Vegetation types where the dominant plants are woody perennials, generally more than 0.5 m and less than 5m in height on maturity and without a definite crown |
| Forest | A woody vegetation type with trees taller than 5m and a canopy cover of more than 10% |

There is no data set on the land use for agriculture using the classification recommended by the FAO World Census of Agriculture. As a land use classification the information cannot be obtained solely from remotely sensed imagery as it requires information from the farmer on types of crops planted, time periods the land is put to rest etc. As an Agriculture Census has not been collected in recent years this data is not available.

The FAO World Census of Agriculture recommended land use classes are which show greater detail in distinguishing the agricultural land use:

|  |
| --- |
| **LU1.** Land under temporary crops |
| **LU2.** Land under temporary meadows and pastures |
| **LU3.** Land temporarily fallow |
| **LU4.** Land under permanent crops |
| **LU5.** Land under permanent meadows and pastures |
| **LU6.** Land under farm buildings and farmyards |
| **LU7.** Forest or other wooded land |
| **LU8.** Area used for aquaculture (including inland and coastal waters if part of the holding) |
| **LU9.** Other area not elsewhere classified |

Recommendations Lands and Surveys Division

* It is recommended to digitize census EAs into vector files
* There is a lack of land use/land tenure data targeted to the agriculture sector. The conducting of an Agriculture Census would supply this data. Thematic maps at a small scale could then be produced of the location of the various lands, etc. This would also provide an opportunity to geo-reference the location of agriculture holders, which would provide a useful data set.
* The lack of a National Spatial Data Infrastructure creates difficulties in understanding what data is available. There are various agencies involved in statistics who have initiated GIS units. There is a need for further high-resolution data sets for statistical data collections and a NSDI would help the various agencies to promote GIS, ensure that the system and GIS products develops in a coherent way.

## Statistical Infrastructure

Statistical infrastructure refers to the information which can be used to build a survey and structural data which can help to generate estimates. This typically refers to statistical frames, variables available for stratification/grouping of holders; cartography necessary for production estimates. Various agencies are collating farmer registers: NAREI, GRDB. This is a good start in developing a master sample frame of all holders, but in order to verify completeness a complete list of holders by type of production would be needed from the agricultural census. A methodology for keeping the register up to date is needed at present agencies rely on extension officers reporting of changes which does not necessarily catch all changes systematically.

Statistical infrastructure also refers to the statistical concepts, definitions, and classifications in use. The classifications in use are in line with international standards for trade (HCS) , pesticides (WHO). Data on crops is not classified but the MoA is working on classifying crops according to the CPC 2 classification.

Statellite imagery and georeferenced data. There is a recent high resolution base data imagery available from RapidEye and digitization of administrative areas. However, the census enumeration areas are not digitized. Digitized EAs would assist in updating of EAs and in conducting agricultural surveys. Building up the data sets available with georeferenced data of holders and farms would also be useful.

Recommendation Statistical Infrastructure

* Digitization of census EAs
* Comprehensive creation of register for statistical purposes only from Agricultural Census

## Physical Infrastructure and Equipment

Only NAREI, GRDB, GMC, are using a database system. In NAREI this is not fully utilized as the final data is not stored on the database but in excel sheets, the database is used for data entry and for the farmers register. In NAREI and GLDA , the final estimates are located with one officers, and in other agencies fisheries, several data sets exist and are scattered on the desktops of several officers. The PTCCB data is produced using excel sheets but this is sufficient as there are relatively few variables for input data and final estimates.

Recommendation Physical Infrastructure

Final aggregated data estimates should be consolidated and available internally to staff through a public shared space. Microdata should be archived on an appropriate database system. A more appropriate work flow needs to be set up with different datasets or tables within the database for raw data received, and validated and estimated datasets. Public dissemination has been discussed in section 2.1.

## Dissemination

Dissemination of statistics both for internal use within the Ministry of Agriculture as well as for the public is lacking. Statistical updates are included in the monthly and annual reports to the board of each agency, but there is a lack of data in electronic form for further analysis and to inform technical work. Datasets are often held on individual PCs which can lead to lack of data sharing. This also means data archiving and metadata are not available.

Recommendations Dissemination

* Development of a one stop dissemination hub
* Develop metadata and archiving for all data sets, based on DDI standard. This would ensure institutional memory of data production processes and assist users in further use and analysis of data

# SWOT Analysis

|  | **Strengths** | **Weaknesses** | **Opportunities** | **Threats** |
| --- | --- | --- | --- | --- |
| **Use of Data** | Reports to the Ministers | Not in readily digestible form | Private sector demand for data  SLA frameworks incentive for greater evidence based reporting |  |
| **Legal and Institutional** | M and E unit set up  Focal points available in each agency | Need to strengthen M and E Unit for coordination of statistical system |  |  |
| **Financial Support** |  | Funding is needed for TA, and census data collection | Resource partners IDB, IICA can be explored for funding opportunities |  |
| **Human Resources** | Heads well educated PhD.  Generally some staff with BA in economics or quantitative degree  Need for more staff with stats training in each agency part livestock and narei | Lack of knowledge of stat principles  Strengthening of staff in regions supervision of collection etc | Willingness to explore new methods and techniques |  |
| **Statistical Operations and Processes** | Willingness to explore new methods  Data is produced regularly | Methods lack baseline data from the Agricultural Census  Unable to update methods without baseline data  Several datasets not well distributed even internally  Updated methodologies require review for key data sets  Some gaps exist in key variables: irrigation, structure of agriculture | New methods tested GMC | Funding for work on new methods |
| **Statistical Infrastructure** | Several agencies use database systems and online dissemination  Officers have good basic education or higher level education  International classification in use for pesticides and trade | Up to date frame is lacking  Farm register lacking  Varies widely, regions not well serviced with IT  No classification in use for crops | GIS units in NDIA and Lands and Surveys  Farm registers initiated | Lack of funding to implement GIS work |
| **Dissemination and Archiving** | Regular monthly or annual reports with data | Lacking a common dissemination hub or one stop shop. Variety of products available need links to these.  Lack of stats products (analytical report or datasets)  Data not available internally or to public in form suitable for further analysis (excel/database9 | Core statistical bulletin in process | Disagregated nature of data production and lack of coordination in dissemination procedures  Lack of metadata and archiving and documentation of methodologies. |
| **Infrastructure** |  | Regions lack IT equipment |  |  |

# Assessment of Data used in Guyana Monitoring and Evaluation (M and E) Frameworks

The assessment of the M and E frameworks starts from the M and E indicators developed by the Ministry of Agriculture M and E Unit for the Service Level Units and the Food and Nutrition Strategy. For each indicator, whether statistical data is required has been identified and the appropriate data sources. In some cases the indicators require only qualitative data or administrative records of the agency, which is not covered by this assessment. It is not an assessment of the M and E system itself.

Assessments of the data sources are presented in section 2.3 and details of the data in the accompanying excel sheets

# Assessment International Frameworks

## Global Strategy Minimum Core Data

Global Strategy Core data items related to economic production are available for the main data sets of crop and livestock production, trade, prices and pesticides. The quality and completeness of the data have been discussed in Section 3. However, several other key economic variables are not available, particularly those on stocks and inputs which are basic data for agricultural sector. The baseline for these data would be supplied by the Agricultural Census. These are presented in the accompanying excel sheets.

Social and environmental indicators fall outside the scope of the Ministry of Agriculture and are therefore not addressed in the assessment.

## FAO Questionnaires

The Ministry of Agriculture could usefully indicate for each crop and livestock product listed, for its records, whether it is produced in Guyana or not.

The detailed classification of land use required (as indicated in the accompanying excel sheet) is not available. Areas irrigated by land use is also not available. The Agriculture Census data would provide this information at least for agricultural land area; land uses and irrigation for forests, inland waters, coastal waters and EEZ would be derived from other sources .

The FAO Questionnaire on Primary Crops Production : estimates are generally available for area harvested and production for Primary Crops Production. These are estimates derived from administrative data and the methodology requires updating. Primary Crops Utilization requires data on feed, industrial use, food, seed and industrial use. This data would not be available for non-traditional crops but may be estimated for sugar and rice.

Livestock Data requires animal numbers of total stocks and number of females. This is not available for any animal species. Meat production requires slaughtered animals and production quantity. Number of slaughtered animals is not available but production quantities have been estimates, although the methodology also requires updating. Milk production requires milking animals and production quantity. Number of milking animals is not available but production quantities have been estimates. Eggs production requires number of laying animals and egg production in numbers and quantity. These figures have been estimates. Honey production is not estimated.

Derived commodities : data is available for main derived products of sugar, margarine and shortening and alcohol.

# Training

## Human Resources

|  |  |  |  |
| --- | --- | --- | --- |
|  | Statistical Producers | Education | Stats Capacity |
| Ministry of Agriculture, M and E Unit | 4 | 1 PhD Economics, 1 agro economics MSc, 1 BA Economics, 1 msc public health, 1 diploma agri | Good – 2 trained statisticians including unit head |
| Guyana Marketing Corporation | Georgetown Office Analytical Staff – 3 staff | 1 BA Economics; 2 diploma in agriculture | Good |
|  | Price Data Collectors – 7 collectors | 2 Georgetown, 5 other regions | The collectors are well trained in their job but could benefit from exposure to understanding how their data feeds into the final estimates |
| NAREI | 1 data processor (Coastal Coordinator) + 1 Coordinator Interior , 1 data entry clerk | BA/Diploma | Production estimates are complex and would require greater understanding of basic principles of official statistics and the nature of statistical inference from a sample.  Only one staff has understanding the estimation process |
|  | Extension officers , data collection |  | The extension officers would need further training on an updated methodology and awareness of how their data is used in the final estimates. |
| GLDA | Livestock dev- lopement specialist , 1 clerk | PhD head of office; Diploma level clerks | Production estimates are complex and would require greater understanding of statistical principles and the nature of statistical inference from a sample.  Only one staff has knowledge of the estimation process |
| Pesticides | 1 person + supervisor | BSc level | Knowledge of statistics is limited but sufficient for the data and methodology used. Further understanding of basic principles of official statistics would assist the staff . |
| MDIA | 1 database clerk and 1 engineer GIS | 2 BSC level | Data produced is specialized to drainage in the expert area of the staff |
| Hydromet | 1 head agro met unit +3 staff | BSC/Diploma level | Data produced is specialized to hydrometerology in the expert area of the staff |
| Fisheries | 1 clerk | BSC/Diploma level | Expert has good knowledge of fisheries statistics but only one staff has understanding the estimation process |

## Training Plan

Titles of training sessions. The priority training sessions are:

* Data organization, cleaning and validation – this session would address the basic statistical needs of agencies. It would cover organization of the work flow, cleaning the data, validation and cross-checking with other data sets.

Applicable to all agencies

* Data analysis and presentation – this session would present simple methods of data description and analysis of key trends and highlights for a standard statistical bulletin.

Applicable to all agencies

Additional training sessions depending on availability of funds:

* Food Balance Sheet compilation – this would cover use of crop and livestock data for food balance sheets
* Food and Nutrition Security Indicators - this would cover production of FNS indicators based on food balance sheet data

Applicable to M and E Unit, GLDA, NAREI and FNS focal point

# SUMMARY OF RECOMMENDATIONS

Recommendations Legal and Institutional

It is recommended to strengthen the coordinating functions of the M and E Unit. The M and E Unit should provide a stronger role in:

* Setting standards: advising on the statistical work programmes, in setting quality standards for the data and statistical procedures used to produce the data ; and in establishing appropriate classifications and definitions.
* Monitoring, Assessing and Aiding: in addition to the current M and E function which monitors the outputs of work of each agency, the unit should play a role in ensuring that the statistics produced by the agricultural statistics system meet a set standard and that the statistical production follows good practice, making use of up to date methods and new technologies which can provide efficiencies. This would cover both keeping up to date on the statistical processes within agencies but also serving a function to assist agencies in improving their statistical procedures.

The current institutional structure can be utilized. Focal points are already embedded in each agency, and it is recommended to re-start the previously existing Committee, for instance through monthly meetings of the focal points with the M and E unit to provide updates on statistical work, to manage arising issues with statistical production and to share information on areas of work.

* In order to enable a more active role of the M and E unit in providing advice to the agencies, it is recommended that an M and E officer rotates among agencies, working with each one for example one day a week. This would enable an in depth knowledge of the statistical processes and therefore enhance an understanding of challenges faced and appropriate solutions. To fill this role it is recommended to provide an additional staff member, who has statistical training or can be trained, be appointed to the M and E unit.
* The understanding of evidence based policy and benefits of statistics is growing among policy users. However, to strengthen this and to ensure appropriate support needed for statistical data collection and analysis it is recommended that statistics be included as an item on the agenda of the Heads of Agency meetings.

Recommendations Human Resources

* Ongoing on the job assistance from an M and E officer to agencies in order to implement procedures to improve statistical standards and methods.
* In the absence of available trained statisticians, particularly for NAREI and GLDA, further training is necessary on statistical procedures, validation etc.

Recommendations M and E Unit

* Institutional recommendations for coordination and oversight are covered under Section 2.1.
* As recommended in Section 2.1 the unit requires an additional officer to assist agencies in implementing statistical methods and standards.
* A one stop site is recommended for dissemination on the Ministry of Agriculture’s web site. The site should indicate what data and variables are available but can provide links to individual agencies web sites if the agency wishes to retain data ownership. The quarterly meetings of the M and E focal points with the unit can provide an opportunity to coordinate and agree on data published, where multiple agencies produces the similar data.
* In order to prioritize necessary improvements, the M and E Unit is recommended to set out a work programme for 2015 for actions this year, outlining the statistical standards to be implemented by agencies.

Recommendations GMC

* Additional field staff and budget is required to improve collection in the regions.
* Greater dissemination of data products to the farmers and communication of the data products available
* Preparation and publication of metadata for public understanding

Recommendations NAREI

* Given the difficulties in obtaining a 100% coverage of farms by extension officers, who also have to fulfill other duties, it is recommended to pilot test a sample based method such as the Non-Traditional Crops Survey Pilot conducted with FAO Technical Assistance in 2014.
* A comprehensive set of basic data is lacking such as on agricultural inputs, number of farmers and holdings, number of trees, numbers of farmers producing crop types. Best use is made of extension officers to collect this information but the coverage is not systematic. As such an Agricultural Census is recommended which would provide a comprehensive view of the agricultural structure. This would also allow for better validation of the monthly reporting of extension officers.

Recommendations GLDA

* For the livestock sector, an agricultural census is required to obtain up to date numbers of livestock by type, age and sex.
* After stock numbers are obtained it would be recommended to conduct a technical factor survey to update the technical conversion factors.
* The method for generating estimates should be documented.
* Efficiencies in time can be obtained by setting up excel templates which the relevant officer (s) can use to calculate the estimates.

Recommendations PTCCB

* Aggregate data should be published
* Data production officers should receive training on basic statistical procedures

Recommendations Guyana School of Agriculture

* This highlights the need for a consolidated platform for data distribution discussed in section 3.1 and for publication of metadata to guide the user in the understanding and appropriate uses of the data which is available.

Recommendations NDIA

* Lack of data on irrigation by farmers is a major gap for the agricultural sector. Such data is necessary to understand impacts on yields and production – looking at yields of irrigated and non-irrigated crops, and to plan interventions for improving access to irrigation or use of modern irrigation methods by farmers.

Recommendations Hydromet

* Further strengthening of the agromet unit and coordination with NAREI

Recommendations GRDB

* An agricultural census would assist in verifying the registry of rice farmers. This would aid the work of extension officers and in assessing the completeness of the officers weekly coverage of farms.

Recommendations Fisheries Department

* The system is designed to cover the majority of fish production. However, the total extent of aquaculture and fingerling producers is not known. This information could be collected in the listing of an agriculture census.
* The methodology used was developed with technical assistance and the data collection from the landing sites is reported to occur regularly as per sampling design. The raising factors should be reviewed based on the recent frame survey.

Recommendations Lands and Surveys Division

* It is recommended to digitize census EAs into vector files
* There is a lack of land use/land tenure data targeted to the agriculture sector. The conducting of an Agriculture Census would supply this data. Thematic maps at a small scale could then be produced of the location of the various lands, etc. This would also provide an opportunity to geo-reference the location of agriculture holders, which would provide a useful data set.
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Recommendations Dissemination

* Development of a one stop dissemination hub
* Develop metadata and archiving for all data sets, based on DDI standard. This would ensure institutional memory of data production processes and assist users in further use and analysis of data