



MALDIVES ECONOMIC REVIEW

COVID-19

FOOD SECURITY

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COVID-19 pandemic: the beginning of an end to our confidence in the voluntary self- refuge of food security

Ibrahim Mohamed

also...

Delivering food security in the Maldives agricultural sector: is the business case embedded in the social solidarity economy?
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Ahmed Shafiu

and more...

IN THIS ISSUE

COVID-19 pandemic: the beginning of an end to our confidence in the voluntary self-refuge of food security

Ibrahim Mohamed

Page 3

Delivering food security in the Maldives agricultural sector: is the business case embedded in the social solidarity economy?

Mohamed Rasheed, Bari

Page 9

Food security: finding meaning at a time of global pandemic

Humaida Abdulghafoor

Page 17

Food security: pitfalls and opportunities on the path to a robust policy

Umar Hilmy

Page 21

HORTIFARM success

Mohamed Zuhair

Page 25

Food supply chain in the time of COVID-19

Rifaath Hassan

Page 29

Food security: a Maldivian conundrum

Shafeenaz Abdul-Sattar

Page 35

The health of the fishery industry is critical for food security of the nation

Ahmed Shafiu

Page 39

Food security and the principle of comparative advantage

Ibrahim Athif Shakoor

Page 41

Priorities: food security or self-sufficiency in food?

Fazeel Najeeb

Page 45

EDITORIAL

With the publication of this issue of the Maldives Economic Review, we reach a milestone by completing the four issues of volume 1. We thank our contributors, readers and critics, past and present, for their contribution.

We dedicate this issue to a theme that is familiar yet so elusive in this country: food security. The COVID-19 pandemic has demonstrated, yet again, the precariousness of the country's food security policy. This concept has two elements: access to sufficient staple foods and satisfying nutritional needs. Both, and more, are variously discussed in this issue.

In our cover article, Ibrahim Mohamed discusses supply networks and infrastructure and argues his case for the need of a holistic approach to food security, covering aspects as governance and legal mechanisms, land use, trade facilitation, food reserves, and others.

Mohamed Rasheed raises the question of sustainability in agriculture in the Maldives, and discusses a 'social solidarity economy' in a context of domestic agriculture.

In her article, Humaida Abdulghafoor highlights, among others, the nutritional aspect of food security and goes on to make important suggestions for policy-makers.

Umar Hilmy's article provides a discussion of pitfalls and opportunities towards a robust food security policy. Umar takes examples from elsewhere that illustrate successful food security policies that may be considered by policy-makers [and perhaps prospective investors in agriculture in the Maldives].

Mohamed Zuhair illustrates a success story in commercial agriculture in the country. His case study provides practical lessons that policy-makers and potential (or even existing) agricultural growers and firms should find useful.

Rifaath Hassan writes on the importance of food supply chain and provides a discussion of the impact of disruptions in the global supply chain on the Maldives. Rifaath highlights the need for linking smallholder farmers to markets.

Shafeenaz Abdul-Sattar provides a discussion of lifestyle, food habits and food security, and goes on to make important suggestions for enhancing aspects of food security in the Maldives.

Ahmed Shafiu delves into the analysis of the importance of a steady fishery industry to food security in the Maldives. He points out several supply side factors that affected in the past and continues to currently affect domestic fish prices.

Ibrahim Athif Shakoor provides important and useful food for thought on growing food domestically in the Maldives by his discussion of the concept of comparative advantage, the basic rationale for trading between nations, and contextualises this to the case of the Maldives while highlighting issues of achieving scale economies.

Finally, Fazeel Najeeb provides an analysis of the government's Strategic Action Plan 2019-2023 and raises important questions regarding the appropriateness of the food security strategies articulated in the plan.

Opinions and views expressed in the Maldives Economic Review are those of the authors and they do not necessarily reflect the opinions and views of the journal.

COVID-19 pandemic: the beginning of an end to our confidence in the voluntary self-refuge of food security

Ibrahim Mohamed

This article is modified and adapted from a book chapter I wrote for the Second National Communication of the Maldives to UNFCCC in 2015. Some parts of this article may contain direct quotes from this work.

Negotiating the implications of food security, which have been laid bare since the lockdown of the Maldives in response to the threats of the COVID-19 pandemic has become critical. Long hidden flaws in food security arose even before a supply shock of the quantities of food available emerged. Consequently, hoarding and attempts to corner the market and hold the public for ransom in the form of inflated prices, in anticipation of future restrictions have been occurring since January. The government quickly intervened with fairmindedness and rationed staple foods as well as other essential commodities through the state-owned company, State Trade Organisation (STO). Even though the rationing and strict price measures are justified though moral economics superseding the markets, there are various challenges in maintaining an uninterrupted food supply chain. Meanwhile, the dark truth of the food insecurity unfolded when the nation's most vulnerable population consisting of foreign migrant workers began starving, leading to drastic relief measures. Even though the locals are not hit as hard as migrant workers at this stage, food shortages are inevitable with the exacerbation of this pandemic. Hence, we need to explore the gaps in food security and ways to enhance a more resilient food system for our future.

From ship to mouth

According to the World Food Organisation (FAO), the three pillars of food security are availability, accessibility and utilisation of food. The availability of food for the Maldives is largely a function of supply to the market via uninterrupted imports, as the country relies 100 percent on imports for staple foods and 90 percent to cover other food items. According to Maldives Customs Statistics Book of 2018, more than 32, 21, and 9 million kilograms of rice, wheat flour and sugar respectively were imported in that year. MMA data shows food imports for 2019 were valued at USD 546.2 million and is 11.2 per cent of the total GDP, according to an analysis by Fazeel Najeeb, an Assistant Professor of the Maldives National University. About one fifth of this money is spent on importing fruits and vegetables which have the potential to be grown and thus reduce dependency on imports. For instance, 4 thousand tonnes of watermelon, 155 tonnes of papaya and 1.9 million bananas were imported in 2018 according to Maldives Customs data. Though production cannot be increased instantly at the local level to cater for such high demand, changing the status quo is crucial. As such, this "just enough", "just-in-time" "ship to mouth" approach to staple food and other foods, practiced since the 60s famine is just the tip of the iceberg of complicated supply, demand, logistical, technological and infrastructure dilemmas. Even though import of staple food is through an

efficient network whereby India, Turkey and UAE act as major suppliers of rice, flour and sugar respectively, flaws in food security are inevitable. With the exacerbation of COVID-19 restrictions, major exporting nations may resort to “food nationalism” leading to stricter export quotas, while closed borders can result in shortages of shipping containers, according to Rebecca Shamritsky of Freightfarms (<https://www.freightfarms.com/blog>). She also believes the impact of workforce shortages within the food system due to the pandemic will lower productivity and reduce the availability of food. In addition, farmers who have contracted with buyers and markets are unable to link with markets due to transportation restrictions and lack of demand for various food items, resulting in huge post-harvest losses.

Supply networks and infrastructure

The accessibility of food in Maldives is based on the distribution network which facilitates its availability to consumers through supermarkets and retail shops. STO, which imports and distributes staple food, maintains a three-month buffer stock, which has been increased to 10 months to address shortages during the COVID-19 pandemic. STO maintains four main distribution warehouses in Kulhudhuffushi, Malé, Addu city and Hulhumale. In addition, 10 small warehousing facilities throughout the Maldives are maintained. Under normal circumstances this system may suffice, but it is unsustainable in a major disaster such as the current pandemic.

Foods imported by various local importers which are to shelf-stable or frozen operate on the inventory principles of maintaining stock in order to satisfy existing demand. Meanwhile a large amount of perishable

cargo such as fresh fruits, vegetables and some dairy products are supplied via air cargo, on the inventory principle of “just-in-time” to cater for the demand. Hence imported food is stocked with a bare minimum of inventory and shipments are scheduled to arrive as inventory begins to run low. Keeping large stocks of perishable food and frozen foods also requires cold storage warehouses which are expensive to maintain due to inflated rent and cost of cooling. As the major airport and port is in the capital region, most such warehouses are in Malé city.

Even though major supply shocks are rare, shortages in commodities like onions and potatoes have been reported in the last two years. From 2013 onwards, price hikes in eggs, onions, potatoes, lemons and certain vegetables have become more frequent according to newspaper reports. Review of media reports indicates that such price hikes are related to lower supply due to shortages in major importing countries as well as due to increased demand during the month of Ramadan. However, the government heavily subsidises staple foods to control the price and since the incumbent government came to power, prices throughout the nation have been made uniform. According to the government budget for 2019, MRF 258.6 million will be spent for food subsidies.

Availability of locally grown fresh fruits and vegetables in the food basket is through an inefficient distribution network of growers and suppliers. While 60 percent of locally grown products reach the capital city, the rest are either sold to vendors in islands or to resort suppliers. This distribution network was boosted by the inter-island ferry system established since 2008. Nonetheless supply chain disruptions occur due to inefficient sea

transport and bad weather conditions, as well as crop failures.

Utilisation and diet

In the past Maldivians utilised foods mainly grown and available on the islands, while imported foods were used on rare occasions only. Traditionally, the main staples grown and used included taro, cassava, sweet potato and breadfruit, while grains such as corn and finger millet were also common. In addition, sugar made from coconut toddy was commonly used. The main source of protein was fish which was consumed daily and is still an essential item in the diet. Utilisation of food changed with the famine which occurred during the Second World War, as the government began importing and distributing staple foods such as rice, wheat flour and sugar. Hence the current pattern of eating rice and wheat became normal.

A study done among school children living on the islands in the Maldives has shown that fruits and vegetables are consumed less, while fish is consumed daily in every meal (Madikilanbu 2007). The most highly consumed fruits are bananas, oranges and apples respectively (Sethi 2009). Consumption of citrus fruits grew by 41 per cent between 1990 to 2003 (Sethi 2009). Consequently, a dietary shift in demand for high valued commodities has been seen over the years and some of the highly valued international brands of dairy products and desserts are also now available from local shops.

The Maldives Health and Demographic Survey for 2016-2017 indicates that the nutritional status of people has improved, where 15 percent of children under the age of 5 are underweight, while 15 percent of same age group are stunted, which is two percent lower compared to

the 2009 Survey. Though no studies have been conducted on the recent school breakfast program, anecdotal evidence shows reduction in malnutrition among school children.

Need for a holistic approach

To enhance food security and build a resilient food system for the future of the Maldives, flaws in food security need to be addressed with a holistic multi-sectoral approach. However, organised planning for disaster management and relief and rehabilitation is still at the infant stage. The country also lacks a National Food Security Act or a strategic food security policy, resulting in a domino effect threatening the food security of the country, especially in the event of disasters.

Cultivable land space available in Maldives is limited to only about 30 square kilometres and is about 10 percent of the entire land area of the country (Shabau, 2006). Hence conventional land-based agriculture will not suffice to cater for local demand. Although an uninterrupted network of supply through imports is established, supply shocks are inevitable. Additionally, unreliability of supply and limited choice of foods is also a major constraint, especially in a global pandemic. Hence, we need to invest in growing locally, and diversifying the markets for import. The following are some recommendations to enhance food security in the Maldives:

1. Governance and legal mechanism for food security

The government needs to develop a National Food Security Strategy and a National Food Security Act to ensure food sufficiency, especially during disasters and pandemics. Such a strategy must lay out the island and city level food security

plans and facilitate allocation of nearby uninhabited islands for local islanders to grow food. For instance, people from Gadhoo Island of South Huvadhu Atoll use the nearby uninhabited atoll called Gan to grow food.

2. Strategic land use planning

As land became scarce, traditional farmlands on islands had to be compromised to provide plots for homes and to build ring roads. Additionally, land plots are given to residents without proper assessments of need and land available. Moreover, reclaimed land on many inhabited islands lack plans to provide land for agriculture. Even though soil-based agriculture is not lucrative on reclaimed soil, agriculture in green houses using hydroponics can be feasible. Hence land use planning must address provision of land for agriculture.

3. Trade facilitation within the country and utilising the regional ports established for importation of foods

Currently the import of staple food is via the port and airport of Malé and hence staples are supplied from Malé to other regions. However, by utilising the two ports in Kulhudhuffushi and Hithadhoo, the efficiency of supply and storage can be increased. In addition, pressure on storage space on Malé city can be reduced. However, this can only become feasible when the population concentration in the capital is dispersed to other regions.

4. Creating seven regional food reserves across the seven major regions of the nation

Currently only two major distribution hubs exist outside Malé city and all are replenished from storages in Malé city. Hence, establishing seven smaller

warehouses in different regions may be more efficient. Henceforth by having such regional stocks, the reserve capacity can be sustained.

5. Improving and facilitating home gardening across the country

As land is scarce and land plots used for housing become small, home gardening has become a major challenge. In the olden days home gardens included trees such as breadfruit and banana and several other species. However, unavailability of land has reduced this type of home gardening enhancing food insecurity. Hence, supplying materials, especially small-scale hydroponic systems and other modern technologies, to island households can improve home gardening.

6. Promoting agroforestry and advancing agricultural technology and research

Monoculture in large farm areas is not possible in the local islands due to scarcity of land and water. However, promoting agroforestry, which involves planting more varieties of crops with large trees, can provide more benefits and may be cost effective and sustainable. In addition, growing local varieties of staple food crops traditionally eaten by people can have immense benefits and can enhance food security as the food basket can be made more diverse. Technological advances in soilless agriculture and efficient use of energy and water also needs to be introduced to enhance local production. Also, concepts such as floating farms and research on salt tolerant species is important for the future.

7. Changing food habits among local consumers

Currently local people heavily depend on imported staples. Locally available staples such as breadfruit, cassava and taro are

only used occasionally and are mainly restricted to a few atolls, when they are available. By increasing the production of locally available staples, and value addition, food habits of people can be changed to include locally grown staples in the daily diet. For instance, taro or cassava can be eaten to minimise dependency on rice.

8. Importing wheat grain instead of wheat flour

Currently milled flour is sourced and imported from countries like Turkey. However, if wheat grains were brought in, they could be stored twice longer than wheat flour. In addition, if STO could invest in a flour mill, it could have major advantages of creating jobs and for value addition, while making supply more stable. Also, wheat grain is produced in several countries, such as Kazakhstan, Australia and Europe and can be sourced with a lower price than wheat flour.

9. Improving aquaculture and conducting more research on fin fish species which can be cultured

Aquaculture is a potential industry which still needs further investments and technological advancement. Currently culture of sea cucumber is carried out with limitations. However, no other species are cultured for commercial purposes. If aquaculture of different species becomes viable, dependency on wild capture of several types of fish will be reduced. This will provide economic benefits and enhance food security.

10. Increasing the number of marine protected areas and managing existing areas

Currently marine protected areas (MPAs) are only protected on paper and illegal fishing for groupers and sea cucumbers is

common. The existing MPAs need to be managed well to replenish the wild stocks overfished over the years.

11. Replanting corals in house reefs of inhabited islands degraded due to various coastal modifications

Soft engineering approaches such as coral re-planting are currently practiced widely in many resorts, providing the establishment of rich marine areas in resort lagoons. Such practices need to be scaled up to include inhabited islands, to regenerate the coral reefs destroyed due to coastal developments on the islands. This could improve bait fish availability and diversify availability of fish and other species for the islanders.

12. Investing in poultry farming and egg production in seven regions of the country through community cooperatives.

The major source of protein is currently fish, and to reduce dependency on fish, other sources of protein must be made available within the country. Poultry farming can be made successful through carefully designed projects initiated through island cooperatives and farmers' cooperatives. Currently, few private companies and few island cooperatives carry out poultry farming.

13. Trade facilitation within the SAARC region and creating a regional food reserve for SAARC nations

According to media reports, discussions are being held and agreements are being negotiated to establish regional food reserves for SAARC nations. These initiatives need to be made into reality and dedicated food reserves must be established within different SAARC countries.

14. Improving efficiency of the inter-island ferry systems and making ferry system more spacious for transporting agricultural products

Inter-island ferry systems are currently run with low efficiency and inflated prices. In some regions the service is often interrupted. By improving ferry services between islands, local agricultural product supply chains can be pivoted to enhance food security. Additionally, the improvement of ferry capacities and schedules can make the supply chain more efficient.

15. Improving the local market in Malé City with air conditioning using solar photovoltaic technology to make perishables items last longer

The local market in Malé city provides fresh produce from islands to city dwellers. However, the conditions in the market are not suitable to maintain the products in fresh condition. By cooling the market using solar photovoltaics, the products can be made to last longer, and wastage of fresh produce can be reduced.

16. Trade facilitation for farmers to market and sell their products in bigger nearby islands through inter island ferry systems and weekend markets.

Trade facilitation for farmers can promote local agriculture and hence supply can be increased. Such practices can enhance food security.

17. Strengthen the capacity for quality control and quality assurance of imported food items such as nutritional value and

residues of pesticides and other chemicals.

Currently the Food and Drug Authority (FDA) of the Maldives conducts some food safety tests to ensure safety of imported foods. However, the authority needs to be equipped with equipment and trained staff to conduct regular testing on staples and fresh produce imported from other countries. Such facilitation can provide quality assurance for consumers and will ensure food safety.

Conclusion

The WWII famine in the Maldives is a dark chapter of history where mismanagement, poor governance and lack of resources made it a catastrophe. This pandemic has revealed the flaws and gaps within our food system. The lessons learned from this pandemic must be utilised to enhance our food security and increase our food sufficiency.

About the author

Mr. Ibrahim Mohamed is the Deputy Director General of the Maldives Environmental Protection Agency (EPA). He leads the overall corporate responsibility of EPA on the portfolio of head of corporate affairs. He completed his Ph.D., on Environmental Science and Management from the James Cook University, Australia in 2018. He also holds a post graduate diploma in research methods and completed his Master of Applied Sciences in Protected Management from the James Cook University. Prior to this he also completed a Bachelor of Science Degree from the University of the South Pacific, Fiji. He has over 15 years of experience in academia and environment sector of the Maldives.

Delivering food security in the Maldives agricultural sector: is the business case embedded in the social solidarity economy?

Mohamed Rasheed, Bari

In 2015, governments approved the Sustainable Development Goals (SDGs), a 15-year plan of action for people, planet and prosperity addressing issues such as poverty, hunger and child mortality reduction; combating major endemic diseases, preserve the environment and set up a partnership for development among others. The emphasis together with eradicating poverty and hunger was also on achieving universal social protection and ‘fundamental changes in the way that our societies produce and consume goods and services’ (para 28) suggesting that business-as-usual is no longer an option. Approaches centered on trickle-down economics, jobless growth, corporate-led green economy, fragmented social, economic and environmental policies and targeting the poor through social assistance programs are inadequate if the ‘transformational vision’ of the agenda is to be realised.

Among the 17 Global Goals or SDGs, Goal 2 addresses global food security and agricultural sustainability requiring urgent and concerted action from developed and developing countries. In spite of policies, strategies, international collaboration in development, the agricultural sector has not taken off in the Maldives even though the tourism sector and the local consumer base comprising of domestic, hospitals and schools represent a huge

market for wholesome local produce alongside successful innovative farming technologies home tested by some resorts and local food suppliers.

The following discussion, in the context of Government of Maldives (GOM)’s continuing efforts with the assistance of development partners, for Maldives agricultural sectoral development, introduces the concepts defining food security and how it relates to food security policy, strategy and product-service delivery mechanisms for the purpose of spurring further thought and discussion towards identifying the nature of business models or where they are located in the economy for achieving national food security goals.

Theoretical background to food security framework

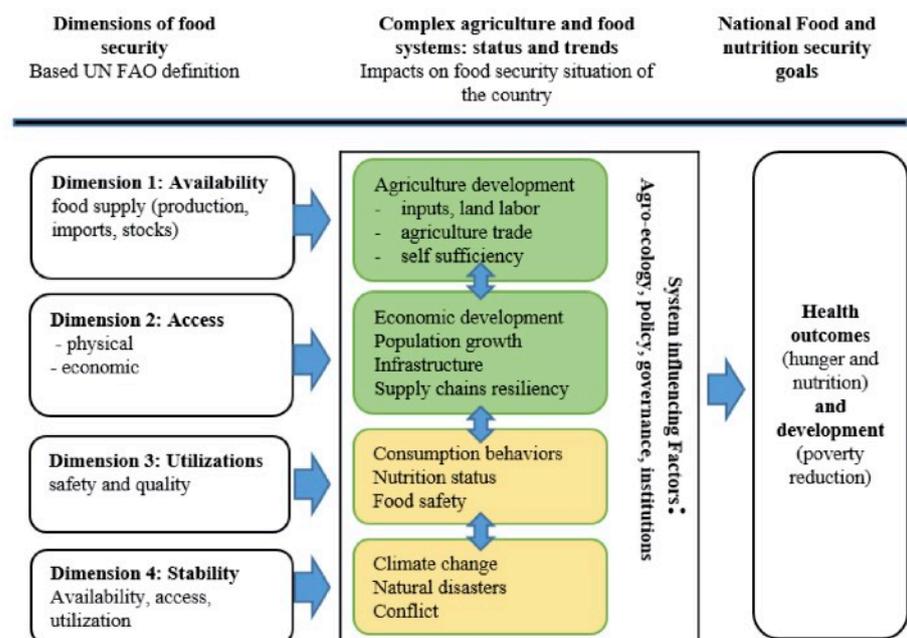


Figure 1: Food Security conceptual framework
Source: Lapina 2018, 56

Ensuring national food security is a vital concern of all governments. Examples from two South Asian countries below bring to life the concepts of food security as defined by FAO (figure 1), in a nutshell: food security embodies how the four dimensions of food security delivers health and development goals as set out in SDG via system influencing factors of agroecology, policy, governance and institutions.

Food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO 1996). Figure 1 is a simplified framework depicting food security in the context of dimension of 1) availability; 2) access - physical and economic; 3) food utilisation; and 4) stability in availability, access, and food utilisation.

The first of these pillars, food availability is dependent upon the supply of food through the sectors of production, distribution and exchange. Food distribution logistics involves efficient and effective storage, processing, transport, packaging, and marketing as a decrease or poor handling can effect food wasted leading to public health and environmental issues as well as increasing the overall price of food.

Singapore, one of the most food secure countries in the world, (Economist Intelligence Unit, 2016) mitigates such risks through food import sources diversification: Singapore imports about 90 percent of its food from 170 countries world-wide, yet was not insulated from significant price spikes following food shortfalls in recent years, either due to poor harvests or domestic policy chances. With 720 square kilometres of land, Singapore has only 1% allocated to food production, yet has et a bold target of 30 percent self sufficiency by 2030 requiring existing farms to be three times more productive to increase food production from 10 percent to 30 percent of domestic consumption. One of the approaches being used is optimising the under-used spaces on rooftops to continue growing for the community.

In the 1980s, food security policy of Bangladesh of self-sufficiency (growing within the country all the food the country needs) evolved in the 1990s to one of self-reliance (importing food from the world market when prices are cheaper than growing it at home, so as to release land for other uses for which Bangladesh has a comparative advantage). The strategy of self-reliance worked well until the global food price crisis of 2007-08, when India and other rice exporters introduced export restrictions followed by an export ban, leading to increased food insecurity.

It is not unthinkable that core strategies as described above - whether focused to offset limitations of the limited space for farming or poor agricultural land and lack of capacity and awareness as in the Maldives - mitigated by diversification as practiced in Singapore (local production and stockpiling), need to be coupled with supporting strategies: research and development; reducing food wastage; strengthening infrastructure; developing financial instruments; focusing on welfare and enabling strategies: cross-government coordination; emergency planning; communication; developing and tracking market and performance indicators; monitoring; and strengthening fiscal, legal, and regulatory frameworks. However, fragmented approaches and well-guarded silo confinement of institutions seems to have created the bottle necks that need to be removed to transform the sector.

Local context

At home, addressing uncertainty in global food security supply chains following COVID-19 lockdowns, quarantine and isolation of people, STO has stocked essential food items, GOM is making provisions to ensure that 25 per cent of produce is generated from inhabited islands, leasing agricultural land for free of charge towards this end. Ministry of Fisheries, Marine Resources and Agriculture (MFMRA) is continuing to play

the central role in providing expertise and advice to farmers and has identified 44 islands for the agriculture program to increase food security to 50 per cent towards reducing the dependency on foreign food supply to ensure self-sufficiency.

Visions and plans facilitating the above policies, strategies and activities are included in FAO MCPF 2013-2017 and 2018-2020; therefore, these recent announcements by GOM may not be considered as firefighting responses to COVID-19. However, it may serve the civil society well to note MCPF's observation on the several policy documents prepared by the agriculture sector (with FAO assistance) such as national policy framework, ADMP and commercialisation plan "unfortunately none of these had received the required attention" (p. 19). Reflecting on how the tourism sector grew and took off under pioneering entrepreneurship, it is important to recognise the challenges of developing a sustainable business plan where there is no business case for the shareholders as in the case of tourism. Perhaps a common enemy or an external coalescence force can initiate scaling food production in the islands. But then what about sustainability? In hindsight, the cholera epidemic of 1978 led to transformation of water and sanitation in the Maldives, yet after 40 years the sector

is still not technically, economically or environmentally sustainable. Perhaps this pandemic has the potential to initiate transformation of the agricultural sector in the Maldives in tandem with potential post COVID-19 tourism. However, sustainable business models would need to embed innovation by responding to communal demand, engagement and development of social capital and capture social impact along with economic value.

Food insecurity to malnutrition linkage

According to FAO's report on State of Food Security in the World 2018, food insecurity contributes to overweight and obesity, as well as undernutrition. The Maldives Demographic and Health Survey (MDHS) of 2009 highlighted that

malnutrition continues to be a serious concern in Maldives. Figure 2 illustrates details of the link between food access and nutritional outcomes that are difficult to capture in comprehensive conceptual frameworks showing the many basic, underlying causes of food insecurity and malnutrition. The main pathways from food insecurity to malnutrition pass through food consumption, or diet (figure 2). Beyond malnutrition, Food insecurity has negative impacts on the academic performance of children and is associated with behavioural problems.

Good agricultural practice and its challenges in ensuring food security

Agricultural productivity can be increased to meet both quality and quantity demand using good agricultural practices (GAP).

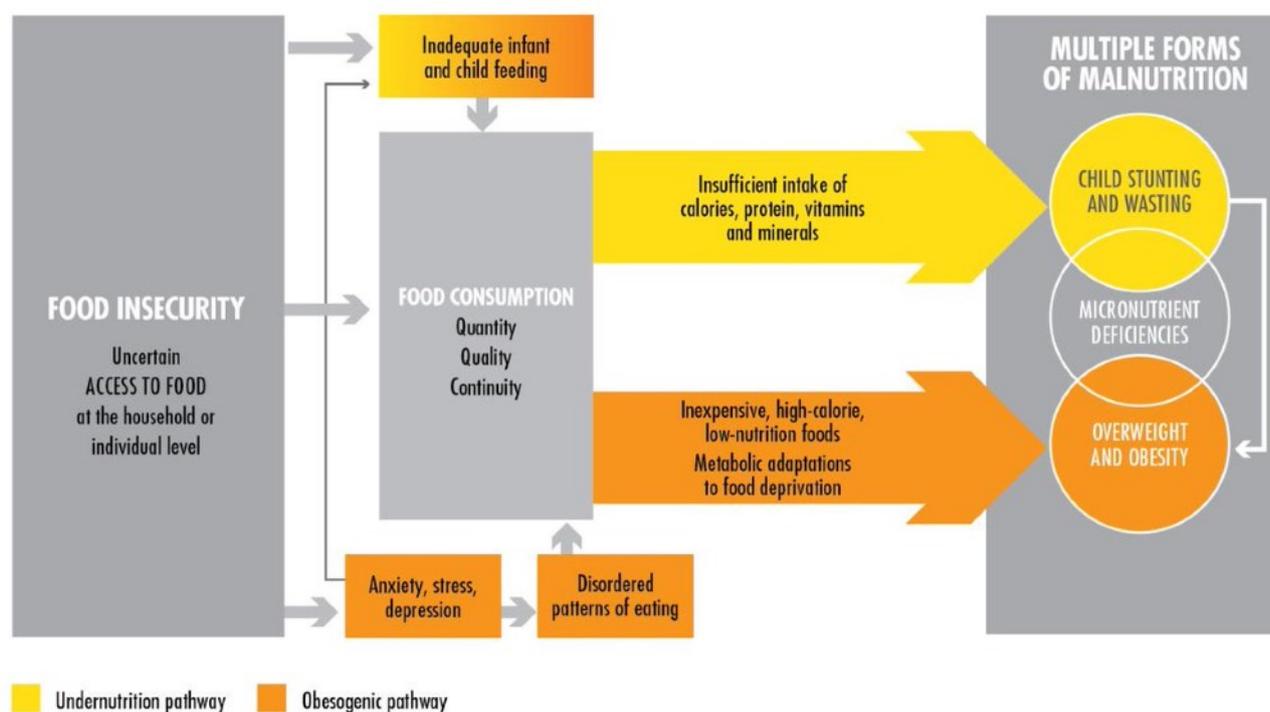


Figure 2: Pathways from inadequate food access to multiples forms of malnutrition
Source: FAO, 2018

GAP addresses a wide variety of farm production and post-harvest practices that contribute to food safety, food quality and environmental stewardship. MFMRA promotes GAP following FAO guidelines. Meanwhile firms such as tourist resorts and their food suppliers are incorporating GAP into production/supply chains and procurement decisions to conform to GAP certifications.

Justifiably, with all the benefits, GAP comes at an institutional, administrative and financial cost relating to aspects of selecting the right type and size of land to be cultivated for food crop production; planting the best-quality seeds and appropriate varieties; use of acceptable chemical inputs; controlling the quality of irrigation water; use of appropriate harvesting and on-farm storing and handling techniques; use of suitable methods for shipping of produce to markets or food processors. This calls for a business case that supports the necessary value creation and value delivery to markets at top-end tourism, the domestic consumer, hospital and school food programs in order to shift from mere subsistence farming to market orientation in the Maldives. Revenue optimisation and risk-based decision making requires business plans to respond to markets in the context of agronomic practices adopting a stakeholder centric perspective. A local

researcher (Mohamed, 2018), rightfully observes that the new paradigm adopting agroecological approach has the potential to change current nutrient management practices at island level to impact the farming system of the whole region.

Business case for sustainable food security delivery mechanisms and social solidarity economy

According to the Second National Communication of Maldives to the UNFCCC, under a national strategy for food security (2012) provided several outputs: integrated farming was introduced, alternative technologies of hydroponics and auto-pot systems successfully demonstrated, storage distribution and supply chains improved (MEE , 2016). However, these projects did not seem to track, rather, they seem more like isolated top-down delivery projects. Three years later, SAP (2019) listed constrains in the agricultural sector as: insufficient technical skills and poor institutional capacity and legal framework for promoting sustainable agriculture, weak policy implementation, weak quarantine, veterinary, and laboratory facilities, lack of appropriate infrastructure for agricultural value chains (storage, transportation, market, electricity, quality water etc.), lack of farmers' organisations, and inadequate availability of market information and lack of opportunities for women in leadership roles, unsafe food production,

degradation of ecosystems, abuse of resources, and increased pest and disease damage in agricultural systems.

Meanwhile IFAD and FAO continue to collaborate with MFMRA attempting scaling up small scale community businesses and SMEs to thrive and sustain in developing the agriculture industry of Maldives enabling the expansion of production capacities, developing island level business and managerial capacity, establishing formal market linkages for SMEs through private sector partnerships. There have been success and disappointments along the way; according to IFAD (2016) the Fisheries and Agricultural Diversification Program has been “very innovative in the Maldives context, spearheading the cooperative business development model promoting affordable micro-finance products to cooperatives and small

producers engaged in the agricultural and fisheries sector”, while, FAO CPF 2013-2017 observed that “despite planning over the years, neither the fisheries nor the agricultural sectors have achieved adequate growth”. However, the sector is yet to prove its worth after all the investment and time by GOM and the development partnership.

Perhaps there was not enough success in entrepreneurship development for an economy that has more social benefits -as in the Maldives in the current form agricultural sector- than economic benefits as in the case of tourism, and fisheries sectors. Perhaps a more holistic business model is required to connect people, planet and prosperity. The answer perhaps would lie at the juncture of agroecology and social solidarity economy. Agroecology can connect producers and consumers through a

circular and social solidarity economy (SSE) that prioritises local markets and support local economic development by creating virtuous cycles promoting solutions based on local needs, resources and capacities, creating more equitable and sustainable markets.

SSE refers to the

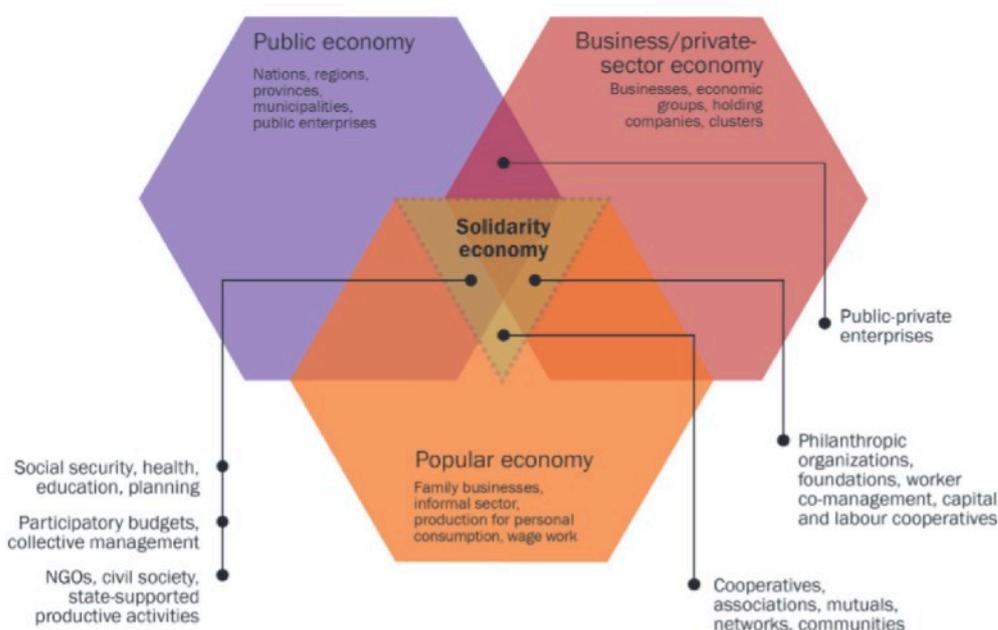


Figure 3: Situating SSE in the boarder economy

production of goods and services by a broad range of organisations and enterprises that have explicit social and often environmental objectives, and are guided by principles and practices of cooperation, solidarity, equity and democratic self-management (UNTFSSSE 2014). SSE is considered a form of economy that is centred on social protection and equality. The SSE movement, growing worldwide prioritises social objectives above profit maximisation, recognising the key role of collective action (ILO, 2017) for both economic and political empowerment of disadvantaged groups in society (Utting, 2015).

The field of SSE (Figure 3) includes cooperatives and other forms of social enterprise (SE), self-help groups, community-based organisations, associations of informal economy workers, service-provisioning NGOs, solidarity finance schemes, amongst others. According to ADB Report on Diagnosis of Social Enterprise Land Scape in the SAARC countries (ADB, 2017), SE while still nascent in the Maldives is located in the private sector, reassuring in reference to other SAARC countries that there is good opportunity

for SE development across the agricultural sector of Maldives.

Conclusion

Several countries around the globe are still under lock down, while some, easing out of the situation are mindful of a possible second wave of COVID-19 infection. Maldives, having temporarily lost markets in the export industries, has only the agricultural sector to feed the nation in the longer term worst case scenarios not hard to imagine. Individuals already returning to agriculture after having lost jobs in other sectors have set the tone for this trend in the shorter term.

However, turning the long term food security strategies into action requires meaningful, collaborative business models and delivery mechanisms in the agricultural sector. There will be no better time to awaken social entrepreneurship in Maldives and work towards developing the social entrepreneurial landscape embedded in the Social Solidarity Economy to facilitate access to funding, materials, technologies, support services, and markets, thereby increasing the capacity of producers to negotiate supply process of primary materials in line with SDG8 (decent work and economic growth). Economists see COVID-19 as an opportunity to fix what is broken; never let a good crisis to waste! Learning from the current circumstance, it is clear that

people need entrepreneurship and active stakeholder engagement to build resilience in food security through the social solidarity economy to continue feeding people in the face of disasters over the longer term while taking care of the environment.

Issues for further research

1. Strengthening organised farming and subsistence farming systems, applying appropriate technologies and developing the required market infrastructure to overcome socio economic challenges in agriculture to improve national food security.
2. Means of overcoming challenges to successful implementation of focused policy level interventions that enable the creation of an environment where small community businesses (SMEs) including social enterprises can grow.
3. Enabling the expansion of production capacities, developing business and managerial capacity at community level, establishing formal market linkages among SMEs, education institutions, hospitals, government agencies, private sector and civil society applying corporate business practices valuing social impact as well as economic value.
4. Linking GAP to integrated water resources management via SDG 6 and SDG2; develop collaboration among the health, agriculture and island development

sectors, to practice climate-smart agriculture and to better regulate, manage and use natural resources, and support the development of integrated water resource management systems.

5. Addressing issues related to public policy for SSE: institutional capacity, policy coherence and participation in the policy process; institutionalisation or long-term sustainability of state interventions and initiatives as recommended in Policy Innovations for Transformative Change: UNRISD Flagship Report 2016.

About the author

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Food security: finding meaning at a time of global pandemic

Humaida Abdulghafoor

On 7 April 2020, Maldives Economic Review editor and writer Fazeel Najeeb asked two critical questions in his article on food security (Fazeel Najeeb, 2019).

1) *Are we stable in staples?* 2) *Does food security matter?*

The short answer to the first question is no, we are not stable in staples. The evidence for this is stark. The answer to the second question whether food security matters, is a resounding yes! These answers show that the food security issue is highly problematic in the Maldives. For these reasons, I want to add a third critical question to that list – what exactly is food security?

Food security may mean different things based on the context. According to the world Food and Agriculture Organisation (FAO), “food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO, 2008). FAO defines food security to have four distinct dimensions as below.

When we consider the first dimension of physical availability of food in the Maldives, we are already acutely aware of the precarious instability of basic staples as Najeeb has highlighted. According to the FAO, “Maldives imports over 90 percent of its food supplies” with fish being the “only food source for which the country is self-sufficient” (FAO, 2019). This shows the precarious position of the Maldives and its high dependency on international trade to sustain the population. Today, as we face the coronavirus COVID-19 global pandemic, we are seeing that food supply and distribution systems globally are breaking down to the point that produce from a few miles away, is unable to reach consumers. Widespread lock-down restrictions are causing supply bottlenecks, disrupting transport networks and bringing businesses to a grinding halt, a situation no one could have imagined possible a few months ago. As an FAO official describes the current situation, “It is a whole different animal. You don’t have labour, you don’t have trucks to move the food, you don’t have money to buy the

From this definition, **four main dimensions of food security** can be identified:

Physical AVAILABILITY of food	Food availability addresses the “supply side” of food security and is determined by the level of food production, stock levels and net trade.
Economic and physical ACCESS to food	An adequate supply of food at the national or international level does not in itself guarantee household level food security. Concerns about insufficient food access have resulted in a greater policy focus on incomes, expenditure, markets and prices in achieving food security objectives.
Food UTILIZATION	Utilization is commonly understood as the way the body makes the most of various nutrients in the food. Sufficient energy and nutrient intake by individuals is the result of good care and feeding practices, food preparation, diversity of the diet and intra-household distribution of food. Combined with good biological utilization of food consumed, this determines the <i>nutritional status</i> of individuals.
STABILITY of the other three dimensions over time	Even if your food intake is adequate today, you are still considered to be food insecure if you have inadequate access to food on a periodic basis, risking a deterioration of your nutritional status. Adverse weather conditions, political instability, or economic factors (unemployment, rising food prices) may have an impact on your food security status.

For food security objectives to be realized, all four dimensions must be fulfilled **simultaneously**.

Source : (Screenshot) *An Introduction to the Basic Concepts of Food Security*, FAO, 2008

food” (Reuters, 2020). But this is our new reality.

In March 2020, President Solih reassured us “that the State Trading Organisation (STO) is currently working on stockpiling essential food items, including 10-months’ worth of rice and sugar, and 5-months’ worth of flour by mid-April” (President’s Office, 2020). A key word here is, essential. With 90% of our food supplies being imported, it is not just essential staples we are unstable in. The vast majority of all food products that sustain our nutrition levels have a high carbon footprint, as we depend for everything from chillies, lime, garlic and onion to tomato, cabbage and kale, on imports. The few commercial farmers producing locally grown produce cater primarily to the lucrative resort sector. The affluent minority among us indulge in leftovers from that industry which trickle down to the local market-place. The same minority will have access to mangoes from Pakistan, avocado from Australia, apples from South Africa, strawberries from Egypt and blueberries from the United States. Sustainability is not a consideration in the globalised supply system which delivers these products to consumers who can afford them. The less affluent majority cannot indulge in locally or globally sourced nutritious luxuries. However, everyone will suffer the consequences of any interruptions to the supply of price-controlled imported ‘essentials’ on which we all depend. Essentials alone will not cover the food needs of people and the COVID-19 crisis does not discriminate. The pandemic pandemonium affects everyone without exception. As food supply systems are disrupted in fundamental ways, the FAOs food security dimension of the physical availability of food is seriously compromised.

In the Maldives’ geographically dispersed and oceanic context, communities experience difficulties accessing goods and services in ‘normal’ situations. Therefore, when we consider the stability of FAOs second dimension of accessibility to food (which include economic and physical access), the current situation is particularly concerning. Many communities are seasonally insecure in water, let alone food (Mihaaru, 2020). The FAO description of “economic and physical access” to food is being negatively affected, as the largest single revenue earning industry, the tourism sector, shut down as a result of the pandemic. Long established resort chains quickly turned to mass lay-offs to save their businesses (Maldives Insider, 2020). While most resorts shut down, some promised that workers will be paid and retained, although the reality is turning out to be very different as workers complain about salaries being halved or in some instances, going unpaid. This will result in large numbers of people in financial difficulties as their wage-based income grinds to a sudden halt in much the same way as the businesses and the food supply systems. The outcome of this will be the challenge to sustain access to food due to financial poverty, even if physical access to food is met. In the unfolding situation, the country’s heavy import dependency may very well jeopardise physical access to food too. Another consequence of the lock-down which is limiting inter-island travel, is the challenge in some communities to access banking services. Many communities do not have reliable banking services and the nationwide lock-down is leaving people cash-poor to purchase essential food and other supplies.

When we turn to the third dimension of food utilisation, FAO explains that the concept of food security rests on

sustained access to adequate nutrition. It also requires enough “energy and nutrient intake by individuals” which will be “the result of good care and feeding practices, food preparation, diversity of the diet and intra-household distribution of food” (FAO, 2008). There exists a hopeful view in the Maldives that so long as there is fish in the ocean - our only stable staple - Maldivians will not go hungry. But how realistic and practical is this viewpoint? While tuna is our staple and daily dietary friend, as a high dependency staple, tuna has another security story. The connection between high levels of tuna consumption and exposure to “mercury in its most toxic form” – methylmercury, which could cause neurological damage to the human body, is a serious concern (UC Santa Cruz News Centre, 2019). Preventing hunger with a high dependency on tuna evidently does not assure nutrition security.

On the issue of nutrient intake in the Maldives, we know there are serious challenges to good nutritional health in our population. Latest available national data shows that 15% of children under 5 years are ‘stunted’, meaning too short for their age while 9% are ‘wasted’ or too thin for their height, and 15% are ‘underweight’, being too thin for their age (Ministry of Health, 2018). Stunting, for instance is described as “an irreversible condition”, the consequence of “a lack of adequate nutrients at an early age, debilitating both cognitive and physical growth for the rest of a child’s life” (UNICEF, 2020). Nutritional deficiencies have serious consequences for children and adults alike, and the government’s recent introduction of the breakfast programme in all public schools could be interpreted as a response to the need for nutrition supplementation among children (Avas, 2019). The Maldives Demographic and Health Survey (MDHS 2016-2017) found that the “feeding practices of only half of children aged

6-23 months meet the minimum acceptable dietary standards”, and 50% of “children aged 6-59 months and 63% of women aged 15-49 are anaemic.” Anaemia is described as a serious condition which impairs “cognitive development, stunts growth, and increases morbidity from infectious diseases” (UNICEF, 2019). Cautionary figures provided in the MDHS on obesity shows that 49% of adult women and 35% adult men are obese in the Maldives. Obesity is a non-communicable condition closely connected to impaired nutrition intake resulting in serious health consequences (Health Direct – Australia, 2019). Thus, food utilisation and dietary practices in the Maldives have significant linkage to food insecurity realities. The business of prioritising and increasing mass dependency on highly processed and packaged food with long shelf-lives, far removed from the origins and sources of food has arguably taken its toll on nutrition availability. In addition, the heavy dependence on chemicals in the production of food grown closer to home plays a role in undermining nutritional value, quality and accessibility.

When turning to the fourth dimension on the sustained stability of the first three dimensions of food security, which are clearly deficient in the Maldives, we can appreciate the broader meaning of food security and the gravity of the food insecurity situation in the country. The evidence is clear that the country was not secure in any of the three dimensions of food security, even prior to the current pandemic. The present crisis further undermines the fourth dimension which is the continued and sustained stability of the three key dimensions of food security, namely the availability, accessibility and utilisation of food.

A concluding question to consider is, what solutions exist to address the food

insecurity we face given the breadth and depth of the pre-pandemic food security issues, and the unprecedented changes happening now in this sector? Within the simple scope of this article, the following suggestions are posed to policy-makers.

1 – Dare to think and do differently:

Significant and tangible interventions are needed to change the way things have ‘always been done’, to address the changing needs of our rapidly changing times and to ensure food-shortage disaster preparedness with the ultimate goal to prevent mass hunger. Acceptance of the need for a paradigm shift in food security outlook is key – this is everyone’s problem, not just the government’s. Fundamentally, policy outlook has to change to a people-centred, community based approach to food-security solutions including the introduction of simple technologies and training suitable to the country context. An enabling environment must be created for subsistence farmers to sustainably establish themselves at both island and atoll levels. Community farming models, such as community gardens can be introduced. A fundamental aim of such initiatives must be to sustainably reduce the food carbon footprint and meet FAO’s four main dimensions of food security.

2 – Prioritise sustainability and protect natural assets:

This change must be aligned with the core concepts of sustainability of all natural resources and potential terrestrial and marine food production systems, available in the Maldives. This means the absolute necessity to safeguard all existing food sources including all food producing flora and fauna, arable land, coastal ecosystems and ensure their preservation, conservation and sustainable environmental management. In land-scarce Maldives, sustainable land management and planning must be among the highest national priorities.

3 – Focus on community engagement, education and mobilisation at island and atoll levels:

Communities must be

consulted and empowered financially, educationally and technically to care for local public natural assets such as land and vegetation that will safeguard food security. This should also involve educational components on nutrition and its critical role in maintaining human health and wellbeing. Such education must be geared towards re-education on the implications of food choices on human health, from the school curriculum and beyond.

4 – Make food sovereignty the end goal:

Maldivians have historically survived shocks to their survival systems by turning to community based public natural resources. The new globalised world has radically devalued those survival mechanisms at local levels by developing an over-dependency on the current centralised system, which is effectively a single point of failure. That failure is being clearly seen today. This lesson must be well-learned, and the time to embrace the concept of food sovereignty practiced elsewhere, which put “people’s need for food at the centre of policies” has arrived (Food Secure Canada, 2020). The time to adopt fresh thinking on food security in the Maldives context, is right now.

About the Author

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Over the last 10+ years, she has worked in various subject areas for different organisations including UN agencies, NGOs, INGOs and government institutions. She works and volunteers with citizen interest groups and civil society organisations on human rights, women's rights and environmental protection issues in the Maldives.

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Food security: pitfalls and opportunities on the path to a robust policy

Umar Hilmy

The COVID-19 pandemic has disrupted global supply chains, causing widespread alarm with regards to food availability and simultaneously caused an economic downturn so severe that, without the right policies in place, it could result in widespread famine throughout the Maldives. In response, the State Trading Organisation in collaboration with the Ministry of Fisheries, Marine Resources and Agriculture has set up the Agri Centre, an institution that is to purchase locally-farmed produce with the public being urged to grow starchy tubers, amongst other key crops. While this policy response is likely to bolster the agricultural industry in the short run and also potentially set the foundations for an industry that will be much larger in scale and output going forward, it risks being a misguided and a reflexive bid for self-reliance and a precursor to destructive protectionism. With fast dwindling usable foreign currency reserves to purchase essentials and a paralysed tourism industry unable to produce a significant enough tax yield to see us through the pandemic, an aggressive drive to grow our food locally is necessary. However, such an initiative must be sustainable and in the best medium- and long-term interests of our food security strategy as well.

The fundamental problem with a policy rooted predominantly on self-reliance is that it contradicts the theory, and practice,

of comparative advantage and could eventually produce adverse results. To delve into this point, let us first explore what a comparative advantage is. An economy has a comparative advantage over another economy when it can produce goods and services at a lower opportunity cost than that of its trade partners. It is one of the foundational principles of international trade. And there is consensus amongst economists that world trade; with countries specialising in the production of goods and services that they can produce better or cheaper than the rest of their trade partners, increases economic growth and raises living standards. This is the reason that the iPhone is manufactured in China, though designed a world apart in Silicon Valley. China is simply better at manufacturing smartphones for various reasons. They have cheaper labour, different regulations, and strong manufacturing infrastructure.

However, with COVID-19, one of the key assumptions for international trade and the global food distribution system has been turned on its head. We have never had restrictions of movement and trade on a global scale after the world became this globalised. In the confusion a situation like this creates, it is possible to misguidedly attempt to overshoot.

STO and the Ministry of Fisheries, Marine Resources and Agriculture have informed the public that even staple foods like rice

can be produced in Maldives. That maybe so. But the question of whether the public should invest savings or borrowed capital in the midst of a major economic downturn, to produce rice due to assurances that the Agri Centre will purchase their produce, must be asked. This is because global supply chains and international trade have not ceased for good. Despite the current economic climate, the world will most likely adapt and forge a 'new normal'. The world has seen many pandemics and they were all disruptive until normalcy eventually crept in. So, in a post lockdown world, it is possible that the rice, or any other crop produced in Maldives cannot compete in terms of price or availability with rice or other such crops from countries that have long held a comparative advantage over the Maldives. This would not be the best outcome for those that are urged to invest time and money to produce staple foods. And it could be an outcome that is just a few months or a year or two away, depending on how long the pandemic lasts.

A sack of imported rice costs MVR 240, and a kilo costs MVR 4.80. While a technology driven agricultural revolution that could help the Maldives to compete with these prices would be a most welcome development, it is still questionable whether these crops can sustainably and competitively be produced here in the long run. Potentially game changing solutions like growing genetically edited rice in the ocean and turning to micro algae for an alternative source of protein, to name a few, all hold promise but are yet novel and require heavy investment.

Once global supply chains restart, the private sector would have the incentive to import cheaper crops from abroad, produced at scale with lower costs of production to be sold cheaper than local produce. To keep up with such developments, policy makers could be forced to support an industry that the public has heavily invested in; leading us down a path of protectionist tariffs and price controls that will ultimately be detrimental to the consumer as well as to our overall food security strategy.

It can however be argued, in the words of John Maynard Keynes, that in the long run we are all dead! That the alternative to not attempting such a feat, could potentially lead to severe food shortages and even famine. And we should make every attempt to avoid such a scenario. But to mistake necessity for longevity could also prove fatal. And for the public to be given the impression that this will be a permanent solution risks moral hazard. A more prudent approach might be to inform the public that growing locally is what is required now. And that we need to produce as much as possible at the moment and also that we can continue producing a much higher percentage of our nutritional needs going forward. This, combined with strategically sourced essential crops, be it in the form of aid or debt, might be an option worth exploring for the immediate future.

For the medium- and long-term, we can adopt successful strategies from countries that have done well on the food security front, and we need not look too far for good examples to emulate. Singapore, a similarly land scarce and small country,

topped the Global Food Security Index for the last two years. Though they still highlight the fragility of their system in the context of a global pandemic, Singapore fared vastly better than most small import dependent nations, aided by their food stockpile, diversified import sources and generally robust food security policy. While it remains to be seen if Singapore can defend its score on the Index post pandemic; there are important lessons we can learn from them.

The Global Food Security Index, developed by the Economist Intelligence Unit and supported by Corteva Agriscience, considers in the annual study, the **affordability, availability, quality** and **safety** of food in the countries they assess (unfortunately Maldives is not yet on the Index). Singapore came in first with an overall score of 87.4 but still has room for improvement in comparison to developed western countries like Ireland and the United States that surpass Singapore's score in the quality and safety category. Nevertheless, it is exceedingly impressive that a country like Singapore, with parallels to the Maldives in terms of land scarcity and a relatively small population, managed to surpass the rest of the world and top the Index for two consecutive years.

So, what is the Singaporean formula? The Singapore Food Agency, a statutory board with the mandate to ensure food security, has a multifaceted approach which we in the Maldives can borrow from while crafting a food security strategy that additionally factors in the unique logistical challenges we face owing to our

dispersed nature. Such a strategy might look as follows:

Diversification of imports:

We can ensure that no single critical item comes from a single location however stable the supply is. Singapore imports food from more than 180 countries. Currently, we are overly reliant on our South Asian neighbours for essential crops and most other crops too. Importing essentials from a variety of sources would be a safer approach.

Growing locally:

While growing locally is a challenge for the Maldives, agricultural technology has evolved drastically, and it is now possible to grow a variety of crops via hydroponic and aquaponic systems along with a vast array of newly developed agri-tech solutions. These systems can even be made weather independent and require relatively small spaces and can even be setup in urban areas as well. Singapore had a "30 by 30" goal – to produce 30% of their nutritional needs locally by 2030, pre-pandemic. This might now be revised with an even more ambitious goal. We too can set a similar goal; and we do arguably have an advantage in terms of land availability in the outer atolls that can be put to use to produce enough crops to cater to a significant percentage of our nutritional needs. The government can also invest in or promote initiatives like Singapore's 18-hectare Agri-Food Innovation Park, a facility dedicated to high-tech farming and research and development in the sector.

Growing overseas:

Singapore grows a significant chunk of their food crops in neighbouring Malaysia, where they own large estates optimised to secure the supply of essential crops. We too can adopt a similar strategy where STO or any other such body can own similar “grow overseas” estates in neighbouring countries like Sri Lanka, India or even Malaysia and Indonesia.

Strengthening distribution networks:

We require an efficient inter-atoll distribution system to ensure that locally produced crops get from farm to market to table feasibly and reliably. Hence, we must invest heavily in creating robust distribution systems that will allow crops, both imported and grown locally, to adequately and efficiently be distributed throughout the country.

Harnessing the power of big data:

Data backed policy making is a fundamental pillar of any successful national strategy. And data science has revolutionised agriculture by allowing us to eliminate inefficiencies and increase productivity by aiding our decision-making abilities. With sensors, we can digitally map soil and crops, recommend fertilisers, detect diseases, and manage pests and set up automated irrigation systems to name a few recent innovations. We also need to gather data on our nutritional needs, how best to cater to them, required yields of all crops, logistical requirements and how to produce essential nutrients that are currently lacking in our diets, to aid better decision-making.

Increasing economic growth:

Sustained economic growth is essential for any food security strategy. It is the common factor that contributes to availability, affordability, quality, and safety. It is the reason Singapore has been able to top the Global Food Security Index while no other Asian country made it onto the top 20. The security of having sufficient reserves to source essential food items during a possibly extended downturn can only be achieved through a period of growth where the state has been fiscally responsible. This needs to be a priority come the next upturn, lest we forget.

In recovering from this pandemic and creating a new normal, we as a nation could benefit from a reassessment of our food security strategy. We can harness innovative, climate resilient technologies and adopt a data backed, well-rounded strategy to ensure that we are resilient in the face of shocks to global supply chains and that the essential food needs of Maldivians are met without fail, come rain or shine.

About the author

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HORTIFARM success

Mohamed Zuhair

With expansion of tourism industry across the country, the demand for fresh products has been increasing dramatically. Concurrently, the interest of local consumers too, for healthy and high-end fresh products have increased. Because of the business opportunity in locally grown foods and interest in commercial farming, Fantasy has ventured into farming to produce some of the imported fruits and vegetables locally. With this intention, Fantasy applied to lease an island under the government's scheme for leasing of uninhabited islands for agriculture projects. Although the effort to obtain an island with adequate land area for open field cultivation was not successful, eventually we were able to lease a small island (Felivaru) of 9 hectares in size, from Noonu Atoll and began developing agriculture under the name of Hortifarm. The key objective of this project

is to grow high quality vegetables and fruits, utilising economically feasible technologies and best management practices.

Fantasy embarked on the agriculture project with no prior experience or knowledge in this field and hence, encountered numerous challenges as the project progressed. It took a significant duration to complete preparatory activities of the project and start the operation. There were delays in surveying the island, preparing the Environment Impact Assessment (EIA) and approving of the report, mobilisation work and developing basic infrastructure. Challenges were also faced due to access difficulties and hence deepened the lagoon for harbour along with the access channel.

Measures were taken to protect the island's eco system, saving groundwater



Topview - Hortifarm

aquifer and minimise environmental impact in the development phase of the project. Water tanks were installed in different locations for storing rainwater harvested from all available roofs including greenhouses with a total storage capacity of 2,600 tons. A reverse osmosis (RO) plant for desalination was also installed to supplement water requirement particularly in the non-rainy season. The desalination plant with rainwater-storage network contribute for energy savings.

Given the small size of the island, focus was made to adopt modern greenhouse practices. Thirty-six greenhouses/tunnels, with a size of 3,000 square feet, were built. Special nurseries were setup to sow seeds and grow seedlings. A drip irrigation system is laid in the tunnels and irrigation time and rate are centrally controlled in an injector house. Fertiliser is applied to the plants through the irrigation system. Disinfestation protocols are carried out after every harvest and if pests

and disease symptoms appear on plants, biological pesticides or fungicides are used. Regular checks are carried on texture, ripeness and sweetness to maintain fruit quality. For controlling pests in the open field crops, Integrated Pest Management (IPM) approaches are applied.

Considering the lack of experience in growing commercial crops in tunnels, on-firm trials are conducted to learn and fine tune the practices, procedures and processes of cropping systems. Similar trials were also conducted in open field, to identify marketable high yielding crop varieties. All these research and development activities are done under the guidance of foreign experts who made regular visits to the site and the project became fully operational in 2015. Rock melon and honey melon are grown in tunnels and scorpion chilli and eggplant are cultivated in the open field.



Melon - tunnel



Egg Plant- open field



Scorpion Chilli - open field

Immediately after harvests, the products are sorted, graded and packed in corrugated boxes specifically made for packaging as a Hortifarm brand.

Agriculture production

Melons have grown in tunnels throughout the year for the past four years while scorpion chilli and eggplant have been cultivated continuously in the open field for more than three years. Currently, 6 tons of produce are supplied to the market weekly.

Adding an Island to Hortifarm

All available land in Felivaru is fully utilised and thus agriculture production cannot be expanded further on the island. As the infrastructure has developed in Felivaru, expanding farming activities to a nearby island and managing the operation from Felivaru could easily be done. By valuing on how the agriculture project has been

managed in Felivaru, the government leased Noonu Maafunafaru in 2018.

Using the experience in Felivaru, mobilising and developing infrastructure was carried at a faster speed. Taking

the dangers that pose to vessels bound to the island due to shallow reef and lagoon surrounding the island, part of the lagoon was deepened along with access channel. Installation of tunnels, RO plant and rainwater tanks are in progress. Concurrently, cultivating chilli and eggplant in the open fields has initiated.

Challenges and concerns

Greenhouse/tunnel production is relatively more expensive than producing the same crop in the open field due to fixed costs such as expenses on tunnel frame and cover, fertigation system, and plant growing systems. These fixed expenses have to be paid whether or not a crop is

produced. In addition, tunnel production is labour intensive. Use of biological pesticides also add up to production costs. Due to the high operating costs, Hortifarm's melon prices have been found to be uncompetitive to imported melons from neighbouring countries. Intermittently, market gets flooded with imported melons grown in the open field. In such situations, resorts go for prices and buy the imported melons despite low-quality produce.

The biggest market for the fresh produce is the resort market. Even while Fantasy have offered a year-round fixed price, resorts' purchases have been inconsistent.

Looking into the future

Agriculture industry has a great potential in the Maldives. However, it is essential to use modern farming technology to develop and expand the industry and to run as a profitable business. This means investing on agriculture projects, but the key condition of such investments will be to make them protected and viable.

Therefore, it is essential to create an enabling environment for investments through appropriate policies and strategies to ensure investor confidence.

Investing in agriculture is typically a long-term venture. In designing policies for promoting investment in agriculture it should be recognised that recovering

investments on agriculture projects takes longer periods.

Today, we are experiencing disruptions in food supply chains due to countries locking down borders due to the COVID-19 pandemic, showing the necessity for investing in agriculture. We can contribute to food security through supporting and collaborating among stakeholders; if not, the agriculture industry will remain in the back seat.

Fantasy is a pioneer of the Maldivian food service industry, having started operations from mid-1980s. The opening of the supermarket; Fantasy Store, offering a wide range of top-quality fresh, dairy, chilled and frozen products from Europe, Australia and Asia allowed Fantasy to become the leading and preferred supplier to the fast expanding Maldivian tourism industry.

Hortifarm is on a small island in Noonu Atoll in the North of the country being developed with the objective of undertaking commercially viable agriculture in selected products using the latest, efficient and environment-friendly technologies and grown sustainably. With the experience at Hortifarm Fantasy looks to the future with optimism and started investments in Noonu Manafaru in 2018.

Food supply chain in the time of COVID-19

Rifaath Hassan

The novel coronavirus disease (COVID-19) has led to logistic bottlenecks in the global food supply chain from production to processing to transportation to retail as countries imposed lockdowns around the world. The impact of COVID-19 is seen both in health and socioeconomic terms. Governments dealing with COVID-19 are faced with many challenges amidst the lockdowns, where they have to deal with disruptions in food availability, accessibility and affordability, which is going to strongly impact food security and nutrition. They are posed with finding options to keep the populations fed.

The experts and authorities in Maldives stated in early March that the country is not likely to face any food shortages with regard to staples (wheat flour, rice). Even so, the whole world including the Maldives are worried over the fear of a food crisis, led by food shortages, which may eventually lead to increased food insecurity. We are unsure whether the perishable goods which we depend on

will arrive in a timely manner and this is where the food shortages will persist as per global experts. These include fresh fruits and vegetables, meat, milk, eggs, processed foods, etc. Most of the importing countries for Maldives (Figure 1) are in one or another form of restrictions or lockdown. From Fig 1, we can see how diverse the supply chain is on a global scale. Our import dependency will be one of the major challenges of food security and we are not sure how much it will impact the current food security issues, added with the economic shocks, that are being driven due to the COVID-19 pandemic.

The COVID-19 crisis has put additional stress on the supply chain which is a system of a just in time approach which in a normal situation enables food to move from farms/fields to our dinner tables in a systematic manner. We get access to a bountiful supply of seasonal fruit, vegetables, milk, meat, various types of grains and cereals and processed foods and beverages. This is all thanks to the global food supply chain where we are a net importer of the products. We do not

know when the effects of food shortages will be seen in our country where at global scale, it is believed that food shortages will be a likely scenario.

IMPORT ITEMS BY COUNTRY

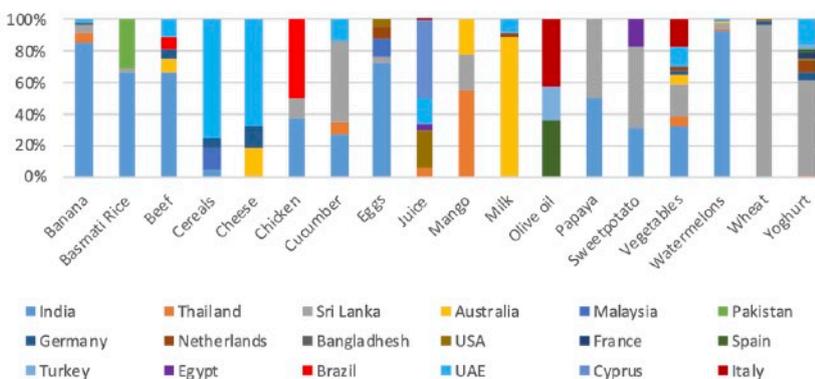


Figure 1: Food imports by Maldives (Jan - Feb 2020)
Source: Maldives Customs Service, 2020

Table 1 highlights some of the food groups that we are highly dependent on, and it shows the imports for the year 2020 (Jan-Feb). The total quantity (Figure 2a) and CIF value in MVR (Figure

Table 1: Import of Food Items (Jan – Feb 2020)

	Quantity (kg)	CIF (MVR)
Eggs	35,343,753.00	42,985,438.58
Meat	3,246,070.91	150,171,105.56
Fruits	3,060,383.42	48,010,407.83
Juices	2,920,706.41	34,690,175.76
Wheat	3,298,327.36	28,363,804.67
Rice	6,661,092.87	71,893,466.16
Vegetables	2,452,583.14	63,396,367.02
Dairy	1,952,168.58	35,749,313.17

Source: Maldives Customs Service, 2020

2b) are shown for the major foods that we are import dependent on. The categories are groups mainly with locally available produce that are imported. Only some imported food items are included for the chart as this chart is to show how much we are importing the stated items and at which price.

What is the food system?

What we eat as food reaches us through a food system (Figure 3) which moves the food in a methodical manner from producers to be delivered to consumers along a supply chain. It is a business model involving producers and

Quantity (KG)

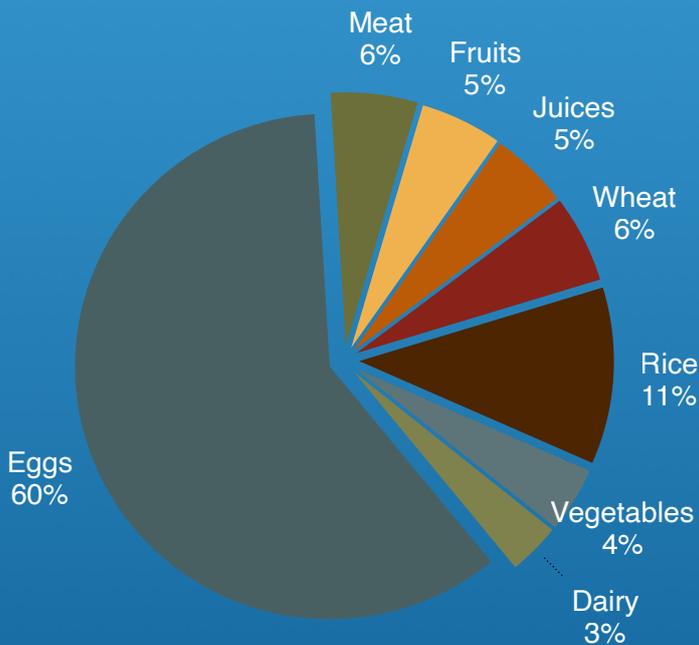


Figure 2a: Qty of foods* imported (KG)

CIF (MVR)

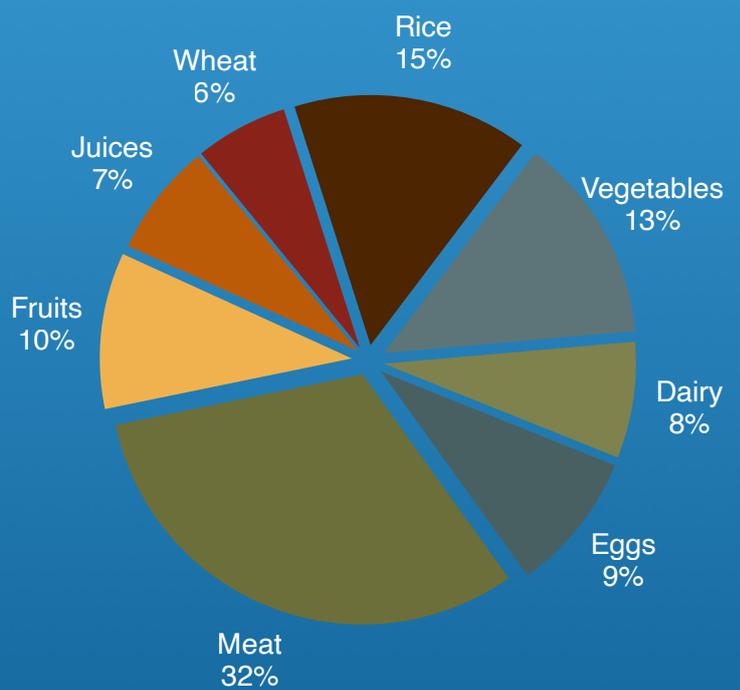


Figure 2b: CIF (MVR) of the same produce)

*The vegetables include only lettuces, chillies, spinach, potatoes, cucumber tomatoes, etc. The dairy is only for milk (excl powdered and baby formula milk), yoghurt and cheeses. Meat is for frozen or chilled chicken and beef. Fruits are for banana, passionfruit, melon, papaya and mango.

agriculture products buyers and the interactions within the supply chain actors from, input supply and production of crops/livestock/fish, and other agricultural commodities to transportation, processing, marketing, retailing, and preparation of foods to consumption and waste management (International Food Policy Research Institute, 2020). What we pay as consumers for the food is the work of many key people who are involved at various stages of the supply chain. Each and every part of the supply chain requires various human resources. The Agri business partnerships depend on each other. It acts like a domino where if one part is affected then the whole food supply chain is affected. This eventually means we may have to pay a higher price for that change to have taken effect, like crop losses, trade barriers, export restrictions etc.

Figure 3 represents a schematic diagram of a basic cyclical food system. These kind of food systems are short and form the basis of local food systems. The global food system is one big network encompassing all these steps and includes the drivers of the food system forming interconnecting linkages with one another.

The main factors that drive the food system include the enabling policy environments, including social, economic, environmental and political. Food systems are shaped by “governance, trade, and investment at the global level and play a



Figure 3 Schematic representation of the food supply chain/food system

major role in powering local and national economies” (IFPRI, 2020). Significant factors such as population growth, socio-economic factors, climate change, urbanisation, consumption patterns and globalisation has been attributed to be driving the food system in the last few decades. Some other key drivers for food insecurity identified in 2019 are also changing the food systems. These are “conflict/insecurity, weather extremes, desert locusts, economic shocks and COVID-19” (Global Network Against Food Crisis, 2020). For the year 2020, COVID-19 is one significant factor which many fear may lead to major food shortages and food insecurity globally, and is likely to be bringing major changes to the way the food systems operate both at local and global level.

COVID-19 impact and food security

The longer the food supply chain and the more complex it is, then the harder the communities will get affected if COVID-19 impact persist in the food economies. With the COVID-19 pandemic, food insecurity will be on the rise as per predictions, due to the economic impact associated with it.

A joint statement on 30th March 2020 by Food and Agriculture Organization (FAO), World Health Organization (WHO), World Trade Organization (WTO), stated that “uncertainty about food availability can spark a wave of export restriction, creating a shortage on the global market” (FAO, 2020). Some countries have already started with the restrictions and they are by major grain exporters. Kazakhstan, India, Ukraine, Russia, have imposed certain degrees of restrictions on exports of grains (Glauber Joseph et al, 2020). Experts are predicting if we will have another food crisis as seen in 2007-2008, where prices for global wheat

doubled and tripled for rice. However, according to FAO stocks for the grains are intact and positive from the 2019 and early 2020 forecasts (FAO, 2020), even though they say supply chains may face issues due to logistic bottlenecks.

The problem right now is for the fresh food supply, the high value commodity products. The seasons have changed in the global North. This is the time when most agricultural workers go back to fields and sow the seeds, manage and harvest what is on the ground. With the pandemic, most food producing companies have to work in restricted conditions, getting workers from across borders and putting the workers' health at risk if working during the crisis. For the agri-food sector, logistics play a very significant role. Disruptions in the food chain will have a domino effect on the supply and will impact on the quality of food, shelf life, safety and can prevent from reaching the markets in time and we will be seeing price increase in foods in such cases (FAO, 2020). With economies slowing down, the affordability of food, access to food and availability of food at local markets may be something to worry about, as it is believed that unemployment and income reductions will be negatively effected. This has been stated by FAO, IFAD, the World Bank and World Food Programme and released a statement during the G20 Summit.

A Call to Action for World leaders petitioned by farmer groups, NGO's, academia for world's food companies, states that COVID-19 response measures should address three major things in order to minimise the risks to global and regional food security. That is 1) by maintaining open trade, 2) to invest in resilient food systems, and 3) to ensure

access to food to all (Food and Land Use Coalition, 2020).

What does it mean for Maldives when the global food supply chain gets disrupted?

Amidst the COVID-19 crisis, the economy of Maldives is not at its best, and our food system is also dependent on a fragile economy which is again heavily dependent on the tourism sector. Food is not only about being produced in the field. It is also about how we get it from the farm or fields to the tables from wherever it has been produced whether it is local or global. It is also about importing the produce and distributing to the island communities. It is a system of agri-food businesses and its local partnerships.

We as an island nation will have more worries as we will be most impacted with the ongoing crisis. There has been a huge disconnect on the way we produce food, and also the way we distribute the food, mainly due to the dependency on the global supply chain.

In the coming weeks and months, the global food system will be strained due to the disruptions that are already in place due to major lockdowns and border control. Workers are needed to run the supply chain locally and globally. The health of workers, both local and global is of importance for the agri-food sector to run. We cannot afford to risk the health of workers who are the only medium of running the supply chain. Low restaurant traffic will be a challenge due to closure of the food service industry, restaurants, cafés, etc., and people will be more dependent on groceries for their meal plans. The biggest disruption to the FSC will be the rapid shift of consumer depending on supermarkets for their food needs and the supply chain has a huge

role to play in catering to the shift in demand. This would further stress the supermarkets and small shops in islands. What is already available in the supply chain will be used including backup supplies. When it comes to national logistics, it is already disrupted with the lockdown of the Greater Malé region and travel ban on marine and air travel. Distribution of foods will be slow even though the shipments will go to the islands but at slower pace. This will be entirely dependent on the global supply availability. In this regard even the local produce taken to Malé will also find its way back to the islands as per normal.

The time for replenishing the supply would be tough when restrictions and lockdowns will most likely start to impact the way we move food specially to remote islands, where access in a normal situation is also challenging. Even if lockdowns and restrictions are lifted, then supply will be a major challenge as many food exporters would have a huge task of feeding the global population including their own. If the pandemic impact persists then this may even be slower to address. If one product is in high demand in retail then clearly in the current crisis, we will face shortage in that. This would be the case for many commodities during the after effects of the pandemic COVID-19.

How do we mitigate the impacts of COVID-19 to the local food system?

This is the time for most of us to think for the future, how we can improve our own vulnerable food system. Individuals and farmers alike are trying to change the way we eat and the way we access our food. Since the pandemic, some of the Maldivian farmers have adapted to growing crops out of their normal crop calendar to feed the communities despite the ongoing crisis, such as maize being

grown by some of the largest producers, in AA. Thoddoo (Avas, 2020). Creating new economies of food could be the next food agenda for Maldives.

For the food system to be of significant economic activity the government of Maldives should have policies and regulations that can provide (1) basic input supply, (2) infrastructures, (3) create market incentives, (4) assist in promoting agribusiness venture models and (5) adopt innovative technologies for efficient and sustainable farming systems. The government's Strategic Action Plan 2019-2023 highlights some key areas which are of importance to the food system.

We are rich in agricultural biodiversity. We may have scarce land and we may be import dependent on resources such as inputs, infrastructures, machineries and tools. However, the country has an abundance of tropical food crops, roots and tubers, and exotic fruit crops. The chart in figure 4 highlights some significant crops which were in higher demand for the last five years. Our production is higher for some fresh food items.

The data in Fig 4 does not however take into account the production of the whole country, which should also be a major food policy outcome; improving agri-food data. Timely market analysis with local production and imported produce for the population should be studied for improving the agri-food sector.

The food imports are something we will be dependent on, but how to mitigate the dependency and make the local food system resilient is something that we should all work together for. We should be able to balance our dependency in import to that of local food production.

The supply side of the chain is a major issue in the Maldives. With food accessibility, and also with food distribution to islands being a major setback the islands are most at risk of

demand for locally grown produce, and with the reduction in imported fruits and vegetables more producers will be willing to contribute to a share in the market. We will be seeing more agri-food partnerships

Top produce sold at the Male' Local Market (2015 - 2019)

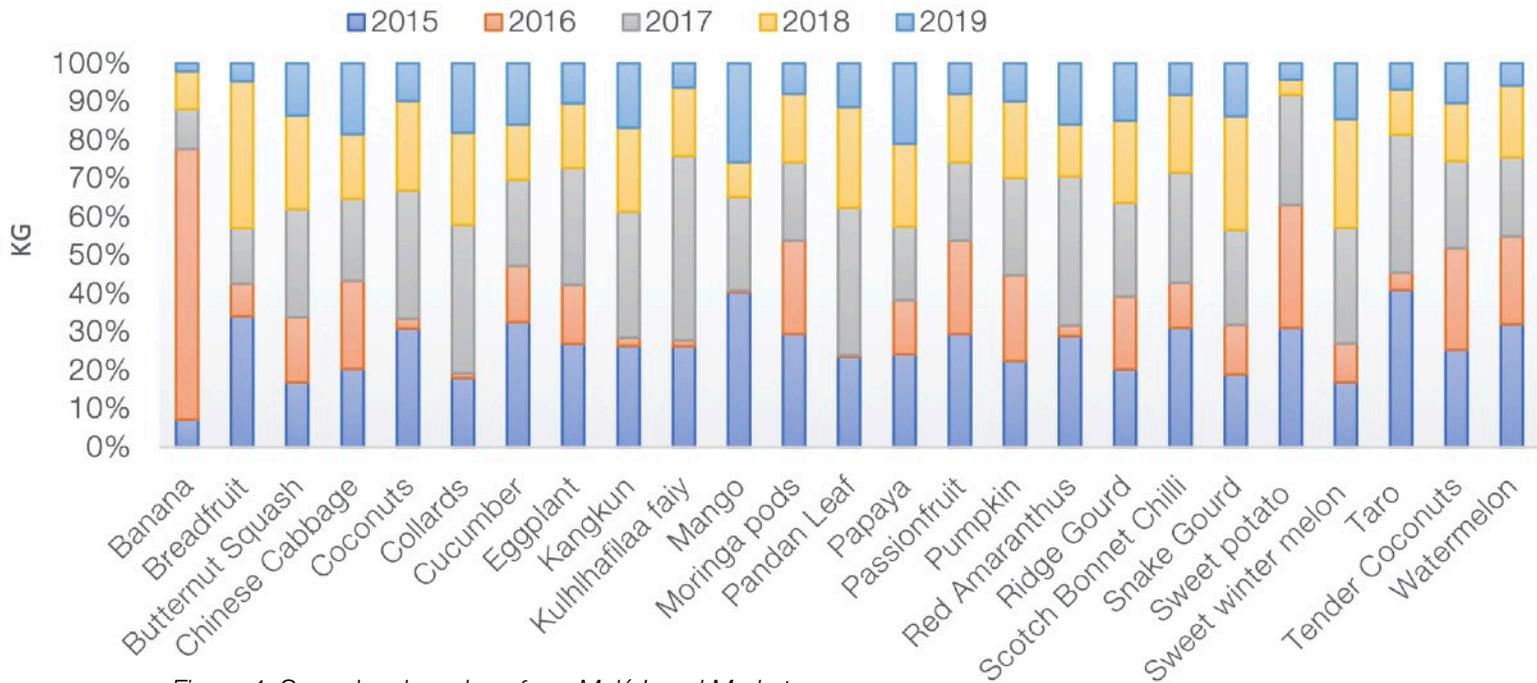


Figure 4: Some local produce from Malé Local Market.

Source: MFMRA

food insecurity. If food production, food quality, food safety, food accessibility and food affordability issues are addressed through proper distribution channels, the local food system has a means of striving in a geographically displaced island nation. For a food system to be resilient it should be able to ensure proper use of available resources and should be able to adopt sustainable policies, create jobs, enhance food security at island and national level.

Linking smallholder farmers to markets should be important for supply and demand to balance out. During the early onset of the COVID-19 cases in the country, the STO and MFMRA stated that local producers will be supported through an agri-centre where their produce will be bought and marketed. Likewise, MFMRA is urging farmers to continue food production and is also allocating land from those islands with available land. This is a great initiative as there would be a huge

coming up in the future. We would be seeing many areas of the agri-food sector playing a significant economic activity even if small.

About the author

Rifaath Hassan is a researcher at the Maldives National University. She has a Masters degree in Agriculture Science and is specialised in soil sciences. Since her post grad she has been working in the field of food and agriculture. She has been involved in community supported agriculture and organic farming projects and has been advocating for local urban food movement through an entrepreneurial program of ClimateLaunchpad. She is also doing a study funded by an MNU research grant on the significance of taro and its impact in the southern atolls of Maldives.

Food security: a Maldivian conundrum

Shafeenaz Abdul-Sattar

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life". (FAO, 1996)

An observation on the concept of staple foods and food security

A staple food is defined by www.businessdictionary.com as one *'that is regularly consumed in a community or society and from which people obtain most or a significant proportion of their calorie requirements'*. Meanwhile Wikipedia refers to it as *'a food that is eaten routinely and in such quantities that it constitutes a dominant portion of a standard diet for a given people, supplying a large fraction of energy needs and generally forming a significant proportion of the intake of other nutrients as well. A staple food of a specific society may be eaten as often as every day or every meal, and most people live on a diet based on just a small number of food staples. Specific staples vary from place to place, but typically are inexpensive or readily available foods that supply one or more of the macronutrients needed for survival and health: carbohydrates, proteins, and fats. Typical examples include tubers and roots, grains, legumes, and seeds.'*

Maldives officially considers rice, wheat flour and refined white sugar as her staple foods. Rice, roshi (the local flatbread) and conventional sliced bread are invariably consumed as an integral part of meals in most households. Wheat flour is also used in several other forms, while sugar is used much as it is used elsewhere; as a

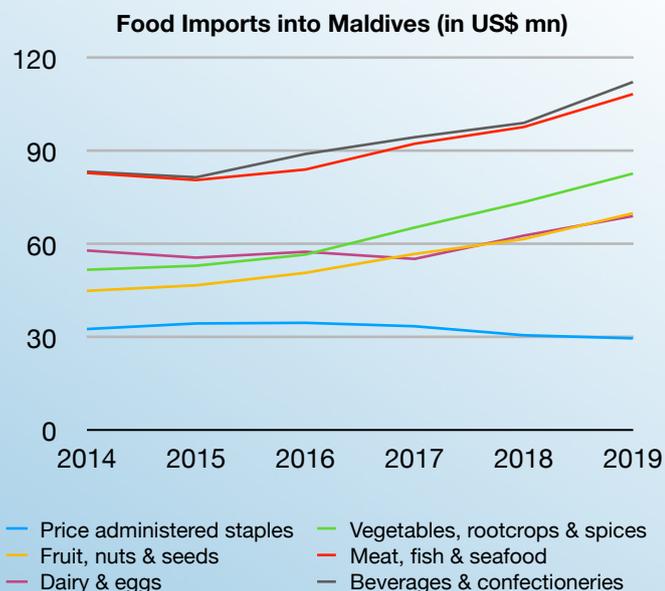
sweetener and to prepare desserts and confectionery.

Until about the early seventies, Maldivians lived a fairly basic, hardworking lifestyle, where the housework as well as all other industrial activity was undertaken with local materials and labour-intensive equipment. As such, much physical effort and hence energy was expended on any given day by men, women and children alike, and even a cup of tea or lime juice sweetened with refined sugar (or just a sweetened glass of boiled rain or well water) added welcome nutritional value. On the other hand, today many people live a more sedentary and plugged in lifestyle, where much of the menial and physical work is either subcontracted or undertaken with the aid of some electric or electronic equipment. Fast food and packaged snacks and drinks are available in abundance and consumed in significant amounts by locals and the expatriate workforce alike, and as in much of the rest of the world, this has made obesity and non-communicable diseases more the norm than the exception today. This has in effect relegated refined white sugar to the role of an undesirable staple food now.

Lifestyle, food habits and food security

With an economic correction imminent, this is an opportune moment to analyse food security in the context of lifestyle and food habits in Maldives. Considering that much of the domestically consumed food items (along with practically everything else other than tuna) is imported into the country, import data would technically be a perfect indicator of food habits of locals.

Food Imports into Maldives (in US\$ millions)						
	2014	2015	2016	2017	2018	2019
Price administered staples	32.9	34.7	34.9	33.8	30.9	29.9
Vegetables, rootcrops & spices	52	53.3	56.9	65.6	73.8	83
Fruit, nuts & seeds	45.2	47	51	57.1	61.9	70.2
Meat, fish & seafood	83.2	80.9	84.3	92.6	98	108.6
Dairy & eggs	58.2	55.9	57.8	55.5	63	69.3
Beverages & confectioneries	83.6	81.8	89.3	94.7	99.3	112.5



However, given that a large part of food imports is brought in to supply the tourism sector, currently available data would not serve as a direct proxy for local consumption, and there is no easily available data that might serve as an indicator for this purpose. Nevertheless, it would not be wrong to say that Maldivians, especially the population of Malé, spends a fair amount of money on food and drink - meals and drinks as well as packaged snacks and canned or bottled drinks. The past decade has witnessed a sharp boom in restaurants and coffee shops to complement the traditional teashops (saihotaa), particularly in Malé and the greater Malé region, as well as the larger islands. While having a cup of tea accompanied by some short-eats or a basic meal of rice or roshi with a tuna based accompaniment at the saihotaa was traditionally an everyday occurrence for many men in Malé, eating out or opting for takeaway or home-delivered food fairly often has become the norm for many young people and families today. An eat in or takeaway restaurant meal for two costs anything from about MVR 100 to in excess of MVR 600 nowadays.

The month of Ramazan is in fact paradoxically associated with increased consumption of food items in Maldives as in many other Muslim societies today,

with an array of dishes prepared for breaking the fast, and for the other meals taken between sunset and dawn. Recent years have witnessed new varieties of imported foods on the domestic market, from exotic fruits and vegetables to confectioneries and luxury items. In terms of numbers, international trade data indicates an obvious spike in food imports immediately prior to Ramazan each year.

Traditionally, much of the local production of fruits and vegetables was also geared towards the month, with a specific emphasis on fruits such as watermelon, other melon varieties, passionfruit, guavas and such for juicing. Nowadays, year-round local production serves a small portion of the extensive tourism demand and some of the local demand, although there still is an emphasis on increased production of fruits for Ramazan. According to statistics available online, 4.3 million kg of fruits and vegetables were produced in the country in 2018 (gov.mv, 2019). Meanwhile 90 million kg of fruits and vegetables (fresh, frozen, dried preserved and prepared) was imported at a cost of MVR 1.9 billion in 2019 (customs.gov.mv, 2019).

While in past decades savoury and sweet local delicacies and sugar laden juices was the norm for breaking fast in Ramazan, in recent years there has been a trend towards including healthier options.

Restaurants and coffee shops also provide several menu options prior to and during the month for traditional 'maahefun' gatherings that bring the month in, and for breaking fast, as well as the later post-Tarawih dinner and even the late-night meal during the month. These have become fashionable for various groups to partake of, with most workplaces organising at least one such gathering each Ramazan. Menus that started at a fairly modest level of around MVR 50-75 per head for about 10 varieties in the early 2000s have in recent years skyrocketed to the MVR 300-500 range or higher, with more varieties on offer. Nevertheless, with the apparent increase in income levels, there does not seem to have been any lack of customers despite the exponential growth in both the number of eateries and the cost of the meals. Meanwhile households often strive to cater to the different tastes of the different members, especially in Ramazan, and often end up preparing far more than can be consumed on a given day. Cultural norms have shifted and people's lives have become much busier and more nuclear, meaning that there are less family interactions, distribution of food to friends and family or visiting friends and family in the evenings in Ramazan (when they would traditionally be served short-eats prepared for breaking fast). There also seems to be a trend towards not consuming food prepared on a previous day. A significant amount of wastage is the inevitable result; according to the Ministry of Environment, a recent waste audit showed that 40 percent (about 60 tonnes per day) of total household waste at Thilafushi is food and kitchen waste (environment.gov.mv, 2019).

Another aspect of this conundrum is the predominant preference of households for bottled mineralised drinking water. This is despite piped water designated as safe for drinking purposes now being available to all households in Malé, most islands being equipped with rainwater storage tanks in the absence of piped desalinated water, and a range of water purification

appliances available domestically. This relatively recent movement towards drinking bottled water has resulted in a significant increase in imports of plastic packaging material and plastic waste as well.

In conclusion, it can be said that the 'nouveau riche' phenomenon that has been sweeping many developing or newly industrialised countries in recent decades has influenced Maldives quite significantly, and makes adjusting to an economic downturn or shock that much more difficult. Lifestyle and food habits are one aspect of this; popular culture, easy access to the internet and other modern amenities have also had their impacts. Today, many Maldivian parents seem to be as caught up, if not more, in the world of social media and an alternative reality as their children, and the domestic socio-political environment seems to have exacerbated this situation. Social interactions by persons in positions of authority without thought to the potential ramifications of their communications, in arenas that include children and others under their supervision have resulted in a breakdown in boundaries and a disruption of traditional patterns of parental or supervisory authority. The fact that this has given rise to an inability to institute effective disciplined environments became evident both at household and national levels during the early phases of the COVID-19 stay at home and lockdown phases in the country. In such a setting, maintaining an individual's or a family's security let alone a trade-dependent nation's food security in an interdependent world becomes quite a challenge. Nevertheless, efforts have to be made and change implemented to take Maldives to where she needs to be to provide a secure future for her children.

Suggestions for enhancing various aspects of food security in Maldives

Suggested Measure	Suggested Participation
Replace sugar with a commonly used variety of lentils or a starchy vegetable (eg: sweet potatoes, potatoes, yams) as a staple food	Government
Create a sustained debate and discussion on the concept and importance of food security in a small, dispersed trade-dependent island nation	Government, Majlis, Media, Educational Institutions, CSOs
Implement effective (low cost) themed messaging campaigns based on big picture/long-term thinking - buying local; proudly locally produced; lowering food miles; it's cool to grow your own food; wasting food is uncool; money spent does not equate satisfaction or nutrition, etc.	Government, MNCCI, MSME Associations, Media, Sector Associations, CSOs, City/Island Councils
Encourage establishment of home gardens for growing food products for household use. Disseminate information on effective use of small spaces and container gardening to grow commonly consumed varieties.	Government, CSOs, Sector Associations, Media, Educational Institutions, City/Island Councils
Encourage growing food items vs other types of gardening, in the context of food security and health; hence with an emphasis on organic or chemical-free/reduced food production.	Government, CSOs, Educational Institutions, Sector Associations, City/Island Councils, Media
In the absence of an institutional mechanism, encourage composting at household or building level for terrace/balcony gardening; make available info on easy composting methods and relevant equipment. (This could also minimise wet waste quite significantly.)	Government, CSOs, Sector Associations, Media, Educational Institutions, City/Island Councils
Make spaces available for small scale community gardening in park areas or rooftops/terraces of public housing blocks. Link to guidance from experts on growing methods and utilisation techniques for healthy eating, and to community outlets/local businesses for sale of surplus crops.	Government, City and Island Councils, MNCCI or MSME associations
Encourage restaurateurs to either try and grow some of their supply requirements or buy local. Encourage a symbiotic relationship between food growers and local eateries.	Government, CSOs, MNCCI, Media, City/Island Councils
Emphasise thinking big but starting small, minimising expenses and growing with demand, with sustainability and long term thinking as the basis for all ventures.	Government, CSOs, Media, Educational Institutions, MNCCI, BDC
Enable large scale food growers to market effectively to the domestic market, minimising supply chain constraints. (See ADB Technical Assistance Report (2005) on Commercialization of Agriculture in the Maldives for a detailed analysis of the subject)	Government, MNCCI, BDC, City/Island Councils, CSOs
Encourage greater use of household water purifiers to replace bottled mineral water for drinking purposes and household use.	Government, Private Sector, Media
Work with relevant domestic suppliers related to the food security equation who are in distress to rationalise for cost effectiveness/ keeping them afloat; bundle financial support and/or repayment moratoriums with business advice and mandatory requirements.	Government, Lending Institutions, BDC, Media

The health of the fishery industry is critical for food security of the nation

Ahmed Shafiu

Fishing is the life blood of the Maldives from times past where our forefathers travelled the seas using thatched coconut palms as sails. Until the advent of the tourism industry, dried and preserved fish were the main export item that earned the foreign currency to purchase basic staples, medicine and other essentials. During the late 70's with assistance from the Japanese government, local boats were mechanised opening up greater horizons for fishermen to explore.

Maldivians used to live and thrive almost exclusively on protein from fishery landings in the past, and even though there are imported protein sources today, fishery landings are still the main source of protein for close to 400,000 Maldivians 200,000, expatriates and 1.7 million tourists who visited us last year.

Even while the tourism industry that started in the early 1970s has gained in importance and is the main employer and the biggest GDP contributor today, there are even today more than 700 fishing vessels providing the livelihood of more than 17,000 fishermen and their families.

As tourism, including local tourism with guest houses has expanded into all atolls, with the number of beds in the guest house segment increasing sharply, it is a worrying sign that, slowly the number of fishing vessels and the number of fisherfolk seem to be declining.

Harvesting effort

The effort required to harvest fishery landings are becoming increasingly more expensive and more time consuming. While we know that fisherfolk of yesterday returned home daily with their catch, even while sailing with wind power alone, today the fish schools are farther afield, and fishing has become a more complex and more expensive process.

1. Time taken: A day's travel or more is now essential to seek a good skipjack school and only the fish aggregating devices allow for daily landings of skipjack. Yellow-fin tuna fishermen now take journeys lasting close to a week before they have a substantial harvest to sell.

2. Ice as an obligatory item: Today it is not only the yellow fin fishery that require ice before they can sail out in search of harvest, but the skipjack processors too, demand that fish be kept in ice. Therefore, the search and purchase of ice has become a pre-requirement and an additional cost and effort for the fishery industry as a whole.

3. Availability of bait: Bait which used to be plentiful has become really scarce in most atolls and seasonally available. Use of large powerful lights to attract bait, has resulted in unsustainable bait capture methods that damage the tiniest micro hatchlings thereby destroying the potential of future bait capture from the area. Additionally, in some seasons fishermen have had to take multi-day voyages across the length of the country to access bait before they can depart for fishing, making the exercise exorbitantly more expensive.

4. Other fishery varieties like reef fishes, sea cucumbers have also been unsustainably harvested and fishermen are having to spend more time, effort and extra expenses to harvest time.

5. The nature of Maldivian geography, groups of islands clustered into atolls, has always meant that travel between islands and across atolls have been expensive and time consuming. The need today to travel for ice, travel for bait and travel to sell to processing sites have, as a measure by itself, also increased costs,

increased time away from families and made fishing a more complex affair.

Fishery industry and COVID-19

With the onslaught of COVID-19, the fishery effort has been one of the hardest hit. The close-down of European restaurants resulted in severe curtailing of demand volumes, unfortunately during a good fishing season. The close-down of airports and suspension of flights meant that the small amounts being ordered too, could not be exported.

While the government organised funds to enable buyers to continue purchasing, fishermen had to queue up for days to enable processors to make space in their processing plants to enable additional purchases.

Areas of concern

Competitive pressure, limitations in purchasing and other factors that have come into play over the last decade and more have resulted in larger dhonis with bigger engines which of course result in higher expenses.

At the same time, many smaller dhonis have left the industry and have been decommissioned or converted to be used in the tourism industry for diving and safari use.

Yet, with the limitations on the major processors on volumes they can purchase, today's dhonis with bigger engines are finding it unfeasible to make the trip to sell lesser volumes.

While fish is the essential item for each local household and no menu item is complete without inclusion of fish, the prices at which the fish required for home consumption are naturally lower.

Also, there are smaller island-based processing plants processing dried fish and other varieties including the famous rihaakuru. Yet the total buying power on any one island or a couple of islands combined is limited and they also offer a lower price for their purchases.

Therefore, without the larger purchasing capacity of the major processors, fishermen are finding it difficult to meet the daily expenses of the trip.

Therefore, it is a welcome sign that fishermen by themselves are slowly starting to use smaller vessels, to go fishing. Fishermen from islands who were at the forefront of increasing dhoni sizes, are today increasingly preferring to go on smaller, less expensive vessels. Instead of plying the high seas on search of larger schools, they target the fish aggregating devices and return at sunset. This means that the fishery effort is less expensive and therefore reach breakeven easier with the lower fish prices available in the islands.

Fishery and food security

Fish is an essential item and the major protein source in the Maldivian diet. Year-round availability of fish is critical for the Maldivian way of life, and hence it is an essential item in the list of items that constitute food security for the Maldivians.

Therefore, in order to design a viable food security model for the Maldives, it must take into account a method and modality to allow fishermen to continue to go fishing and land their harvest on islands. For without fishery landings, the major protein source on the Maldivian dinner table will be lost.

About the author

Ahmed Shafiu is the President and Founder of Dhivehi Masverin (Maldives Fishermen), registered in February 2018 as a non-government organisation in the Maldives with its major aim to promote pole and line fishing and other sustainable and related fishery activities in the Maldives. The Association works to create awareness in the community and especially encourage youth to be a part of the industry for sustainable pole and line fishery. Dhivehi Masverin also works to educate fishermen of the latest technology to increase their productivity.

Shafiu completed a Master of Educational Leadership Skills and Management course and served as a teacher from 2013-2017. Since 2018 he has been a full time fisherman while simultaneously working to promote Dhivehi Masverin and doing research in the various facets of the industry.

Food security and the principle of comparative advantage

Ibrahim Athif Shakoor

The world at large, individual nations and blocks of countries had been, for the past couple of centuries operating broadly on the Principle of Comparative Advantage for International Trade. Apart from the devastatingly harmful and ultimately failed attempts in a few countries for relatively short periods of time, most countries have chosen to specialise on products over which they had comparative advantage to earn the income necessary to buy the rest from other countries. Yet, this global model, tested in times of war and peace, recessions and boom times, have experienced a life-threatening shock with the advent of COVID-19 as countries closed their borders, thereby disrupting trade and commerce.

Though, countries are slowly opening up, with China slowly starting their factories even in March and going into full mass production in April. The ramped-up status of the Chinese factories is perhaps best evident by the huge numbers of medical items gifted by Chinese philanthropist Jack Ma to so many countries around the world. As countries slowly open up, it is very much anticipated that the global order of trade will slowly re-emerge, and countries will again focus on where they have comparative advantage.

However, the GDP share from agriculture is only 1.3% and the combined average of the Primary Sector in the 5-year period 2014-2015, is only 5%. Therefore, even though the principle of Comparative Advantage will continue to guide us, as a

nation we must prepare to grow more, grow better and grow smarter. Not only for times like these but also as a matter of general principle.

Comparative advantage in agriculture production

This island nation of ours, the Maldives, is a boon and a blessing in so many ways. Straddling the equator with a sunny, year-round temperature, bypassing the two hurricane prone zones of Arabian Sea and the Bay of Bengal, we also call our own almost a million km of rich EEZ waters. It is indeed a haven on earth and the sunny side of life to which all aspire to visit for fun and frolic.

While we are rich with much blessings, the geography of the nation also imposes limits on industries and curtails opportunities. Of these limits, the ones on economically viable agriculture output is one of the most significant.

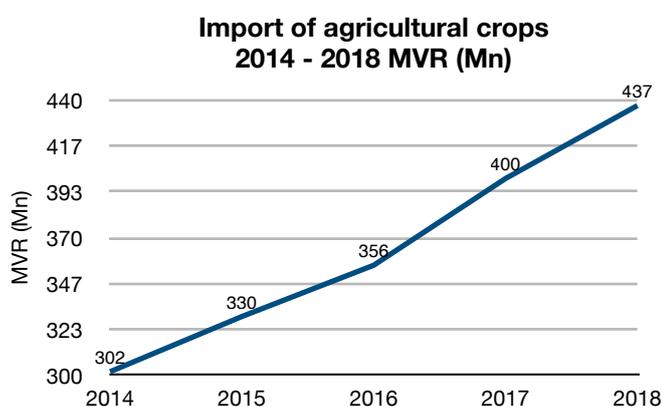
Our nation of 1,200 islands and many more islets and sandbanks are spread over 820 km north to south and the average size of island is less than 1 sq km with only a handful over 5 sq km. The islands are low to the sea with average height at below 1m.

Consequently, the soil is poor and the water table is saturated with sea water and shallow. Limited space for agriculture, also means that fields cannot be left fallow for crop rotation resulting in an over dependence on fertilisers to achieve yield.

Unsurprisingly they require additional fertiliser in the following year to achieve the same output. Additionally, labour is expensive, and entrepreneurial capital for agriculture, difficult and expensive to obtain. Logistics is a basic challenge of the Maldivian geography for movements of all goods and services, especially for fresh agricultural produce. Unsurprisingly, therefore, reaching for advantages in large scale

production is not a viable concept that comes into play.

Consequently, the GDP share of Agriculture while at an average of 1.3% today, have been slowly declining from 1.4% to 1.2% today. Meanwhile imports of agricultural products into the country have been consistently increasing going from MVR 302 million in 2014 to MVR 437



Graph 1: Increase of the value of agriculture products imported.

Source: National Bureau of Statistics

million in 2018, an increase of 44% in the 5 year period.

The increasing imports of agricultural items, as seen in Graph 1, include and consist mainly of the crops most popularly grown in the country as can be seen in

Agricultural Crops	Qty grown	Import Qty	No. of times
Watermelon	200,805.00	4,104,114.18	20.44
Cucumber	96,172.00	798,508.23	8.30
Chilly	23,401.00	457,958.07	19.57
Papaya	674,320.00	155,318.62	0.23
Pumpkin	60,768.00	399,847.43	6.58
Banana	123,600.00	2,016,303.00	16.31
Mango	47,289.00	924,584.07	19.55

Table 1: Selected quantity of home grown and imported agricultural products in 2018

Source: National Bureau of Statistics

Table 1. As a nation we have imported many times the quantity of major agricultural items grown in the country.

In 2018 we imported 20 times the quantity of watermelons, 19 times the quantity of chillies and mangoes (Table 1). The major agricultural product which we are most competitive looks to be papayas as we have imported only 0.23% of the home-grown quantity.

It is important to note here that much of the above are air-lifted with air cargo rates, normally close to a USD 1 per kg, and that a 15% import duty is paid on all such imports.

Entrepreneurs are sourcing these items, paying to transport them to sea or airports, paying freight (air or sea) and duty at the border, and have increased the trade by 44% over the past 5 years. This clearly speaks of how much more competitively they are grown elsewhere and the numbers in Table 1 offer stark evidence of this.

Being smart about food security

While the figures in Table 1 belie the real challenges in fostering and expanding a

competitive wide-spread agricultural sector in the Maldives, it does not and should not be construed as a call for giving up attempts at local production and harvesting. We should, as a nation, instead, have a strategy for sustainable agricultural production that is smart and innovative. One that takes into account the realities on the ground, not ignore them.

Understanding the reality and the economics of agricultural production is the first step in understanding what can be done and what need not be attempted. Being smart in the selection of the types of products targeted will allow us to be more prepared and less dependent. But our efforts need to be based on smart thinking and innovative flair.

We must design and nourish smart and innovative solutions to enhance our food security and they need not be one single strategy nationwide. For optimum results it is best that strategy and tactics differ at different levels.

1. State level interventions

- The government has announced 44 islands to be specialised for agriculture development. These islands must be developed using smart, innovative methods and using modern day technology to generate harvest that are more competitive. Products must be selected, and technology decided to offer scale of production and use of locally available resources to maintain production.
- Using naturally available organic elements like fish waste as the basic ingredient for fertiliser production, might

indeed be something that offer large potential and require urgent attention if food security is to be taken seriously.

2. Island level interventions

- Instead of allocating every available piece of land for tourism or guest house development, islands need to allocate empty spaces for growth of trees that have proven their hardiness in the local geography. Breadfruit and mangoes are protein rich, easy to grow items suitable for the Maldivian soil. Because they take time to mature, there need to be a long-term, sustaining strategy with long term incentives.
- Bananas, papayas, varieties of cassavas and other similar items mature sooner, are easy to grow, and are healthy nutritious products. Because they mature faster, the nature of incentives could be different for those interested to cultivate them.
- There are many homes in islands, unfortunately left empty or with very few people as many householders have moved to Malé for employment and other reasons. Some of them are considerably large plots of land and can be brought into productive use with minimal investment and time.
- Coconut groves have to be seen as a lifeline, an asset to the family who owns the palm and to the island that hosts them. They are ecologically important to anchor the soil of the island especially on the beaches. The nation, islanders and palm owners need to value the coconut palm as more than a source of a one-off-payment for the horrifying and

still continuing sale of these valuable palms to beautify resort islands.

3. Household level interventions.

- Pomegranates, guavas, water apple (jamburoalu) and other such fruits used to be plentiful in the backyard of each household. Papayas, and moringa are easy to grow in back yards and are healthy to boot. Households need to be made more aware of their utility and encouraged to make space for their growth in the backyard instead of clearing the space for a common room.

4. Apartment level interventions

- At the level of apartments with small balconies too, production of easy to grow items need to be attempted. Chilies, mint leaves and local cabbage are easy to grow, and quick to harvest and good to eat.

When such fruits and vegetables are grown at the island level, in the home garden or balcony, they complement the home dinner table and offer additional nutrition and protein and more importantly result in real savings on food expenses. When offered to a neighbour or friends, it helps their diet and result in savings on their expenses. While modest at the household level, at an island level, at the national level such effort and such harvests can offer much nutritional benefit and result in considerable savings on foregone expenses nationally.

5. Smart interventions

Modern developments in hydroponics has allowed for vast farms, including vertical

farms in urban centers. In our crowded capital too, there exist today, local entrepreneurs who have for some time now, been practicing smart hydroponics effort and indeed making it a modest yet thriving business.

Being smart and being innovative about the methods and the selection of items to grown can make a large difference in deciding whether it is a hobby that will make the dinner table or indeed whether it can be transformed into a small business that can be fostered and slowly expanded.

The fact that larger countries, with rich nutrition soil, cheaper labour and indeed cheaper cost of capital will and does generate advantages of scale in production of basically anything, including agriculture, does not mean that we should not attempt to grow more and better healthy local produce.

Aside from the pride that follows naturally while consuming products that is self-produced, the effort will enrich the dinner table and collectively lead to reduced expenses at the national level. Smart technology and modern methods might indeed lead us to be competitive in products that we have not even thought of today. Yet, the reality on the ground need to be learnt and appreciated before we can design strategies to overcome them.

Priorities: food security or self-sufficiency in food?

Fazeel Najeeb

A widely discussed topic in the Maldives in the wake of the COVID-19 pandemic is food security. Such debates tend to be heightened in many countries following crises as was the case during the 2008 financial crisis. This article attempts to analyse this issue as it applies to the Maldives. Firstly, it is necessary to understand the concept of food security and the related concepts of self-sufficiency in food and staple foods.

Understanding food security, self-sufficiency in food, and staple foods

The Food and Agriculture Organisation (FAO) of the United Nations describes food security as the existence of a situation in which all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life (FAO, 1996). Leaving aside the intricacies of determining what social access is, what food is nutritious, what dietary needs are, and what healthy life is, it would be useful to understand two elements in the FAO definition that are more readily comprehensible, i.e. physical access and economic access. Physical access is the ability to reach food sources via the transportation infrastructure, and

economic access is the ability to purchase with disposable income.

FAO's definition of self-sufficiency states that "The concept of food self-sufficiency is generally taken to mean the extent to which a country can satisfy its food needs from its own domestic production" (FAO, 1999). In the context of debates on trade and food security, self-sufficiency typically refers to countries that seek to produce all or most of their own food for domestic consumption (FAO, 2016).

It is also important to know the food for which security and self-sufficiency is sought. This is where the concept of staple foods comes in. The FAO (FAO, 1995) description of staple foods states that:

"A staple food is one that is eaten regularly and in such quantities as to constitute the dominant part of the diet and supply a major proportion of energy and nutrient needs.

A staple food does not meet a population's total nutritional needs: a variety of foods is required. This is particularly the case for children and other nutritionally vulnerable groups.

Typically, staple foods are well adapted to the growth conditions in their source

areas. For example, they may be tolerant of drought, pests or soils low in nutrients. Farmers often rely on staple crops to reduce risk and increase the resilience of their agricultural systems.

Most people live on a diet based on one or more of the following staples: rice, wheat, maize (corn), millet, sorghum, roots and tubers (potatoes, cassava, yams and taro), and animal products such as meat, milk, eggs, cheese and fish.”

These definitions show that food security, self-sufficiency in food and staple foods are three different, but closely related concepts each of which is an important element of a country’s overall food security.

Going by the FAO’s description, staple foods in the Maldives until around the 1970s used to be breadfruit, taro, coconut (also cooked as a sweetener) and fish. With growing affluence especially following the advent of tourism as an industry in the early 1970s, breadfruit, taro and coconut were gradually given up for rice, flour and sugar, none of which was locally grown and had (and still has) to be imported. Rice, flour and sugar thus came to be recognised as the de facto staple foods of the land. They gained official recognition as the people’s staple foods following the introduction of the government’s subsidy on these three items in the 1970s (and it is an unusual place to be in, having to domestically

subsidise a crop that is grown by foreign growers in a foreign country) and the beginning of their price administration (controlling prices) somewhere in the 1960s.

Does Maldives have food security and self-sufficiency in food?

A good place to start is to determine if the Maldives has food security or self-sufficiency as it applies on its staple foods, rice, flour and sugar.

Based on FAO’s definition of food security, Maldives’ economic access to food depends on (a) its disposable foreign exchange, the proxy for disposable income in the definition (because all three items have to be imported), and (b) generosity of foreign governments and suppliers (because exporters, even if willing, can only export if their governments allow them to). In similar manner, physical access depends largely on foreign shipping lines, which is the proxy for the transport infrastructure mentioned in the definition.

While a local importer operates a ship on charter basis between the Maldives and neighbouring Sri Lanka, the bulk of goods are carried on shipping lines operated by foreign companies. The degree of vulnerability the Maldives faces in both economic access and physical access is therefore obvious, since its discretion in both is none to limited: for foreign

exchange the country depends largely on tourism, and for goods, entirely on decisions of foreign governments and suppliers; for physical access, i.e. transport, dependence is largely on foreign shipping lines. If foreign exchange earnings fall (for example, like in the ongoing COVID-19 pandemic), that is a constraint on the country's ability to import food. If a foreign government, for whatever reason (e.g. natural disasters, emergencies, pandemics, wars, instabilities, straining of relations, etc.) prohibits the export of a good or goods, the country will not be able to import food (especially if the source of the lion's share of the supply is a single country), and even if a government allows the continuation of exports, the Maldives cannot import food if the shipping line, for whatever reason, is unable to – or would not – transport the goods. The existence of a real potential for such a situation can be understood in this COVID-19 pandemic.

A recent development of direct relevance to physical access, i.e., the commencement of operations albeit on charter basis by the Maldives Shipping Service (MSS, a subsidiary of State Trading Organisation (STO) PLC) is a welcome initiative. MSS currently operates a single ship between the Maldives and Sri Lanka. While it must be recognised that such an operation could not have

been made to start without a detailed feasibility study, success also depends on good management, strategic thinking, and foresight.

As is demonstrated in charts 1 – 3 and tables 1 – 3, Maldives depends on a just a few countries for the bulk of its supplies of staple foods. This dependence is particularly heavy on India. For example, India accounted for nearly 90 per cent of rice and 52 per cent of sugar in 2019.

Such high dependence on a single country for the supply of staple foods is a considerable vulnerability. This cannot be described as a situation where food security or self-sufficiency in food exists. Indeed, the government's Strategic Action Plan 2019-2023 appears to confirm the absence of food security and self-sufficiency in food as it speaks of increasing the role of agriculture in achieving food safety and food security, and of increasing the production of identified crops for self-sufficiency and reduction of imports (table 4).

Reasons for the heightening of food security concerns and the intense debate during this crisis is therefore obvious. There appears to be a broad realisation that the country's complete dependence on other nations for its staple foods bears a real potential that supplies could run out in some unexpected way.

Chart 1: MVR share of flour imports, %

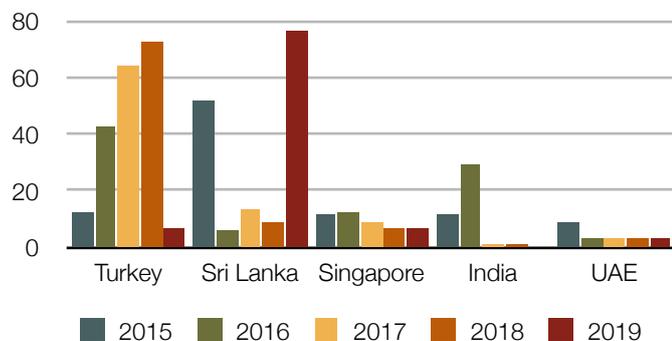


Table 1: MVR share of flour imports, %

	2015	2016	2017	2018	2019
Turkey	12.0	42.3	64.2	72.8	6.5
Sri Lanka	51.6	6.2	13.8	8.8	76.8
Singapore	11.1	12.1	8.9	6.6	7.1
India	11.1	28.9	1.0	1.4	0.5
UAE	8.5	3.1	3.3	2.7	2.9

Chart 2: MVR share of rice imports, %

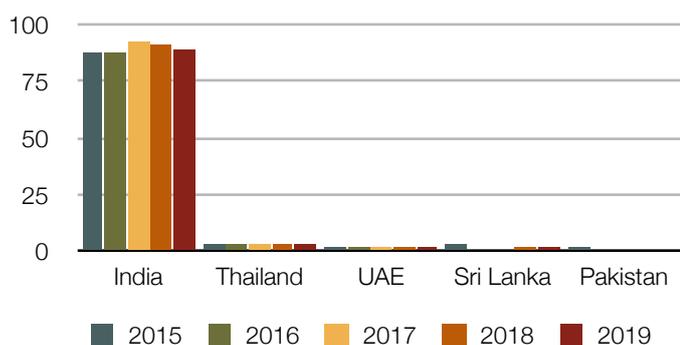


Table 2: MVR share of rice imports, %

	2015	2016	2017	2018	2019
India	88.1	88.1	92.2	91.2	89.5
Thailand	3.4	3.4	2.8	2.8	2.7
UAE	1.9	1.5	2.1	1.9	1.9
Sri Lanka	3.3	1.0	1.3	1.5	1.9
Pakistan	1.9	1.0	0.3	0.4	0.5

Chart 3: MVR share of sugar imports, %

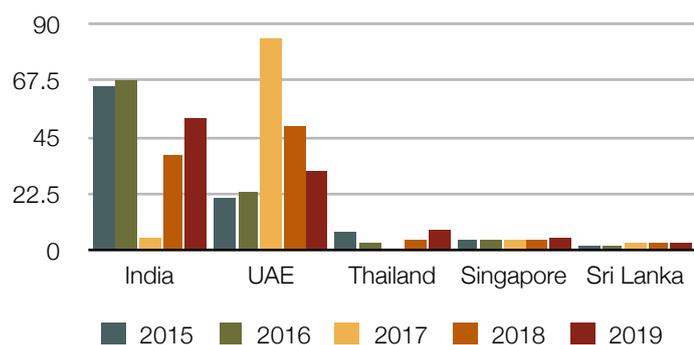


Table 3: MVR share of sugar imports, %

	2015	2016	2017	2018	2019
India	65.35	66.83	5.31	37.77	52.4
UAE	20.23	22.32	84.21	48.94	31.2
Thailand	7.18	2.41	0.35	3.43	7.9
Singapore	4.28	4.09	3.68	3.98	4.6
Sri Lanka	1.77	2.08	2.23	2.62	2.7

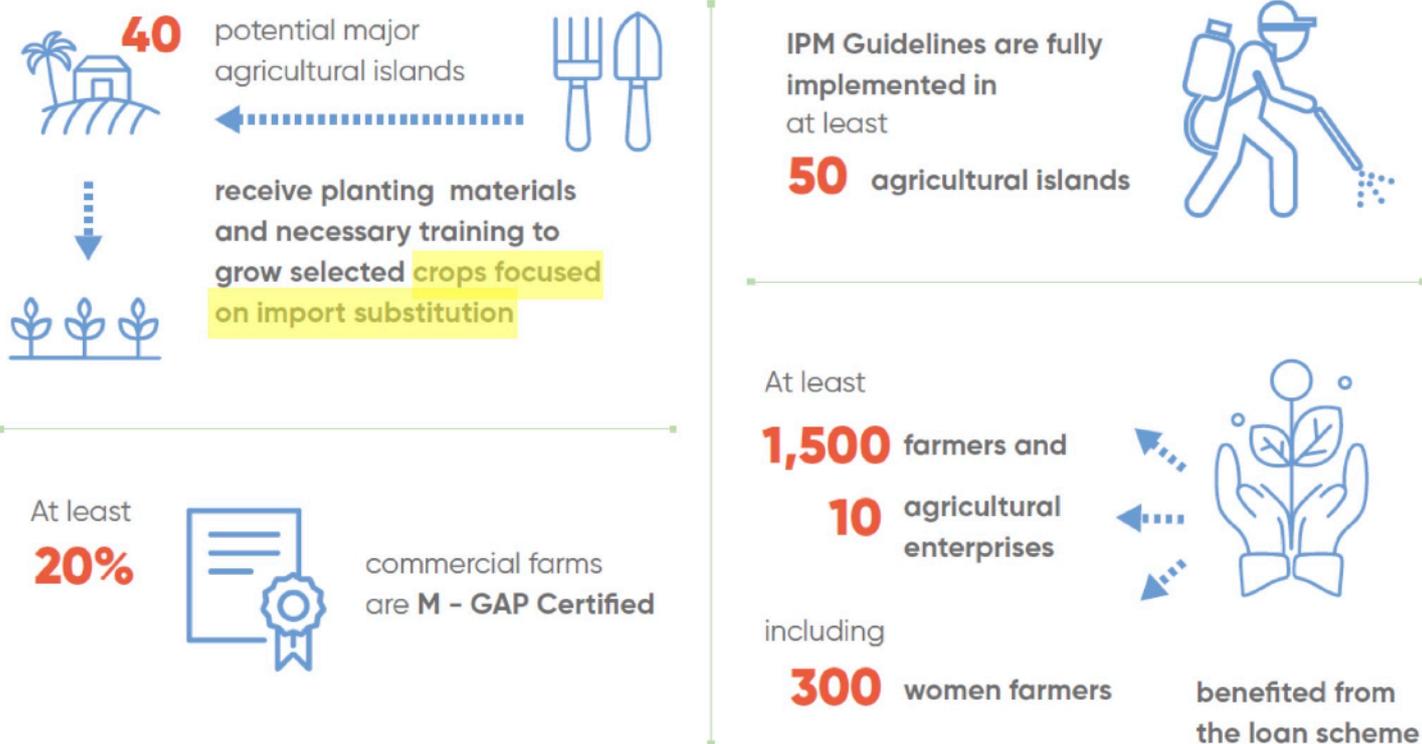
Can food security and self-sufficiency in food be achieved?

An earlier article on food security published in the Maldives Economic Review cited reports in local papers in December 2018 that the STO was embarking on a food security strategy. No details of this initiative have yet been made available to the public. The managing director of STO was quoted as saying that basic food storage in the country only lasted for two months. STO's initiative therefore appears to be aimed at securing staple food stocks for a longer period. It is not clear that the initiative also aimed at diversifying sources of import of

staple foods. But domestic agriculture does not appear to be covered in their initiative.

The government's Strategic Action Plan 2019-2023 (SAP) outlines several measures on agriculture as sub-sector 1.2 of its "Blue Economy", the first of five sectors "presented" in SAP. As reproduced in table 4, the plan mentions food security five times: once under sub-sector fisheries and marine resources (1.1); twice under sub-sector agriculture (1.2); twice under the fourth sector, "Jazeera Dhiriulhun", sub-sector resilient communities (4.7). SAP does not appear to recognise "staple foods".

By 2023



Graphic 1: Highlights of the agricultural policy and under SAP

Source: Strategic Action Plan 2019-2023, Government of Maldives, 2019.

Target 2.3 of SAP aims that by 2023, “40 potential major agricultural islands [would have] receive[d] planting materials and necessary training to grow selected crops focused on import substitution.” Strategy 2.3 under this target aims to increase production of “identified crops for self-sufficiency [the only mention of self-sufficiency of food in the plan] and reduction of imports”. And, action 2.3a under this strategy aims to facilitate “interventions to increase cultivation of 5 major agricultural crops that has [sic] potential for production and has [sic] high import volumes”. Therefore, a central target under SAP appears to be import substitution (see graphic 1, text “to grow selected crops focused on import substitution”), albeit policy 2 aims to

ensure “that the agricultural sector significantly increases its contribution to food security and safety”.

Strategy 2.3 of SAP requires (1) the determination of what constitutes self-sufficiency; (2) the identification of crops for self-sufficiency; and (3) determination of what constitutes import substitution. Action 2.3a has three elements: (1) identify crops that has high import volumes; (2) out of those, determine five “major” crops that has “potential for production”; and (3) determine “interventions to increase cultivation”.

Table 4: Government's food security plan

Sector	Sub-sector	Policy	Target	Strategy	Action	Year	Lead implementing agency	Other implementing agencies
1. Blue Economy	1.1 Fisheries and marine resources	Policy 1: Ensure all types of fishery are developed sustainably, incorporating modern fishery management principles and approaches	Target 1.4: By 2023, at least 10 targeted training programs on food security and food safety related matters are conducted	Strategy 1.4: Ensure the quality and safety of the Maldivian fishery products	Action 1.4b: Conduct training programmes on quality inspection, food hygiene and safety, and good manufacturing practices of fish and fishery products, with a specific focus on small and medium scale fish producers [To be coordinated and implemented with Action 1.1i of Health subsector matrix]	2019 - 2023	MoFMRA	MFDA, HPA, PSTI, MoED, MoH
					Action 1.4c: Conduct training on Hazard Analysis Critical Control Points (HACCP)	2020; 2023	MoFMRA	MFDA, HPA, MoH, PSTI
	1.2 Agriculture	Policy 2: Ensure that the agricultural sector significantly increases its contribution to food security and safety	Target 2.1: By 2023, at least 02 Urban Gardening Plots (ready for commercial sale) established in each population hub Target 2.2: By 2023, training programs coupled with inputs assistance (cuttings and seedlings) conducted for 20 islands Target 2.3: By 2023, 40 potential major agricultural islands receive planting materials and necessary training to grow selected crops focused on import substitution	Strategy 2.1: Improve livelihoods through development of urban agricultural models for edible crops and aesthetic plants (flowering, medicinal, and aromatic plants) [To be coordinated and implemented with Action 1.7b of Resilient Communities subsector matrix]	Action 2.1a: Establish and pilot 'urban gardening models' in 2 RUCs	2020; 2022	MoFMRA	MoNPI, Local Councils, LGA
				Strategy 2.2: Increase production of traditional crops to ensure nutrition safety of communities	Action 2.2a: Encourage the sourcing and cultivation of traditionally grown high nutritional value varieties of fruits and vegetables to farming islands to increase production, and	2020 - 2023	MoFMRA	Local Councils, LGA

Sector	Sub-sector	Policy	Target	Strategy	Action	Year	Lead implementing agency	Other implementing agencies
					promote use of locally grown produce [M77]			
				Strategy 2.3: Increase production of identified crops for self-sufficiency and reduction of imports	Action 2.3a: Facilitate interventions to increase cultivation of 5 major agricultural crops that has potential for production and has high import volumes [M77]	2020 - 2023	MoFMRA	Local Councils, LGA, MCS
					Action 2.3b: Review and revise the import policy to alleviate farmer production costs to create a balanced competitive market environment [M77]	2020 - 2023	MoFMRA	MoED, MCS
4. Jazeera Dhiriuhun	4.7 Resilient communities Climate induced extreme weather disrupts regular supply of these essential commodities to remote islands while stockpiling for emergencies also remains extremely challenging in smaller islands. Climate induced vulnerabilities are extremely high in the Maldives, especially due to natural habitat loss, depletion of water resources, and issues related to food security.	Policy 2: Promote environmentally sound technologies and practices towards building sustainable climate resilient island communities	Target 2.1: By 2023, Water Security Plans and Sanitation Safety Plans are implemented for all inhabited islands	Strategy 2.1: Promote climate resilient fisheries and agricultural practice to improve food security and ensure sustainable livelihood opportunities at all level	Action 2.1b: Establish essential goods (fuel, food and water) storage in RUCs and SRUCs in line with National Spatial Plan	2020 - 2023	NDMA	MoEn, STO, MoNPI, MPL, HPL, KPL, MoTCA
					Action 2.1c: Facilitate storage of perishables at Kulhudhufushi and Addu ports [To be coordinated and implemented with Action 2.2f of Transport subsector matrix]	2020 - 2023	NDMA	MoEn, STO, MoNPI, MPL, HPL, KPL, MoTCA

Source: <https://presidency.gov.mv/SAP/> accessed: 15 April 2020

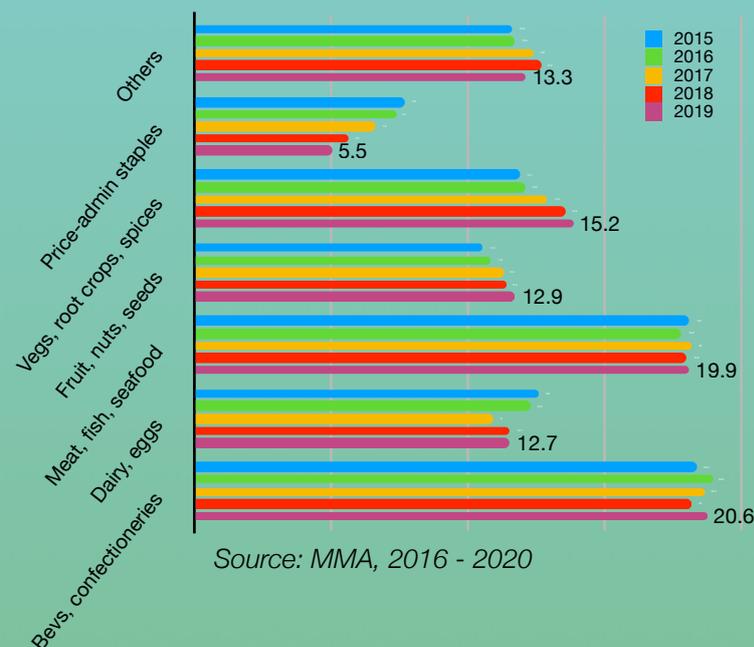
Assuming that the “5 major agricultural crops” that action 2.3a speaks of are to be staple foods for self-sufficiency (strategy 2.3), the requirement that they have high import volumes suggests that the strategy is to replace the import of those crops with domestic production of those crops. If indeed this is the case, the question then is, what are the five major agricultural crops that have high import volumes?

Table 5: Total imports and food items, USD millions

	Total imports, CIF	Food items	% of tot imp
2015	1,896.3	405.9	21.4
2016	2,125.4	429.6	20.2
2017	2,360.4	462.4	19.6
2018	2,959.8	495.6	16.7
2019	2,887.5	546.1	18.9

Source: MMA, 2016 - 2020

Chart 4: Share of food groups in total food imports, %



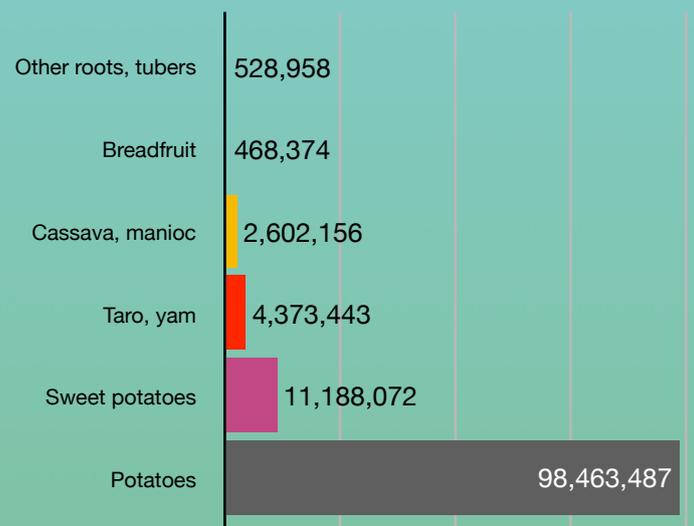
Source: MMA, 2016 - 2020

Import figures show that in 2019 food imports totalled USD 546 million (table 5), 19 per cent of the total imports. Out of the food groups, beverages and confectionaries accounted for 20.6 per cent (highest import volume) of total food imports (chart 4), followed by meat, fish and seafood (19.9 per cent), vegetables, root crops, and spices (15 per cent), fruits, nuts and seeds (12.9 per cent), dairy and eggs (12.7 per cent), and price-administered staples (flour, rice and sugar), 5.5 per cent).

Assuming that food security that SAP speaks of is on items that can be used as staple foods (table 6 provides some reference crops used as staple foods in different parts of the world), such crops would fall within the vegetables, root crops,

and spices group or the price-administered staples group. A natural assumption would therefore be that rice, flour and sugar would fall within the five crops mentioned in action 2.3a of SAP, and that these imports will be replaced with domestic production [of these crops]. Therefore, the other two crops that action 2.3a speaks of would have to fall within the vegetables, root crops, and spices group. The task then is to identify what crops of a staple food type imported have high import volume. Chart 5 shows imports of crops of staple food type imported in 2019. Potatoes accounted for the highest volume, just under MVR 100 million, followed quite some distance away by sweet potatoes (MVR 11 million), taro and yam (MVR 4 million), cassava and manioc (MVR 3 million), breadfruit (MVR 0.5 million) and other roots and tubers (MVR 0.5 million).

Chart 5: 2019 imports: crops of staple food type, MVR



Source: MMA, 2016 - 2020

This article does not attempt to determine the potential for production as envisaged in action 2.3a, as this would involve analyses based on agricultural science, including the study of soil, climate and other factors. However, domestically grown taro, breadfruit, and sweet potatoes used to be the people’s staple foods some decades ago, and these are still grown in the country, which means there may be no need to determine the potential for production of these crops. The relevant questions in this case would be of whether such crops could be grown in scales that could ensure self-sufficiency (perhaps in the medium to long term), and of whether it would be sustainable economically with or without subsidies. There are other crops that may be

Table 6: Selected food crops (staple crops are shown in bold type)

The world has over 50 000 edible plants. Just three of them, rice, maize and wheat, provide 60 percent of the world's food energy intake.		The main staple foods in the average African diet are (in terms of energy) cereals (46 percent), roots and tubers (20 percent) and animal products (7 percent).		In Western Europe the main staple foods in the average diet are (in terms of energy) animal products (33 percent), cereals (26 percent) and roots and tubers (4 percent).	
<u>1. Chinese - Japanese region</u> bamboo, millet , mustard, orange, peach, rice , soybean , tea	<u>4. Hindustani region [Indian subcontinent]</u> banana, bean, chick-pea, citrus, cucumber, eggplant, mango, mustard, rice , sugar cane	<u>7. Mediterranean region</u> beetroot, cabbage, celery, fava bean, grape, lettuce, oats , olive, radish, wheat	<u>10. South American region</u> cacao, cassava , groundnut, lima bean, papaya, pineapple, potato , squash, sweet potato , tomato		
<u>2. Indochinese-Indonesian region</u> bamboo, banana, coconut, grapefruit, mango, rice , sugar cane, yam	<u>5. Central Asian region</u> apple, apricot, bean, carrot, grape, melon, onion, pea, pear, plum, rye , spinach, walnut, wheat	<u>8. African region</u> coffee, millet , oil palm, okra, sorghum , teff , wheat , yam	<u>11. Central American and Mexican region</u> French bean, maize, pepper/chill), potato, squash		
<u>3. Australian region</u> macadamia nut	<u>6. Near Eastern region</u> almond, barley , fig, grape, lentil , melon, pea, pistachio, rye , wheat	<u>9. European-Siberian region</u> apple, cherry, chicory, hops, lettuce, pear	<u>12. North American region</u> blueberry, sunflower		

Source: FAO, 1995

successfully grown domestically that are not of the staple food type, but that analysis is beyond the scope of this article.

Conclusion

The above analysis shows that food security and self-sufficiency in food are two separate but related concepts. While the government has plans to address the both these issues under the SAP, a major weakness in these plans is the lack of recognition of staple foods and therefore the absence of a plan to address the entire dependence on imports of staple foods. SAP appears to have overlooked the possibility that crops that were once used as staple foods in the Maldives, which included, among others, breadfruit, taro, sweet potato, and coconut, have the potential to replace rice, flour and sugar, to a significant degree, as the people's staple foods. This oversight is apparent since strategy 2.2 aims at increasing production of traditional crops "to ensure nutrition safety of communities", whereas strategy 2.3 aims at increasing the production of identified crops (based on potential for production and high import volumes) "for self-sufficiency and reduction of imports". Thus, SAP envisages that traditional crops will be used for nutrition safety and other crops for self-sufficiency and import substitution.

The priority may be given to first achieve self-sufficiency in food, and for this a more realistic approach may be to aim to grow traditional crops in large enough quantities in the medium to long term which would make a significant impact on import of staple foods. Growing a manageable number of crops that are now imported but not grown domestically may also be simultaneously considered.

Achieving both self-sufficiency in food and food security and may not be impossible goals for the Maldives to achieve. But to do so, detailed planning will have to be made on matters such as, among others, land (including sufficient availability, soil issues, etc.), finance, human resources and expertise, incentives, subsidies, technologies, marketing and selling/buying, logistics of storage, transport, distribution, delivery, campaigns on getting younger generations to acquire the taste and preference for domestically-grown staple food crops, consumerisation, and other significant matters. These are areas for further study, analyses and planning as the country takes on the daunting challenge of becoming self-sufficient in staple foods and ensuring food security eventually.



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