

AGRICULTURE SURVEY 2019



For selected islands



AUTHOR:

Ms. Aishath Laila

LAYOUT DESIGN & COVER ARTWORK:

Ms. Aminath Musfiqa Ibrahim

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Maldives Bureau of Statistics
Ministry of National Planning, Housing & Infrastructure

in collaboration with
Ministry of Fisheries, Marine Resources and Agriculture

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Sampling Design was prepared by Ms. Aishath Laila. Preparations, implementation, and management of the survey in terms of the questionnaire design, training manual, data collection, coding, editing, and entry was led by Ms. Mari-

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Survey training was led by MOFMA with involvement of staff from other units of MBS.

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Planning and management of the survey operation was carried out, with the direct supervision and guidance of Ms. Aishath Laila and Ms. Mariyam Sajua, under the overall guidance of the senior staff of both MOFMA and MBS. Survey teams were supervised by MOFMA and MBS.

Ms. Aishath Laila wrote the agriculture survey report, Ms. Mariyam Sajua, and MOFMA provided technical inputs in finalisation of the report.

We hope the findings of the survey will be useful in improving relevant policies as well as to improve future agriculture surveys.



1

INTRODUCTION

In the Maldives, basic agricultural information concerning land utilisation, area planted, crop production and yield statistics and livestock numbers and production etc. are lacking. This lack of reliable agricultural statistics has made planning, policy analysis and formulation of development projects very difficult for the Ministry, NGOs and donor agencies.

Up until 2006, island administrative officials were required to mainly collect coconut production and other agriculture-related information from their local farmers, generally through farm visits and adhoc interviews. This information was then forwarded through their Atoll Office to the Ministry of Fisheries, Marine Resources & Agriculture (MoFMRA). However, this process of collecting agricultural data was discontinued around 2007 due to high non-response from many island councils and atoll offices and also questions over the collection processes adopted by island officials and subsequent concerns with the quality of information provided.

Currently MoFMRA's agricultural data activity is primarily limited to the collection of volumes and wholesale prices of commodities (mainly fruit and vegetables and fish) arriving by boat to supply the market in Malé, the Maldives' Capital. Retail prices of these commodities at the Malé market are also collected. These collections are undertaken over two hours (10am – 12 noon) per weekday (Sunday to Thursday).

There are varying estimates as to what proportion of the nation's total crop production is traded through this market, with estimates ranging from 25% to 65%, however there are no national production data available upon which to verify this proportion.

Fisheries data have been collected continuously since 1959, with current reporting of tuna and other off-shore species catches via logbooks completed by fishing boat operators. The response rate is generally high as renewal of fishing licenses is conditional upon compliance in submitting logbooks when required.

Data collection of reef fisheries remains problematic, as the reef fishers are not obliged to report their catches. Whilst the total catch of reef fisheries is low compared to the tuna

fisheries, it has a substantial value for the local economy. Reef catches, particularly at the household or subsistence level are not collected.

No agricultural or fishery census has been conducted in the Maldives and it would appear that no nationwide or large-scale sample survey of agricultural and/or fishing households has been conducted, at least in the past decade.

There is a clearly identified need to introduce some form of regular and sustainable statistical system in the Maldives to produce the type and quality of agricultural and fisheries information needed to guide evidence-based decision making. The timely availability of accurate and relevant agricultural data and business statistics is critical to the formulation of policies and strategies as well as the monitoring and evaluation of sector performance.

The challenge for the Maldives, the Ministry of Fisheries, Marine Resources & Agriculture and Maldives Bureau of Statistics (MBS), as with a number of other Asian and Pacific Island nations, is to find the necessary resources, both financial and human, to enable it to deliver and maintain a regular and sustainable agricultural and fisheries statistics system into the future, including regular data collection activities. Financial resources, including an adequate budget to both introduce and sustain such a statistical system will be critical, including the provision of adequate statistical and support staffing in both MoFMRA and MBS, with appropriate administrative funds to support field activities.

FAO through its global strategy to develop an in-depth country assessment (IdCA) of the agricultural and rural statistics system in the Maldives was commenced in September 2015.

The IdCA identified several areas of agricultural and fisheries statistics in the country which required technical assistance and support. A country proposal for short-term technical assistance was prepared. The priority activities identified included: (i) development of a Master Sample frame for agricultural statistics; (ii) developing country capacity in the design and development of an agricultural survey and associated collection strategies, including the adoption of CAPI and mobile technologies; (iii) capacity

building to undertake analysis of fisheries data and produce analytical reports; and (iv) reviewing and strengthening the Malé Market produce data collection, assessing production and market arrival trends and identifying collection improvements.

In this regard, major documentation has been prepared for carrying out the agricultural survey. A master frame was prepared to conduct the survey islands in two categories namely; take place semi commercial production in the inhabited islands and a second category of commercial agriculture production long term leased islands.

Agriculture has potential for growth and creation of employment opportunities particularly for unskilled and semi-skilled people. Agriculture has contributed to the improvement of poverty and livelihood of the island communities and creating opportunities to empower women. Farming in the island community has contributed to the supply of local products within the communities and creating food security at times of crisis. However, in Maldives, the sector is not performing optimally due to different reasons.

No Agricultural Census or Agricultural Survey has been conducted before this and the country lack appropriate statistics to develop the sector. Main source of agriculture production data is from the agriculture produce traded in the Local Market established in the capital island, Male', collected by Ministry of Fisheries, Marine Resources & Agriculture (MoFMRA). As per this data, a total quantity of 2,600 tons of agricultural crops amounting to a total value of MVR 43.5 million were brought from other islands by boats, for sale in the local market in Male'. MoFMRA also

maintains a farmer's registry, which amounts to a total of 7,568 registered farmers by 2018.

The agriculture survey 2019 is the first attempt to design and implement a comprehensive survey to collect agricultural production data, much needed to improve the Gross Domestic Product estimates for the industry, promote evidence-based decisions to develop the industry, improve the food security and provide better employment opportunities for farming households.

Maldives Bureau of Statistics (MBS) together with Ministry of Fisheries, Marine Resources & Agriculture (MoFMRA) launched the Agriculture Survey on April 2019 for 11 islands which is well known as per MoFMRA for Agricultural production, among inhabited islands¹. This paper presents a brief finding of the survey results for these 11 islands. As the survey did not account for all the islands of the country, it is important to keep in mind that this survey results do not represent a comprehensive picture of agricultural production, land area under agricultural production, farming households or employment in the industry at a national level.

This report provides statistics on socio-demographic factors of the farming households of the survey. The survey also covers a wide range of agricultural production indicators with the view of facilitating evidence-based decision-making, policy development and monitoring and evaluation of agricultural development programs. Information on the agricultural holder characteristics such as gender and age are also covered.

¹ There are also uninhabited islands leased by MoFMRA exclusively for agriculture purpose on a long-term basis. By the end of 2018 there were 59 such islands leased out for commercial agriculture activities.

2

AGRICULTURAL HOLDER'S CHARACTERISTICS

In 2019, the total population of the islands selected for the survey was 33,442, out of which 11,504 comprises of the population living in agricultural households or 1 in 3 people live in an agricultural household. An agriculture household is defined as a household with an income from growing crops or with a leased island or raising livestock. There were more female than males living in these agricultural households, i.e., 53% vs. 47%. Even though there are more females, around 55% of the agricultural households are headed by male.

On average 6.2 people live in an agricultural household, with the largest households in Adh. Maamigilli, L. Gan & L. Fonadhoo as seen from Figure 1. When compared to overall household size in these islands from 2014 population and housing Census, the survey results revealed that on average an agriculture household have a larger household size. This could be due to the increase number of foreigners engaged in this activity and residing in these households may lead to a higher household size.

Figure 1:
Average household size for agricultural households by island

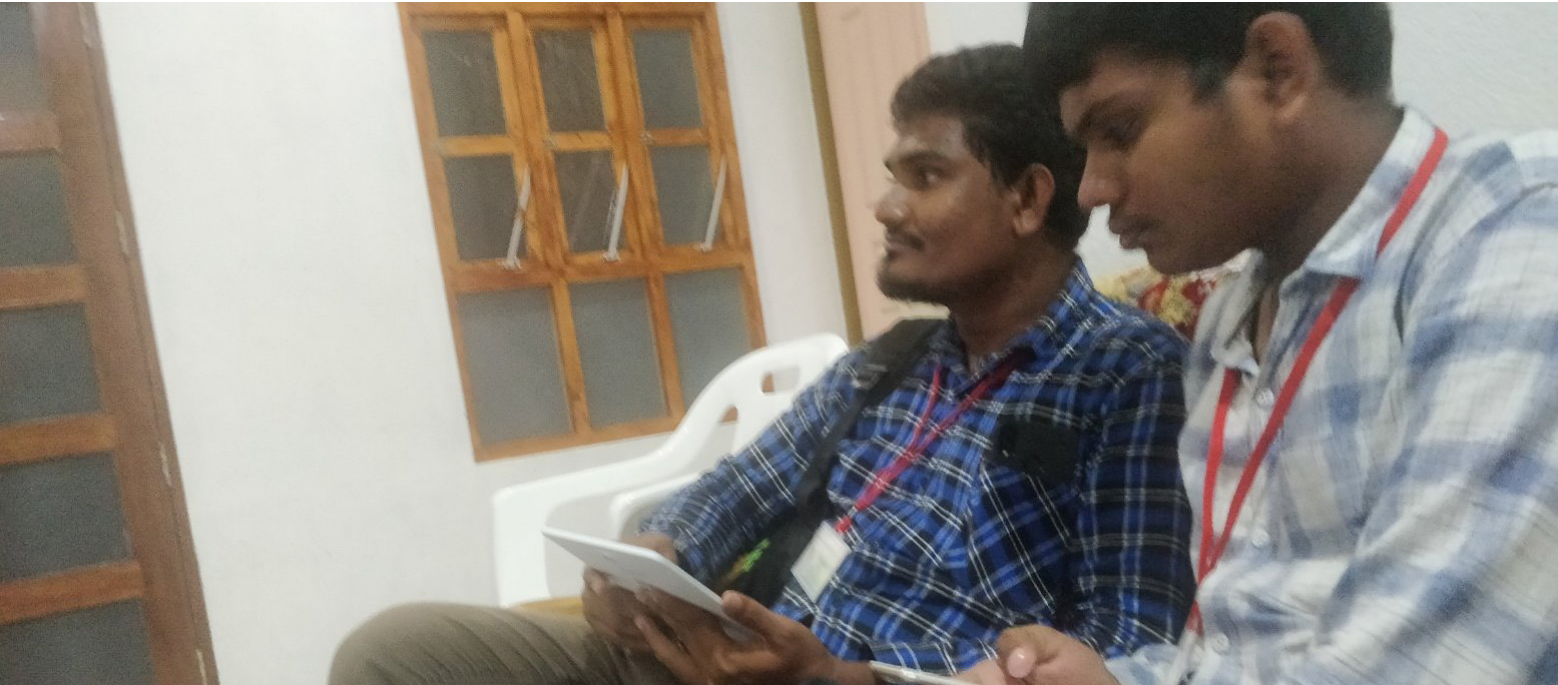
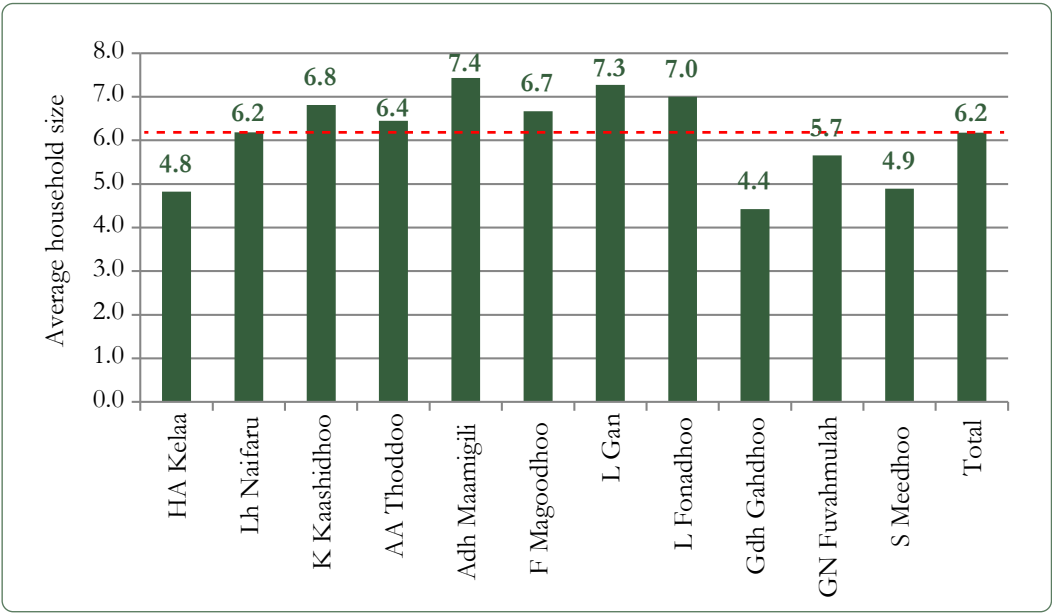
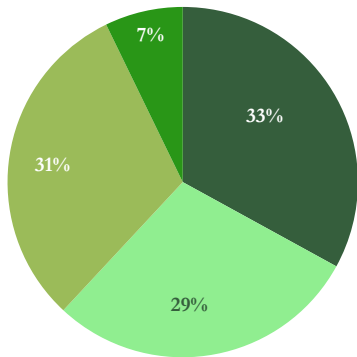


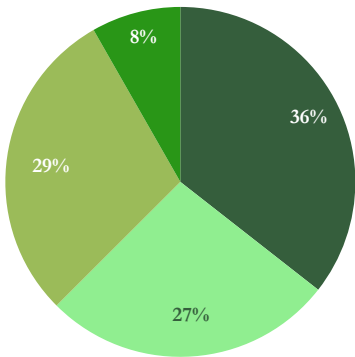
Figure 2 shows the distribution of population by broad age group. Breakdown of population in these households shows that 60% of them are working age population (15-64 years); that is, 31% of which is the adult population (31- 64 years) and 29% consists of the youth (18-34 years). The share of the child population in these households results to 33% in total. There is no significant difference between the overall distribution when compared to Census 2014.

Figure 2:
Population by broad age groups

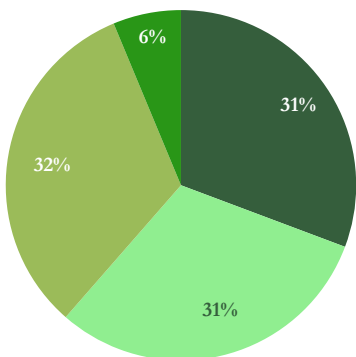
Population by broad age group for both sexes



Population by broad age group for Male



Population by broad age group for Female



■ Children (0-17) ■ Youth (18-34) ■ Adult (35-64) ■ Elderly (65+)

The dependency ratio is the ratio of children or elderly to working age population. This ratio suggests a country’s ability to support the young and old. Generally, the higher the age dependency ratio, the greater the proportion of children and old persons in relation to the working age population, and therefore, the greater the burden that the working age population has to carry. In contrast, lower age dependency ratios usually signify better prospects for rapid socio-economic development.

In 2019 the dependency ratio in these agricultural households is 67 percent, of which the child dependency ratio is 55 percent which indicate that 55 percent of the child population is dependent on the working age group (15-64 years) while 12 percent of the elderly population is dependent on the working age population. When compared the survey results with Census 2014, there is no difference seen in the dependency ratio among agricultural households with the rest of the households.

Employment in agricultural households

From the total 4,592 households surveyed, in 2019, 8,123 people who falls within the working age group (>15 years old) were living in the agricultural households. Out of these 4,950 were employed accounting to 61% of the population 15 years and above. This sums up to 2,188 were females while 2,762 were males.

The remaining 39% of the population were either unemployed or not in the labour force.

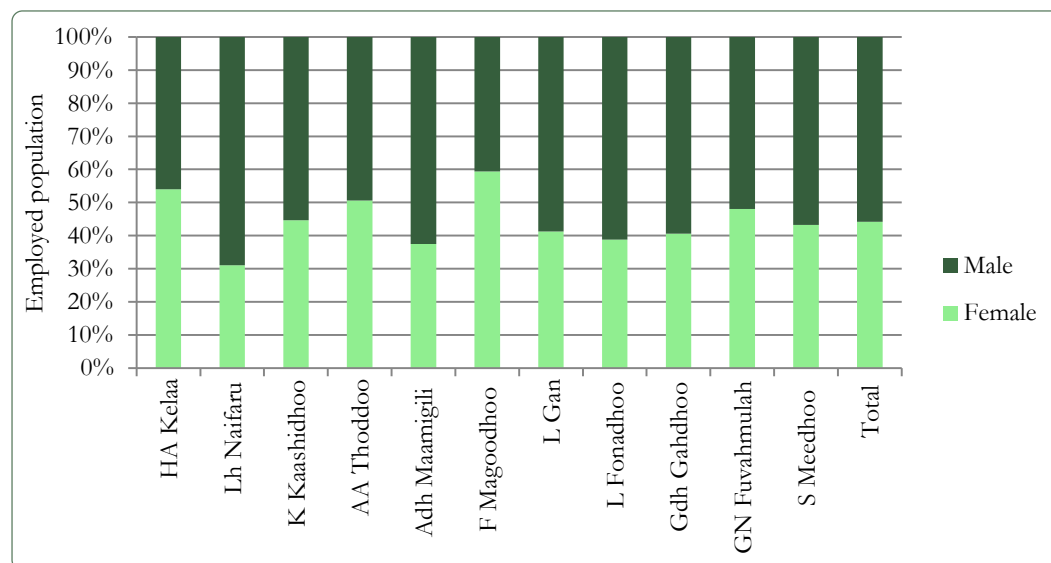
Of the 4,950 people employed, 1,176 (24%) people engaged in Agriculture & livestock (farmers) as their main activity; 1,154 farmers in crop production & 22 farmers raising live-

stock. 3,540 people of these households (72%) people engaged in another economic activity apart from agriculture, fisheries, aquaculture and raising poultry.

As a main activity, on average a both farmers & non-farmers work 11 months and 6 days per week. However, a non-farmer work 8 hours per day while a farmer work 4 hours per day in their main activity.

Out of 15 years and above population only 4% of the population engaged in agricultural activity without any remuneration/pay.

Figure 3: Percentage of employed population in agricultural households by gender, 2019



Compared to the male there were more female employed population in F. Magoodhoo, Ha. Kelaa & Aa. Thoddoo as seen from Figure 3. Apart from S. Meedhoo, more than 50% of the farmers are female (Figure 4). In terms of total

farmers, the majority of the farmers were seen in Gn. Fuvahmulah, L. Gan & Aa. Thoddoo. Only few farmers were seen in F. Magoodhoo, i.e., also all female.

Figure 4:
Percentage of farmers in agricultural households by gender, 2019

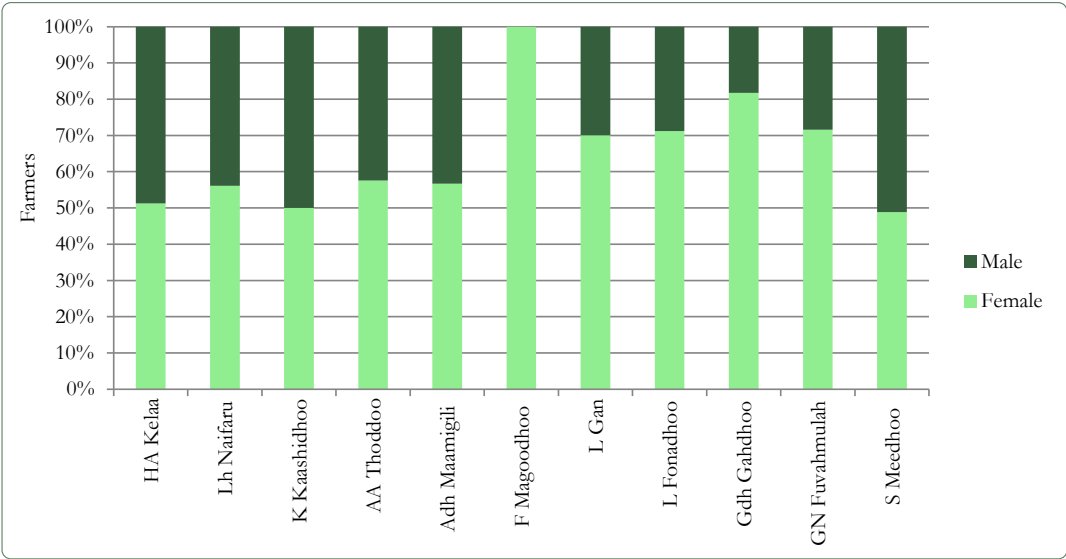


Figure 5:
Status of employment, 2019

Figure 5_a: Status of employment in all agricultural households (including farmers & non-farmers)- total employment

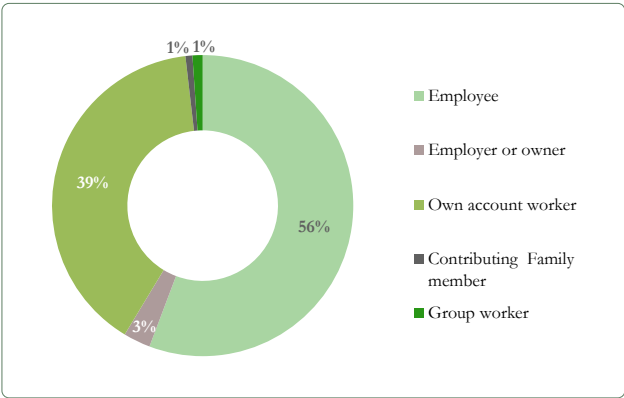


Figure 5_b: Status of employment ONLY for farmers (those who engaged in Agriculture & livestock)

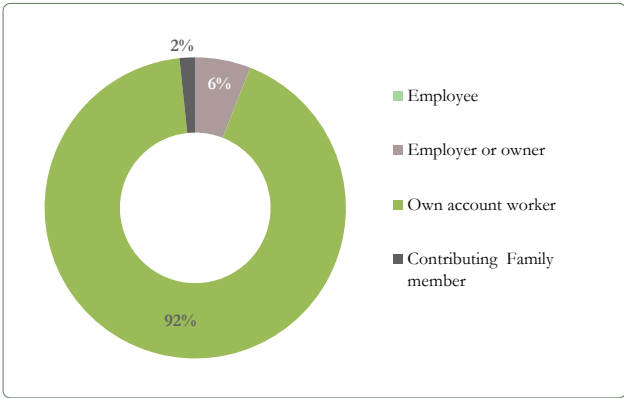


Figure 5 shows how the employed population in the agriculture households was divided according to type of employment (left panel shows total employed population while right panel shows ONLY farmers). Majority of total employed population in the agricultural households (total employed population including those engaged in agricul-

tural & livestock activity as well as other industries) were working as employees. While in the case of farmers (those who engaged in Agriculture & livestock) more than 90% of farmers were own-account workers. Few people work as contributing family members (1% of total employed population vs. 2% of farmers).



Secondary activity

Out of 4,950 employed people, 1,254 people –25% of the employed population- hold more than one job. The proportion of men holding more than one job is higher (61%) than that of women with more jobs (39%). Out of those who have more than one job, 54% of these workers were farmers.

On average a farmer works 11 months per year while a non-farmer works 10 months per year in their secondary ac-

tivity. In terms of days, on average a farmer work 6 days per week while non-farmer work 5 days per week in their secondary activity. In both main & secondary activity a farmer work less hours than a non-farmer. On average farmer work 3 hours per day while a non-farmer workers 4 hours per day in their secondary activity. However, it can be clearly seen from Figure 6_b that that more people are engaged in farming as their secondary activity.

Figure 6:
Employed population by primary & secondary activity, 2019

Figure 20_a: Employed population doing a Primary activity by Island

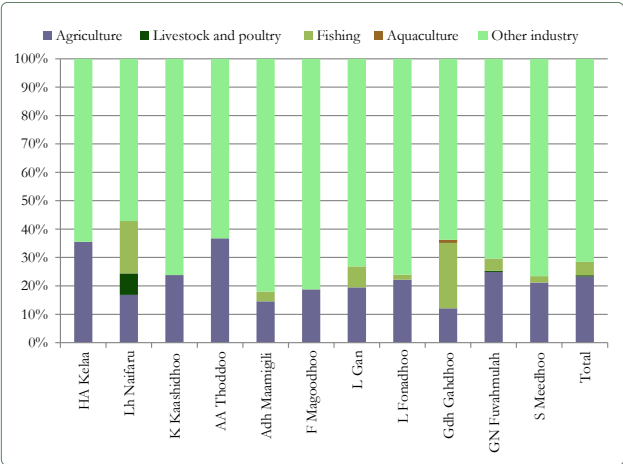
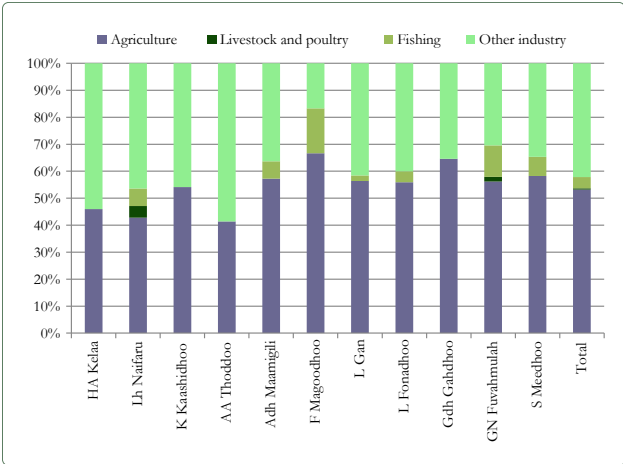


Figure 20_b: Employed population doing a secondary work by Island



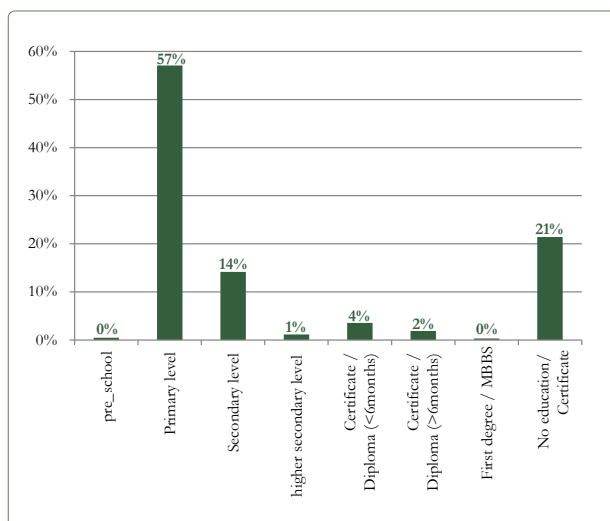
Educational attainment

The skill level of the employed population is to some extent determined by the educational attainment of employed population. In broad terms, it may be said that the larger the proportion of the employed population having higher level of education, the higher the skill level of the employed

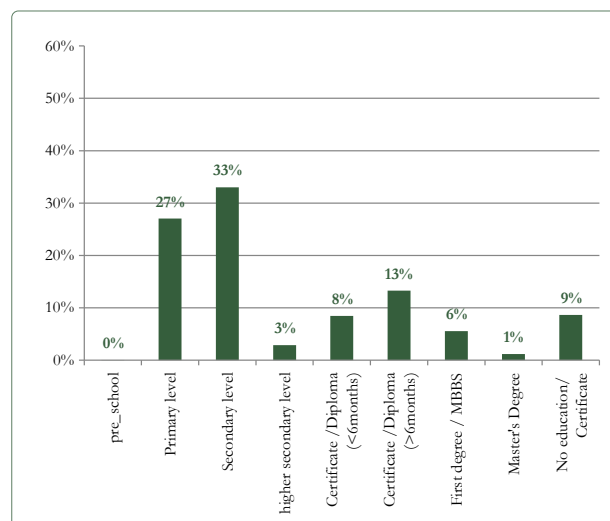
population. Also, it is widely recognized that there is a close relationship between educational achievement and employment opportunities. Figure 7 shows the distribution of employed population by highest level of education attainment achieved for farmers & non-farmers separately.

Figure 7:
Employed population by highest level of education attainment achieved, 2019

a. Farmers



b. Non-farmers



The data shows that non-farmers are relatively more educated than farmers. More than half of the farmers have studied till primary education level and 21% of the farmers have reported that they have no education/ certificate. More than one third of the non-farmers have attended secondary education while only 14% of the farmers have attended secondary education.

An educated farm labour is an important indicator to reach to be more open to the use of modern farming methods. However, education levels of the farm population are much

lower than the general population. In, 2019, only 5% of the farmers have certificate/ diploma qualification. Only 14% of the farm population had completed secondary school.

In Household Income and Expenditure Survey 2016 revealed that women have higher levels of education attainment than men. The result of this survey also confirmed that this also applies to those residing in the agricultural households. In 2019, 13% of women aged 15 and above in agricultural households had completed diploma & above level, compared with only 11% of men.



2

AGRICULTURAL HOUSEHOLDS

The 11 islands selected for the survey comprises of a total of 4,592 household in 2019, out of which the agricultural households account to 1,862 (41%); agricultural households meaning the household is involved in growing one or more crop or raised livestock. For these households, agriculture is an important source of income and an important food source for the household.

Most agricultural households are engaged in growing some type of crops. In 2019, 1,729 households were involved in growing crops, 221 household involved in cultivating floriculture/nursery while 57 households were raising livestock/poultry.

Many households were engaged in agriculture as a secondary activity; often they only have a small plot of garden crops or a few fruits trees.

Of the 1,729 crop households, 30% of the households are in Gn. Fuvahmulah while 16% of the households are in L. Gan and 10% of the households are in L. Fonadhoo, meaning these 3 islands cover more than 50% of crop households.

Table 1:
Number of Agricultural households by island, 2019

Island	Crop_Household	Livestock/Poultry_Household
HA Kela	6%	15%
Lh Naifaru	4%	69%
K Kaashidhoo	9%	0%
AA Thoddoo	8%	0%
Adh Maamigili	4%	0%
F Magooodhoo	2%	0%
L Gan	16%	0%
L Fonadhoo	10%	2%
Gdh Gahdhoo	4%	0%
GN Fuvahmulah	30%	14%
S Meedhoo	7%	0%
Total	100%	100%

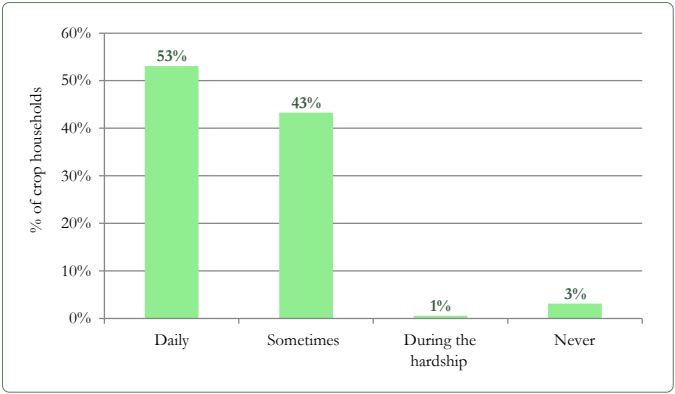
Main purpose of production

Most households grow crops for subsistence purposes. In 2019, 1,135 (66%) households were engaged mainly in subsistence agriculture. This means that crop households are predominantly small-scale subsistence producers, growing crops mainly for their own consumption.

Despite the vast numbers of households growing crops for subsistence purposes, agriculture is also a market-oriented activity. Among the total crop households, even though 1,071 households produced mainly for home consumption, some sold their produce at the market.

Among those crops produced for income generating purpose (1,729 households), 53% of the households have stated they consumed those crops daily while 43% of the households have stated that they consumed those crops sometimes, as seen from Figure 8.

Figure 8:
Crop households by the frequency of household consumption,2019



There were only 54 (3%) crop households producing solely for sale. This means a proper policy need to be address to improve and boost agricultural production as an income generating activity.



Size of holding – use for growing crops

The total area used for growing crops among the respondents was 185.66 hectares, representing 8% of the area of these 11 islands. The area covers farmland far from the households which were used for growing crops as well as the backyard/front yard of the households used for agricultural purpose. Table 1 below presents total crop holding area & the share of the crop holding area from the total

land area of 11 islands. Of these islands, K.Kaashidhoo has the largest area under cultivation (43.85 hectares) followed by AA. Thoddoo (35.62 hectares)

In AA. Thoddoo 22% of the total land area of the island was used for growing crops, K. Kaashidhoo 16% and S. Meedhoo 13% of the land was used for growing crops.

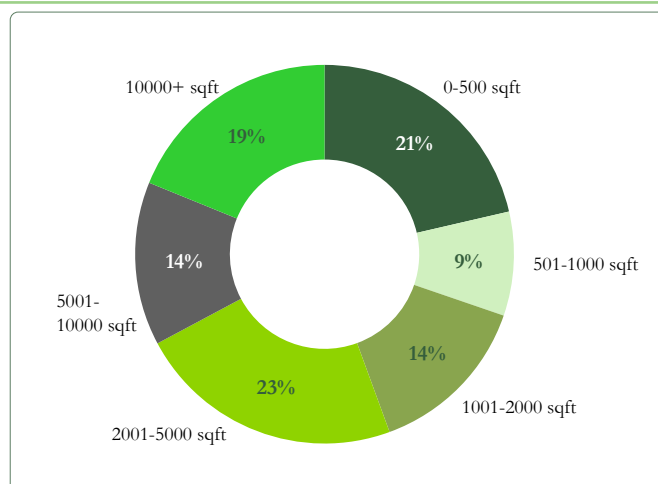
Table 2:
Area & the share of the land used for growing crops by island,2019

Island	Crop Area (in hectares)	Share of the land of island used for growing crops
HA Kelaa	14.93	7%
Lh Naifaru	2.09	4%
K Kaashidhoo	43.85	16%
AA Thoddoo	35.62	22%
Adh Maamigili	9.01	5%
F Magoodhoo	0.36	2%
L Gan	21.89	3%
L Fonadhoo	7.33	5%
Gdh Gahdhoo	3.83	6%
GN Fuvahmulah	23.57	5%
S Meedhoo	23.19	13%
Total	185.66	8%

Figure 9 depicts the share of the crop lands. Nearly one fifth of the crop land (i.e., 19%) were more than 10,000 square feet, 14% of the land were between 5,001-10,000 square feet and 23% used for growing crops were between

2,001 -5,000 square feet. While one-fifth (21%) of the crop lands were less than 500 square feet. These small areas (less than 500 square feet) represent mainly the backyard/ front yard area uses to grow crop.

Figure 9:
Share of the crop lands by land area used for growing crops,2019

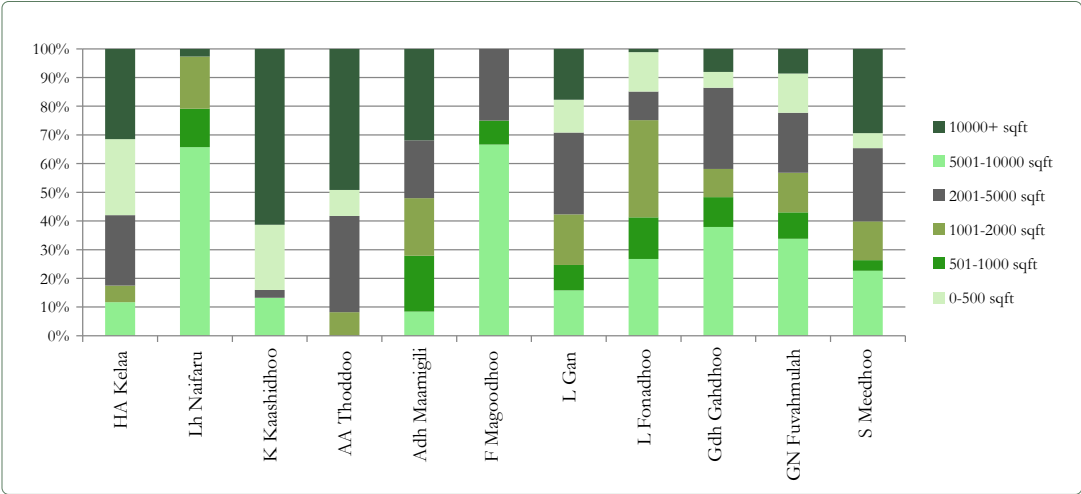


For the crop households, the average size of holding was 8,300 square feet. Farm sizes are larger in K. Kaashidhoo, S. Meedhoo & Ha. Kelaa as seen from Figure 10. In K. Kaashidhoo, the average size of holding is 20,000 square feet, with 70% of the crop households operating 10,000 or more square feet. In S. Meedhoo, the average size of holding was 14,000 square feet, with 36% operating 10,000 or more square feet. The average size of holding in Ha. Kelaa is 10,000 square feet, with 30% operating 10,000 or more

square feet of land. Out of the 11 islands, these 3 islands represent 50% of the land operated by the holders.

F. Magoodhoo & Lh. Naifaru were highly concentrated with small crop lands with less than 500 square feet. In F. Magoodhoo, 97% of the households involved in home gardening while in Lh. Naifaru, 88% of the households involved producing crops in the backyard of the home.

Figure 10:
Share of the crop households by Island & land area, 2019



Among those households engaging in some agricultural activities of the survey, 2% of the household have reported that they have land that is temporarily fallow (not used for agricultural purpose for at least 1 year but not more than 5

years). A total of 69 plots with the total area of 4.33 hectares were reported as temporarily fallow lands. More than 60% of them reported financial reasons for the temporary fallow lands.





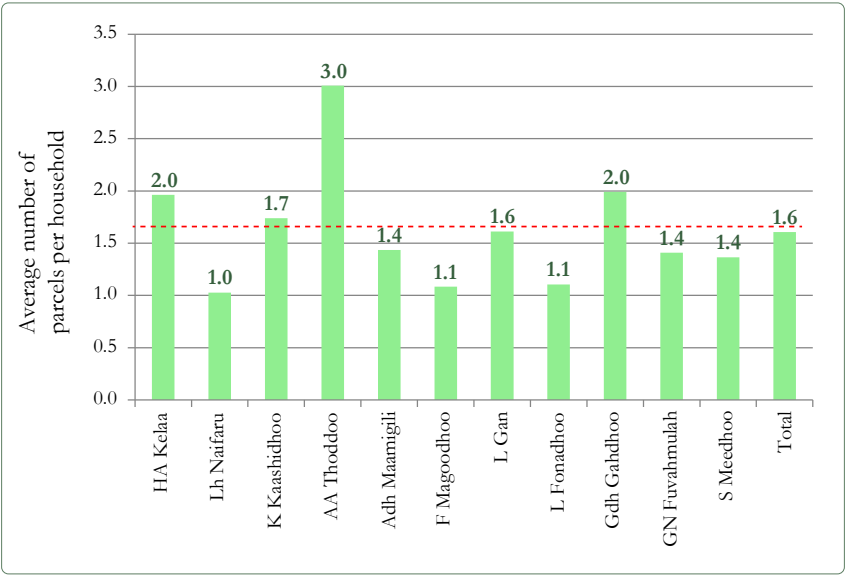
3

PARCELS OF
LAND

A total of 2,796 parcels of land was operated by the crop households. Approximately 20% of the crop households have two or more parcels of land. The average number of parcels per crop household was 1.6. Crop households in AA. Thoddoo have an average of 3.0 parcels which is

higher than the overall average. This was followed by Ha. Kelaa & Gdh. Gahdhoo where the average was 2.0 parcels per households. The average number of parcels in all other islands was below the overall average; 1.6 parcels per household except in K. Kaashidhoo.

Figure 11:
Average number of parcels per household by Island, 2019



Land tenure

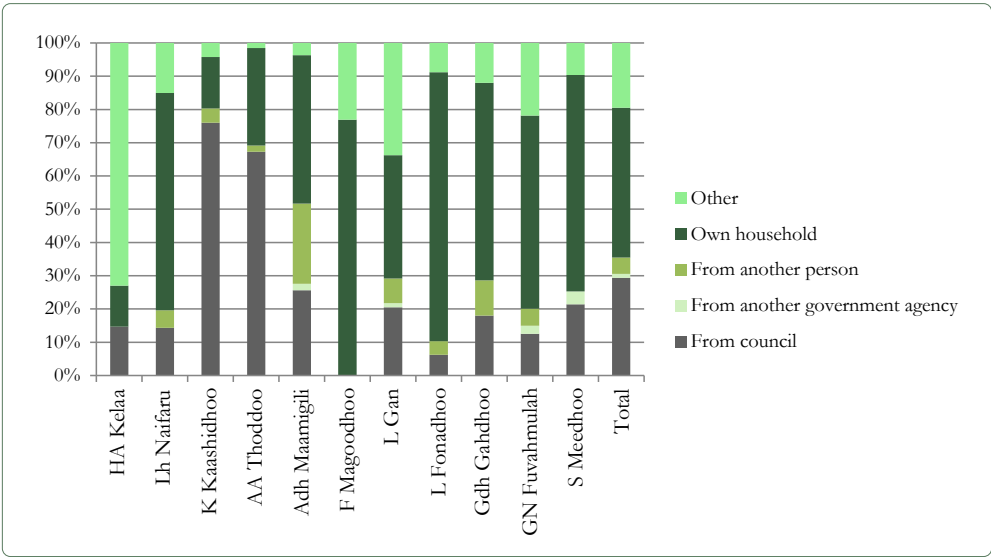
In Maldives, almost all the lands belong to the state. Maldives runs on a decentralized system where the local councils have the authority to lease or rent the land area according to their own regulations. In 2019, 45% of the parcels among crop households was within the household, which belongs to the household itself and 29% of the parcels belong to the island council office.

Crop production in the own household² is predominant in L. Fonadhoo (81%), F. Magoodhoo (77%), Lh. Naifaru (65%) & S. Meedhoo (65%). K. Kaashidhoo (76%) & Aa. Thoddoo (67%) has the highest number of farming parcels provided by the council.

In some islands such as Aa.Thoddoo, where agriculture is the predominant economic activity, each and every citizen

registered in the island is entitled to a parcel of agricultural land of certain size, which is free of charge and allocated by the council under their name. Oftentimes, the land area of all members in a family/household is combined and used by few of the adult family/household members for farming and they can get plots allocated adjacent to each other making it easier to combine the plots and farm in a bigger area. In addition to other crops, Aa. Thoddoo specializes in growing watermelon³. Therefore, to accommodate a higher production of watermelon, additional plots of land are allocated by the council to grow watermelon for the month of Ramadan. The production volume increases substantially during the Ramadan and with the increase in consumption of watermelon during this time of the year, the income generated often lasts for several months, during the year.

Figure 12:
Share of parcels by tenure type & Island, 2019



Out of the total number of parcels, 4% of the parcels were rented by the farmers. The average rental value of these rented parcels is MVR MVR 1,440.

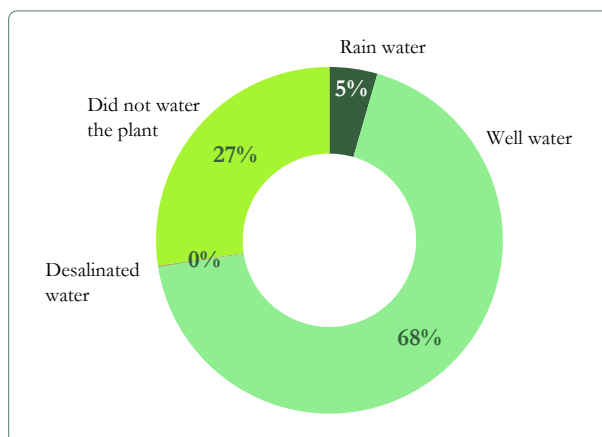
2 This includes backyard and front yard farming

3 According to the MOFA data on agricultural produce traded in the Male’ market in 2018, close to two third or 60 percent of watermelon was from Aa.Thoddoo, amounting to 120 thousand Kgs.

Type of water & irrigation system

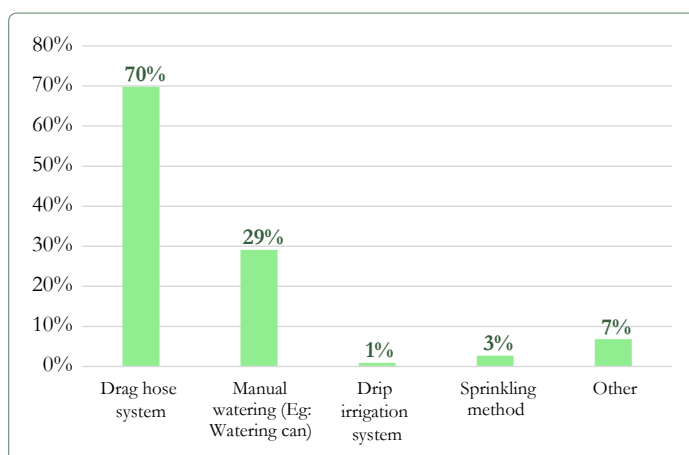
Rain water and well water were the two main source of irrigation used for the parcels. While 68% of the parcels mainly used well water for plants, 27% of the parcels were not irrigated at all. Permanent crops such as mango, and breadfruit requires regular watering when it is young and when these trees are matured, the plant, itself acquire water from ground water lense which is replenished during rainy season.

Figure 13:
Percentage of parcel by main water used for plants, 2019



Among the 1,747 of irrigated parcels, 70% of the parcel practice surface irrigation system using pump and drag hose to irrigate the plants. More than one-fourth of the parcels uses manual watering method i.e., using watering can. It is notable that, more than one method of irrigation is practiced for the same parcel.

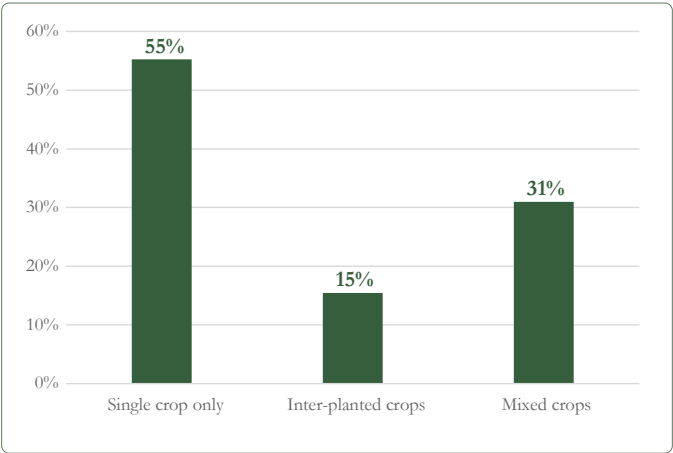
Figure 14:
Percentage of parcel by type of irrigation system, 2019



Cropping pattern

The cropping pattern included in the survey covers mono-cropping (single crop only), intercropping (additional crop grown in between the rows of main crop) and mixed cropping (growing multiple crops in a single piece of land). The most common method for cropping pattern was mono-cropping comprising of 55% of the cropping whereas approximately one third of the land used mixed cropping. Inter-cropping was the least used method accounting to 15%.

Figure 15:
Percentage of parcel by pattern of plantation, 2019





4

CROPS

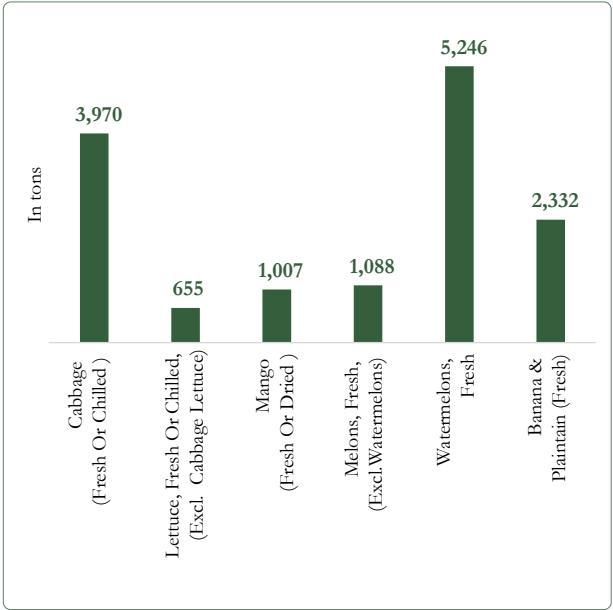
Imports

According to Maldives Import Data from Maldives Customs Service, 19,490.3 tonnes of fresh vegetables and fruits was imported into the country in 2019. The main 5 crops imported were Watermelon (5,245.9 tonnes), Cabbage (3,969.9 tonnes), Banana & plantain (2,332.3 tonnes), Melon (1,088.1 tonnes) & Mango (1,006.7 tonnes). Overall, 63% of the fresh vegetable imports were from India.

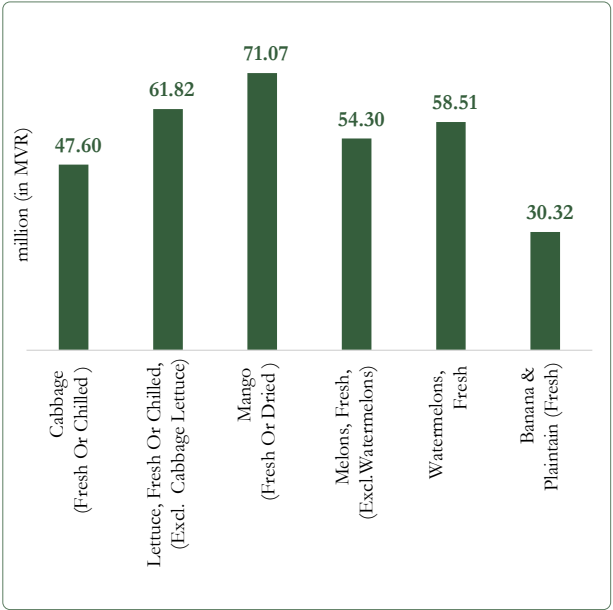
The import value of the agricultural produce imported accounts to MVR 514.95 million (CIF Value) in 2019. CIF value of Mango accounts to MVR 71.07 million which comprises of 14% of the total CIF value of the agricultural crop imports while 12% of the total purchasing of fresh agricultural crops was contributed by Lettuces.

Figure 16: Imports of fresh agricultural crops mainly produced in Maldives- Top 6 products in terms of tonnes & MVR, 2019

a. Imports of fresh agricultural crops mainly produced in maldives, Top 6 products, in Tonnes, 2019



b. Imports of fresh agricultural crops mainly produced in maldives, Top 6 products, in MVR, 2019

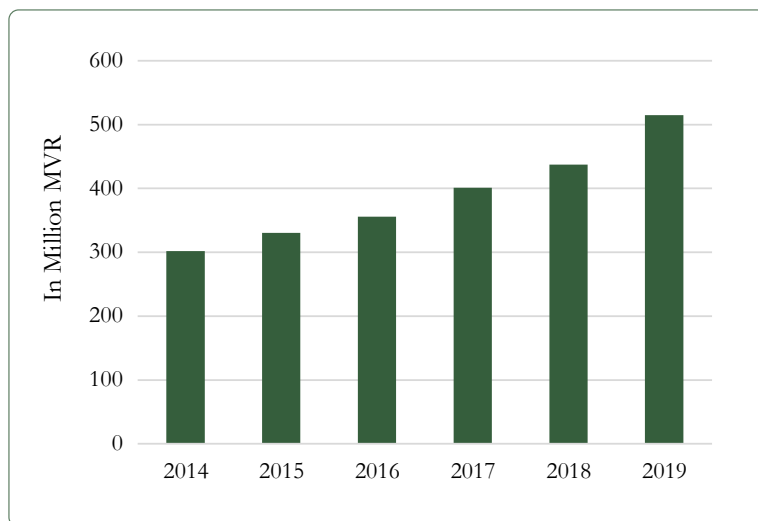


Source: Maldives Customs Services, Statistical Yearbook of Maldives 2020

An increase in the value of agricultural imports is observed from Figure 17. The CIF values of these imports has increased by 11% per annum from the year 2014 to 2019. The figures depict a huge demand for the fresh agricultural crops and a shortage in the local production simultaneously. However, the increase in the tourist arrivals is a significant factor for the increase in the number of imports. The

results of the survey show a demand curve indicate that with an increased supply, there is a market demand for these crops and policies must be formulated to increase the local production. This demand needs to be catered as much as possible by increasing local production in the country.

Figure 17:
Imports of fresh agricultural crops mainly produced in Maldives, 2014 – 2019



Source: Maldives Customs Services, Statistical Yearbook of Maldives 2020



Short-term crop – from survey data

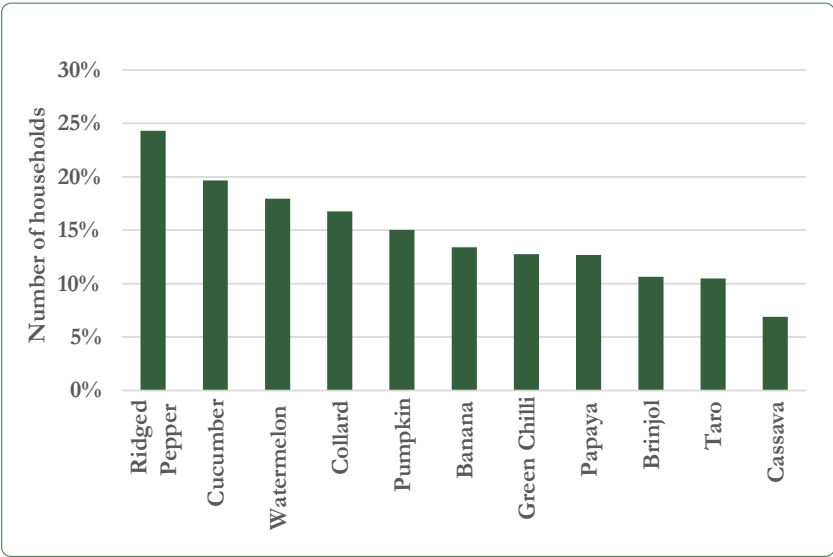
In 2019, 57% of the agricultural households in the selected islands grew one or more short-term crops. With approximately one-fourth of the households growing ridged pepper, the crop accounts to the highest short-term crop grown. From the 11 islands, Adh. Maamigili and K. Kaashidhoo had the highest production of Ridged Pepper whereas 54% and 44% of crop households grew the crop respectively. It was observed many farmers used containers (plastic) for growing Ridged pepper. On average each parcel had 453 plants. and plants are kept in growth for 1.5-2 year.

Cucumber is the second most commonly grown short-term crop which is followed by watermelon (see Figure 18)

Cucumber was a frequently grown plant in K. Kaashidhoo, Aa. Maamigilli, Adh. Thoddoo & Ha. Kelaa. The main planting medium being the land.

Aa. Thoodoo has often been presented as the watermelon island due to its high watermelon production. The production has been dominated in in Aa. Thoddoo, Ha. Kelaa & S. Meedhoo as per the results of the survey.

Figure 18:
Most commonly grown temporary crops- Top 11 products, 2019



Crop Harvest- Short-term crop

Information on average harvest, quantity sold and price variations in different crops was collected. This section presents the detail for short-term and long-term crops separately.

Table 3:
Short-term crops- Top 10 products based on harvest, 2019

Items	Average harvest cycle	Harvest				Sold				Damage		
		Gram	Kg	Piece	Sack	Gram	Kg	Piece	Sack	Gram	Kilogram	Piece
Watermelon	2	-	645,101	11,493	99	-	585,832	7,010	95	-	13,713	1,010
Papaya	1	-	606,062	3,397	25	-	554,477	1,075	22	-	38,728	324
Brinjal	5	-	555,380	185	1,589	-	233,458	70	1,454	-	3,560	-
Cucumber	3	-	403,129	16,874	1,126	-	378,505	6,790	1,053	-	4,754	-
Pumpkin	3	-	216,604	13,163	24	-	202,021	1,394	17	-	1,650	6
Yam	8	-	99,893	102,384	1,210	-	83,223	1,937	1,167	622	-	-
Bottle gourd	4	-	79,573	-	-	-	79,536	-	-	-	-	-
White gourd	3	-	76,812	672	-	-	76,794	-	-	-	-	-
Ridged Pepper	2	10,710	75,841	49,735	130	12,647	62,789	34,216	130	775	180	4

Even though ridged pepper was the highest in terms of growing crops, watermelon was the highest in terms of harvest. Results from the survey showed that most of the harvest were from watermelon, papaya, brinjal, cucumber, pumpkin and taro. On average these products were harvested four times a year.

A total of 645 Tonnes⁴ of watermelons were harvested during the past 12 months. Among the watermelon harvested, 586 Tonnes were sold and 233 Tonnes were damaged.

As the month of Ramadan is an anomaly in the production of watermelon in AA. Thoddoo, this time period was excluded in the data analysis. A total of 271 tonnes of watermelon was produced by AA. Thoddoo during Ramadan in the year 2019. The total production of watermelon throughout the year accounts to a lesser value of 171 Tonnes whereas the produce was mainly sold in the Male' Local Market through a middleman. Even with the exclusion of Ramadan, AA. Thoddoo had sold 21% of the total watermelon while S. Meedhoo was the second highest producer with a percentage of 14%.

In the cases of papaya, a total of 606 Tonnes were harvested. From these, 554 tonnes were sold while 38 tonnes were

damaged.

A total of 555 Tonnes of brinjal were produced over a year. However, 233 tonnes were sold while 4 tonnes were damaged.

Among short-term crops most damage was reported from papaya and water melon. From harvested items, more than 90% of the production was sold for water melon, papaya, cucumber, pumpkin, bottle gourd & white gourd.

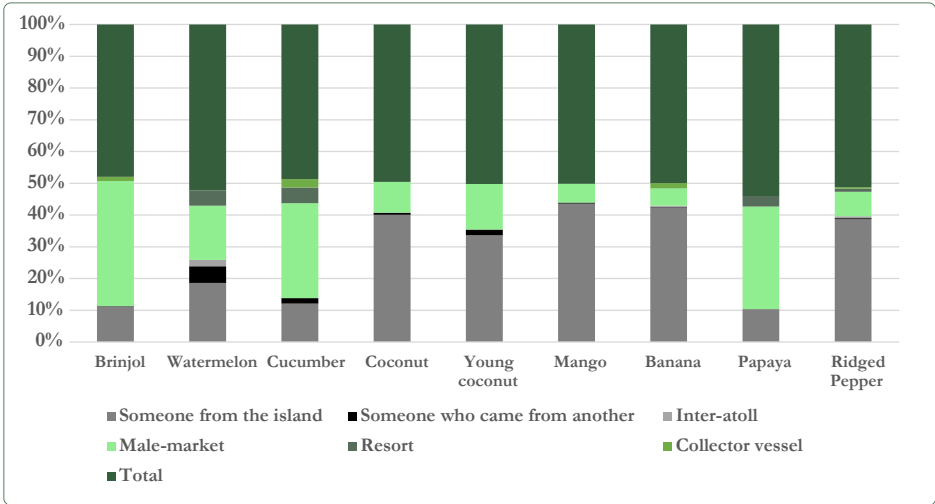
When looking into the sales of ridged pepper, a common household item in Maldives, a total 75 tonnes were sold during the past 12 months. Lowest price per kg for this crop was MVR 155 while the highest price was MVR 198. Even though Ridged pepper accounted for a higher percentage in Adh. Maamigili and K. Kaashidhoo, highest sales were carried out in L. Gan & Gn. Fuvahmulah. In L. Gan 9 tonnes 500 were sold during the year and in Gn Fuvahmulah 6 tonnes were sold. Ridged pepper was mainly sold within the island.

⁴ KG was converted to tonnes. 1000kg is equivalent to 1 tonne. Ideally the total production, damages, harvest and sold quantity should be reported in same unit. Since no conversion measurement for these unit was provided, it limited the presentation of total production as such.

Main suppliers of cucumber into the market; the main market being Male’ local Market, were K. Kaashidhoo & Aa. Maamigilli. A total of 117 tonnes of cucumber was sold in the past 12 months, out of which both Kaashidhoo and Maamigili accounted for 20% of the production each. Following the harvest of these crops, farmers are engaged in selling them at the earliest. The main marketing channels used for these crops are someone from the island or some-

one who came from another island. Marketing to resort is still low and perhaps an avenue to improve in future. Only some products are sent to Male’ and this might be due to many reasons- less frequent transportation to Male’, few links established with creditors in Male’ and post-harvest conditions the fresh produce can be kept in before it reaches Male’. This indicates whatever produced is already taken care by buyers in the island or coming from other islands. Farmers mainly sell their product on their own.

Figure 19:
Where the product was sold for selected items, 2019



Value-added Production (VAP) – short-term crops

Value-added production (VAP) from agricultural commodities generates additional income to the farming households. The most common items available in the market are breadfruit chips, taro chips & fried moringa. VAP creates a positive effect in improving livelihood of the farmers.

According to the survey, only 1% of the respondents are engaged in Value Added Production (VAP) using short-term crops. They are mainly engaged in making fried moringa leaves, Taro chips, Cassava chips and sweet potato chips.

Fried moringa leaves was the most commonly produced value-added production. However, it is surprising to note

that none of these products were sold. In a further study, it is advised to see the reasons behind this.

From the total Taro production, 38% of the production was used to make Taro chips. However, 55% of the these was sold to the market.

In the case of cassava, 45% of the cassava production was used to produce VAP. Among these VAP, 98% of these products were sold.

From the Sweet potato production, 18% of the production was used in VAP. However, none was reported as sold items.

Table 4
Value-added production (VAP)- short-term crops- Top 5 products, 2019

Items	Percentage of harvest used for agro-processing	Percentage of agro-processing sold
Drumstick	90	0
Taro	38	56
Cassava	45	98
Sweet potato	18	0
Banana	20	100

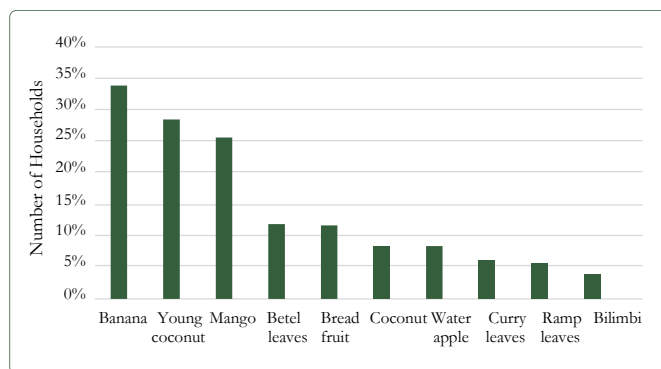


Long-term crops – from survey data

Most of the households grow one or more long-term crops, mostly consisting of banana, coconut palm and mango trees. All the farming households of F. Magoodhoo had one or more Banana tree. While K. Kaashidhoo, S. Meedhoo, Ha. Kelaa & Gn. Fuvalmuah were major producers of Banana, where more than half of the farming households are

engaged in the production of banana. Among the producers of banana in these 11 islands, 99% of the farmers have reported to have harvested banana in the past 12 months accounting to a total of 762 banana trees. The farmers in these 11 islands, had produced an approximate production of 509 Tonnes⁵, 23,421 bunches and 836 pieces of banana.

Figure 20:
Most commonly produced long-term crops- Top 10 products, 2019



Coconut & Young coconut is one major crop produced and used in the country where its by-products can also be sold for its economic value. In 2019, almost close to one third of the households in these 11 islands had one or more coconut tree. Of the total number of crop households growing coconut, 36% of this households are in Gn. Fuvahmulah, 18% in L. Gan and 14% is from L. Fonadhoo.

Mango although a seasonal crop, was the third mostly common produced long-term crop in these 11 islands. The production is most common in southern part of the country and the most dominant is in Gn. Fuvahmulah and Laamu Atoll.



⁵ KG was converted to tonnes. 1000kg is equivalent to 1 tonne. Ideally the total production, damages, harvest and sold quantity should be reported in same unit. Since no conversion measurement for these unit was available, it limited the presentation of total production as such.

Table 5:
Long-term crops- Top 10 products based on harvest, 2019

Items	Average harvested trees	Harvest						Sold						Damage			
		Gram	Kg	Piece	Sack	Bundle	Bunch	Gram	Kg	Piece	Sack	Bundle	Bunch	Kilogram	Piece	Sack	Bunch
Banana	95	-	523,948	836	-	105	37,385	-	513,844	1,412	-	616	26,728	-	-	-	23
Mango	8	-	8,037	581,486	108	-	-	-	5,257	369,915	43	-	-	-	4,695	-	-
Breadfruit	2	-	6,576	91,802	189	-	-	-	9,412	55,938	84	-	-	-	1,424	4	-
Coconut	46	-	6	561,702	1,163	-	-	-	-	414,134	1,076	-	-	-	-	-	-
Young coconut	21	-	-	333,762	60	79	4,662	747	-	309,308	23	2,231	3,998	-	19	-	-
Bilimbi	2	-	10,370	92,849	-	-	-	-	303	65,766	-	-	-	5,106	-	-	-
Water apple	1	6	9,142	125,743	-	-	-	-	2,368	27,907	-	-	-	-	1,470	-	-
Drumstick	3	-	507	33,022	-	-	-	-	363	6,793	-	-	-	-	11,201	-	-
Guava	2	-	199	14,409	-	-	-	-	99	5,720	-	-	-	-	-	-	-
Stone Apple	1	-	183	16,607	-	-	-	-	-	13,286	-	-	-	-	-	-	-

In the case of long-term crops, banana was the most common produced crop. A total of 523 tonnes⁶ and 836 pieces of bananas were produced over the period. Among those 23 bunches of bananas was reported as damaged and 513 tonnes of bananas 1,412 pieces and 616 bunches was sold. Banana was most commonly sold in K. Kaashidhoo followed by Gn. Fuvahmulah.

Mango was reported in Kg as well as in pieces and sack. A total of 8 tonnes and 581,486 pieces and 108 sacks of mango was reported as total harvest. Only few was reported as damaged goods while 4 tonnes and 1076 sacks of mangos was reported as being sold.

“Fuvahmulah Mangoes” are a famous crop all over the country and hence mangoes being sold mainly in Fuvahmulah and L.Gan reflects this scenario. Most of the produce was sold within the island whereas the second mostly sold market for mangoes was the Male’ Market.

Among long-term crops most damage was reported from Bilimbi. From harvested items, almost half of the production was reported as damage. It is important to know the reason and if these goods can be used for value added production.

The main marketing channels used for permanent crops are similar to temporary crops (i.e. Someone from the island or someone who came from another island).

⁶ KG was converted to tonnes. 1000kg is equivalent to 1 tonne. Ideally the total production, damages, harvest and sold quantity should be reported in same unit. Since no conversion measurement for these unit was available, it limited the presentation of total production as such.

Figure 21: Where the product was sold - Banana

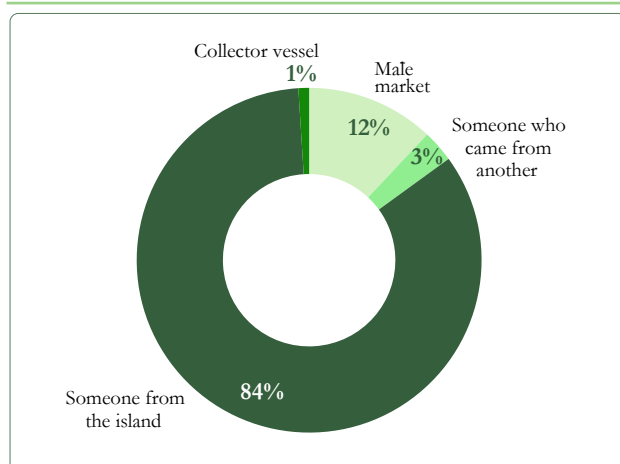
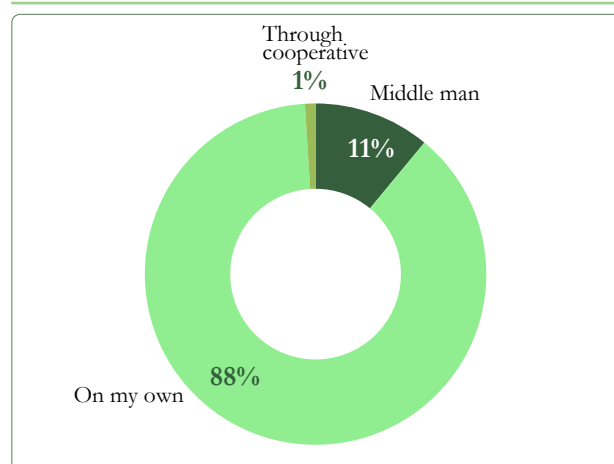


Figure 22: How the main product sold- Banana



Value-added Production (VAP) – Long-term crops

Survey results revealed that 5% of the respondents are engaged in Value Added Production (VAP) using Long-term crops. They are mainly engaged in making banana chips, breadfruit chips, Bilimbi pickles and bi-products from coconuts.

80% of the banana harvest was used for VAP and all the production was sold during the period.

From the total breadfruit production, 51% of the production was used for VAP. Among these VAP, 24% of the products was sold.

In the case of bilimbi, 77% of the bilimbi production was used for VAP and from these 33% was sold.

From coconuts, 46% of the production was used for VAP. Among these VAP, 78% of VAP was sold.

Table 6
Value-added production (VAP)- long-term crops- Top 5 products, 2019

Items	Percentage of harvest used for agro-processing	Percentage of agro-processing sold
Banana	80	100
Bread fruit	51	24
Bilimbi	77	33
Coconut	46	78
Mango	2	0



Crop inputs

The usage of fertilizers in farming is high in these 11 islands. More than half (56%) of the crop households (966 households) use fertilizers in farming. Organic fertilizers are used more than chemical fertilizers. The most commonly used organic fertilizers are cow dung and Unigrow.

Table 7
Type of Fertilizers used and the quantity used

Type of Fertilizer	Number of times used per month	Average Quantity used, everytime w fertilizer		
		Gram	Kilogram	Litre
Chemical pesticide - Insecticide	1.3			
Chemical Pesticide - Fungicide	1			
Chemical fertilizer	3.2	500.6	14.3	27
Organic Fertilizer	2.7	111.6	441.8	2
Soil amendment	2.8	172.1	12.2	
Unable to code	1.6		18.5	

Over the years the usage of pesticides in controlling pests and diseases has increased. In 2019, 47% of crop households (823 households) used pesticides. On average, the farmers used pesticides 3 time per month. The most commonly used pesticides are “Chemical pesticide - Insecticide”, “Chemical Pesticide - Fungicide” & “Chemical Pesticide-unable to code”.

Table 8
Type of Pesticides used and the quantity used

Type of Pesticide	Number of times used per month	Average Quantity used, everytime when used pesticides			
		Gram	Kilo Gram	Litre	Millilitre
Biological Pesticide	1.9				344.5
Biological Pesticide - insecticide	1.8			2.0	50.0
Biological Pesticide / Adjuvent	2.0			1.0	
Chemical Fertilizer	3.2	74.3	87.8	39.7	25.3
Chemical Pesticide	0.0		10.0		500.0
Chemical Pesticide - Fungicide	2.5	95.5	1.0	17.5	30.2
Chemical pesticide - Insecticide	3.0	146.7	6.8	17.9	74.7
Chemical Pesticide - Rodenticide	2.0				10.0
Organic Fertilizer	2.1		15.0		5.0
Unable to code	2.7	156.6		1.6	5.0



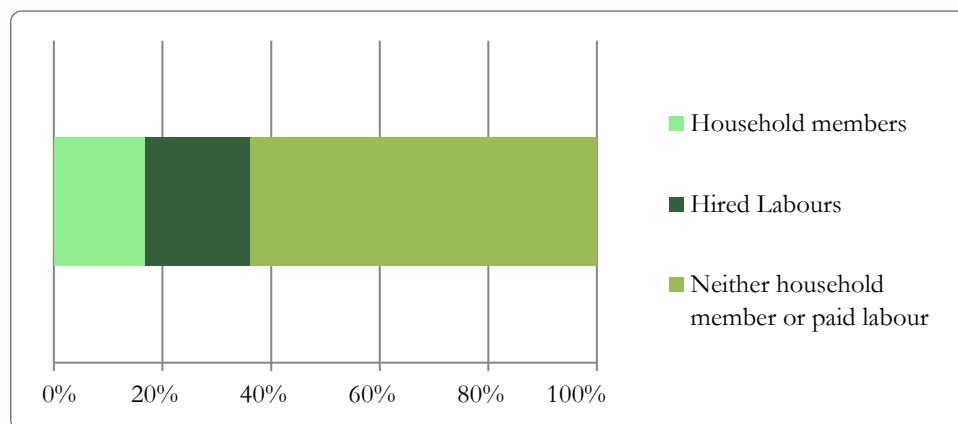
5

WORKERS
INVOLVED IN
CROP
CULTIVATION

Out of the total agricultural household, 34% of the households employed household member or paid farm labours for crop cultivation on the agricultural land in the month prior to the survey. Out of those household employed household members or paid farm labour, 34% of the households

employed hired labour in their farms. In total 1,154 people actively engaged in the agricultural activity. Out of those actively engaged in crop cultivation, 44% of the workers were hired employees.

Figure 23: Percentage of households with paid farm labour, household member in agricultural land, 2019

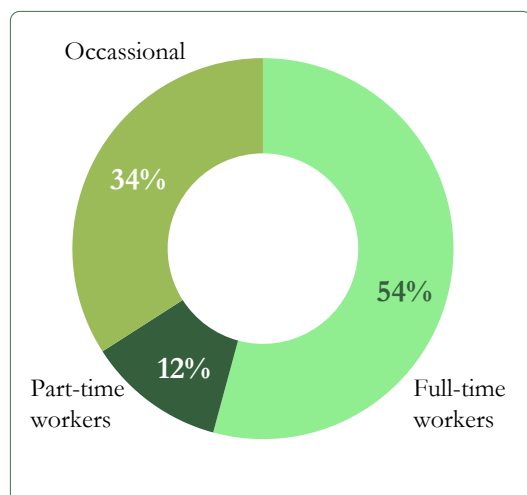


The practice of employing part-time workers is not common. Households prefer to hire permanent employees & occasional employees. Of hired workers, 54% of them worked as permanent employees and 34% of workers are

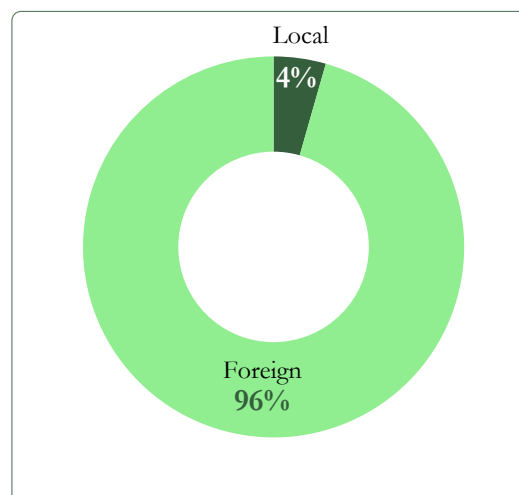
occasional workers (refer to Figure 24_a). However, only 4% of the hired workers are local. It is surprising to see that none of the workers hired is female.

Figure 24: Percentage of Hired workers, 2019

a. Percentage of hired workers by status of job



b. Percentage of hired workers by locality



Source: Agriculture Survey, 2019

Majority of the people working in the farm are household members. This shows that the majority of the islands farming is a family business. However, in Adh. Maamigili, K. Kaashidhoo and Gdh. Gahdhoo majority of the workers are hired farm labours. In the case of Gn. Fuvahmulah & Aa. Thoddoo almost equal proportion family members & hired workers involved in the crop cultivation activity as seen from Figure 25.

Figure 25:
Percentage of household members & paid farm labours





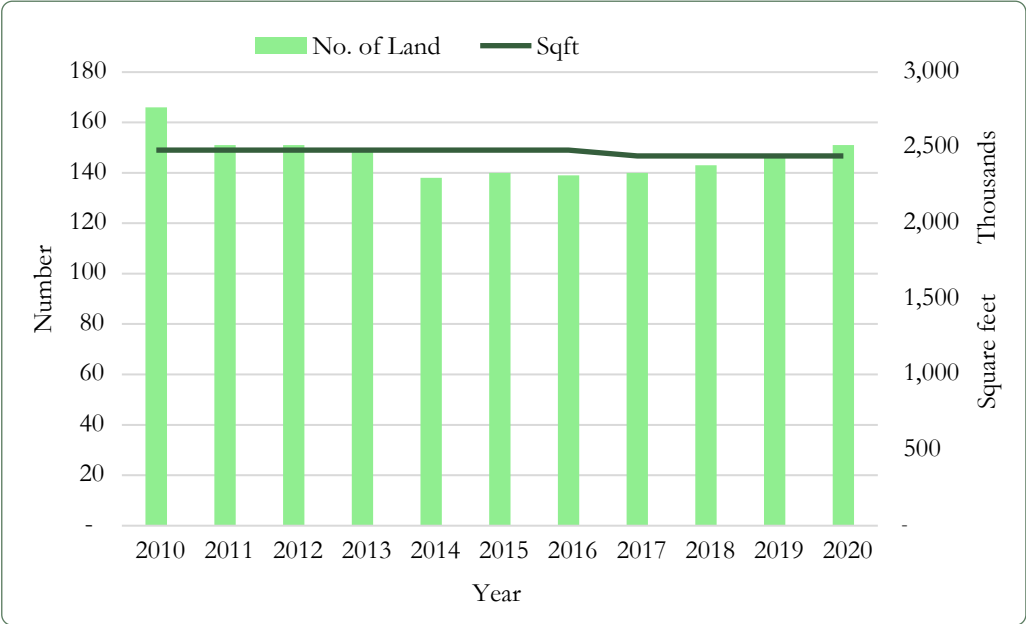
6

SPECIAL FOCUS
ON
AA. THODDOO
BASED ON
ADMINISTRATIVE
DATA

Aa. Thoddoo is a key agricultural production island for Male' and other centrally located islands. Although the island produces a number of fruits and vegetables such as papaya, bitter gourd, radish, lettuce, it is best known for its production of watermelons. Watermelons are commonly produced during the month of Ramadan when demand is high and prices are high.

In Aa. Thoddoo specially farm lands are provided by the council to the farmers to grow watermelon for the Ramadan. In this part, we will focus on the production of watermelon in AA. Thoddoo. In 2020 Ramadan month was from 24 April to 23 May.

Figure 26: Number of farm Lands provided to grow watermelon during Ramadan & total square feet, 2010-2020



Source: Aa. Thoddoo Council



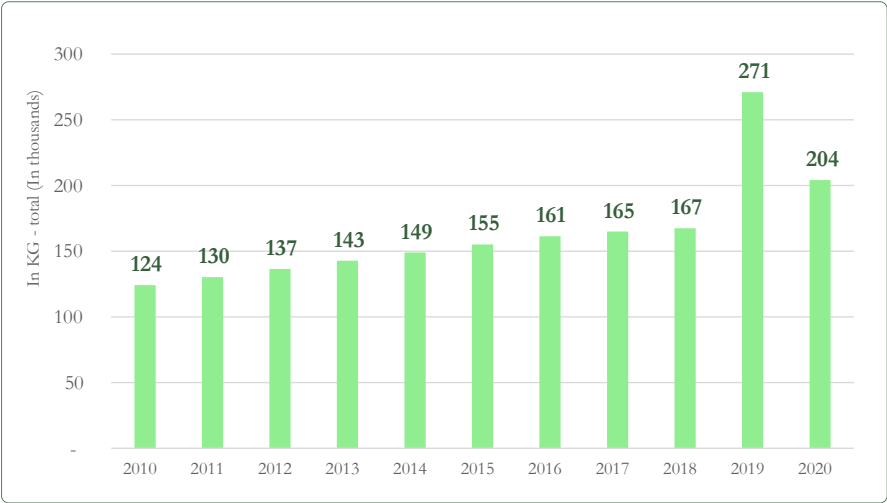
Number of farms provided to grow watermelon have slight drop from 166 plots/parcels to 139 plots/parcels over 2010 to 2016. However, over the same period the land in farms remain same at 2,483,219 square feet, while the production increases dramatically over the same period.

Starting from 2017, the number of farms has slight increase from 140 plots/parcels to 151 plots/parcels in 2020. The total land size decreased from 2,483,219 square feet to 2,444,700 square feet in 2017 and remained same. This reduction on plot/parcel size is seen due to the reallocation

of land for the housing purpose. However, the production increased over time except in 2020. In 2020, total production dropped slightly, however, the unit price dropped dramatically. This is due to the current pandemic COVID-19 in the country. The COVID-19 pandemic has disrupted activities in agriculture and supply chains. Agriculture sector were particularly affected under COVID-19 lockdowns due to market closures and declining demand. Since Male' market was the main market and movement restriction have led to stop the transportation between Male' and rest of the country making it worse.

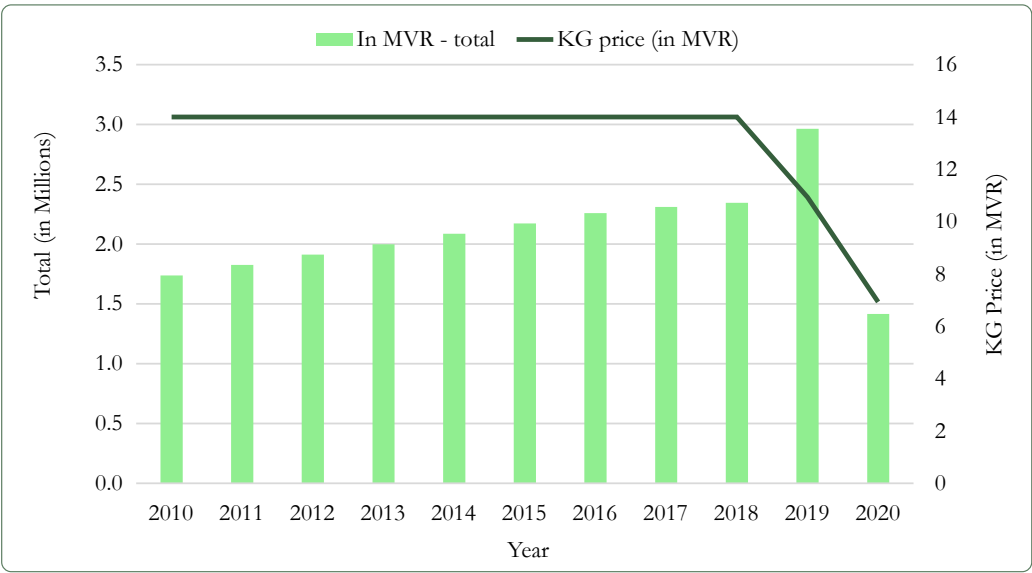


Figure 27:
Production of Watermelon in kilogram, 2010 to 2020



Source: Aa. Thoddoo Council

Figure 28:
Amount received for Watermelon & per KG price, 2010 to 2020

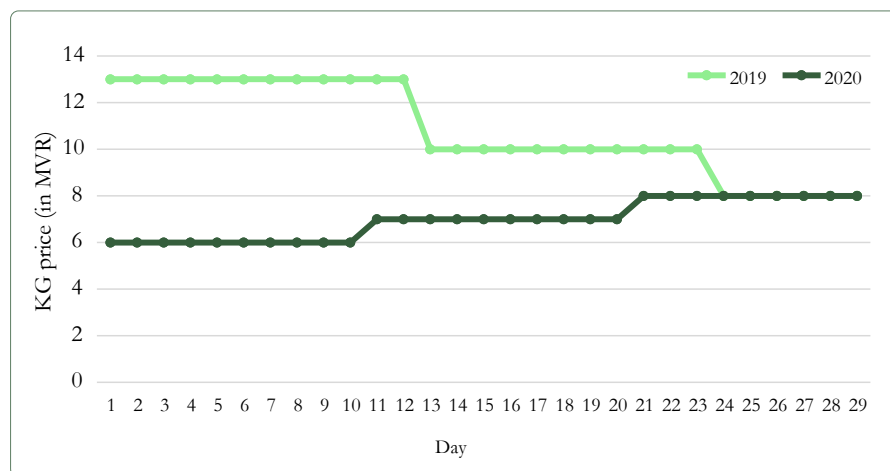


Source: Aa. Thoddoo Council

As seen from Figure 29, in 2019, the first 12 days of Ramadan the price of Watermelon remains at the peak (MVR 13 per KG) and gradually decline towards the end of Ramadan. However, in 2020, the first 10 days the price was almost twice lower compared to 2019. This is due to the strict lockdown placed in the country due to the pandemic (COVID-19). Apart from the restriction of travel from one

island to another island, Male' local market where most of the production was sold were also closed during this period. From day 11 onwards, the kilogram price per watermelon increased and reached to the same level where lowest price in 2019 exist.

Figure 29:
Daily per kilo price of watermelon during Ramadan month, 2019 to 2020

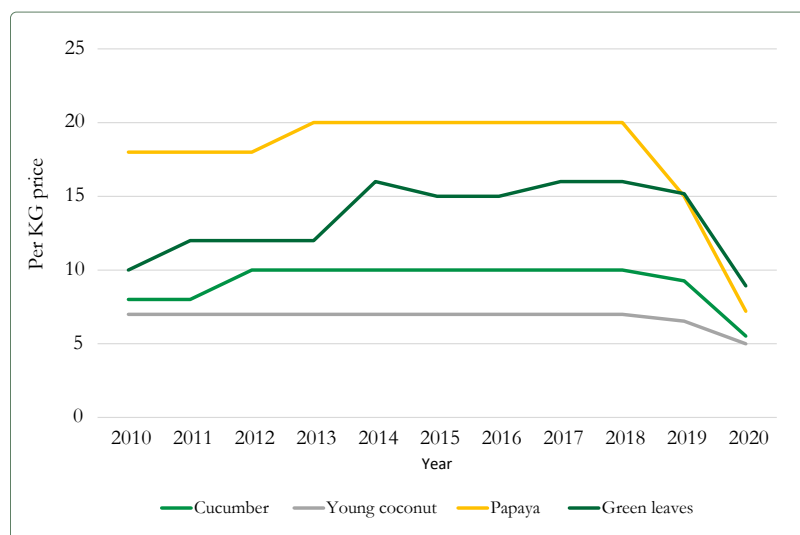


Source: Aa. Thoddoo Council

Other production during Ramadan period in Aa. Thoddoo

Apart from Watermelon, during Ramadan time, farmers in Aa. Thoddoo produce cucumber, young coconut, papaya, chilli & green leaves. Over the years the production of these vegetables increases significantly, however, in 2020 due to the pandemic the production as well as the price per kilogram also reduced.

Figure 30: Production of other fresh vegetables, during Ramadan month, in per KG price, 2010 to 2020



Source: Aa. Thoddoo Council





Maldives Bureau of Statistics

Ministry of National Planning, Housing & Infrastructure,
Dharul Eman Building (7, 8, 9th Floor),
Majeedhee Magu,
Male 20345,
Republic of Maldives

info@stats.gov.mv
<http://statisticsmaldives.gov.mv>



statsmaldives



@statsmaldives