

Department of Agribusiness Management Faculty of Agricultural Sciences Sabaragamuwa University of Sri Lanka



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Research | Ideas | Experiences | News & Events





Eco Friendly Infusion Tea Bags P 06

## Lessons Learnt from COVID-19 and Building a Resilient Food System



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Lessons Learnt From COVID-19 Building moré Resilient Food System

# COVID-19 and Food Security: the Road Ahead

2020 was an unprecedented year for all of us given the impact of the COVID-19 pandemic, that was experienced around the globe. With restrictions to curb the spread of the virus occurring in almost all sectors of the economy, the pandemic truly challenged the multiple aspects of the global economy, including food supply chains.

Currently, the price of food has increased exponentially; the statistics from the World Bank show that the Agricultural Commodity Price Index is 25% higher compared to 2020. In fact, the price of corn and wheat are 34% and 6% higher, respectively, in comparison to the price in January 2020.

The World Food Summit defines food security as "when all people, at all times, have physical and economic access the sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life." If all elements of the definition are not met, food security is not achieved. For example, if food is available yet unaffordable, food security is not achieved. With rising food prices, food security is becoming a challenge in some regions, especially in developing countries. One of the major risks to food security is higher retail food prices. When higher prices are combined with reduced income levels, the outcome can be dire. Across the globe, many countries are experiencing higher food prices due to disruptions to supply chains caused by COVID-19, currency devaluations, and other factors. Skyrocketing food prices severely impact low and middle-income countries. People in such countries spend a significant amount of their income on food than people living in countries with relatively higher incomes.

The direct and most obvious result of food insecurity and reduced food intake is hunger and malnutrition, which can cause drastic effects on children. As such, it is imperative to address issues associated with food insecurity to prevent catastrophic outcomes.





Dr. Narendra Malalgoda Universituy of Manitoba, Canada



While the world still grapples with the effects of the COVID-19 pandemic, we need

to ensure that our food supply chains are better equipped to face challenges that the future holds. One of the key avenues to pursue in this regard is to investing in increasing local capacity to meet food needs. By providing support to local farmers and industries, countries can develop a supply chain system that ensures the availability of food when needed. Additionally, supporting smallscale producers can also be beneficial as it creates resilience by avoiding bottlenecks. Recruiting workers in the field of agriculture also needs to happen, and when attractive opportunities are created in the agriculture sector, more workers are likely to join. Moreover, food retail practices need to be investigated to make them a more stable line of work. Another aspect of ensuring food security would be to build a framework that would financially support low-income families.

In conclusion, the pandemic has taught us to be more prepared for unprecedented events the future may hold, and future challenges related to food security can be successfully addressed if we take necessary steps today to increase the resilience of food supply chains in the region.

### References

- The World Bank. Food security and COVID-19
- Wakefield, S. Eating in the age of COVID-19: Food security in Canada during and after the pandemic.



## Contribution of Agriculture Sector Modernization Project (ASMP) to the Hybrid Chilli Seed Production Sri Lanka through he World Bank funded project on Agriculture Sector Modernization (value chain University development) under the State Ministry of Development of Minor Crops Plantation including sugarcane, maize, cashew, pepper, cinnamon, cloves, Enterprise betel related industries and export promotion has initiated a farmer clustering program as a Collaboration University Enterprise Collaboration (UEC) program by linking Dialog Axiata, and Faculty of Agriculture, University of Ruhuna in a program of hybrid seed (UEC) and production in automated protected houses, initiated by the Department of Agriculture, targeting to reduce the import of dry chilli to the country in Farmer a program initiated by the government to bring down the trade deficit of US\$ 6 billion (in 2020). Project initiated with 185 farmers, in Welimada,

Clustering Approach



Professor Emeritus, K.D.N. Weerasinghe Department of Agricultural Engineering Faculty of Agriculture University of Ruhuna, Sri Lanka

Consumption of dry chilli in Sri Lanka round ups to 60,000 mt per annum against the local production of 7,500 mt, and the balance (around 52,500 mt) to be imported by expending Rs. 14,500 Mn. (around US\$ 72.5 Mn.). Moreover the yield of the existing local chilli varieties are low and varies from 4.7- 5.8 mt/ha whereas the yield of hybrids like MICH HY1 may go up to 32 mt/ha. The low productivity of local varieties is also linked to susceptibility to pest and diseases and poor management practices. Therefore, the Department of Agriculture plans to extend hybrid chilli cultivation with additional 10,000 ha by 2024 with hybrid (MICH HY1) which is a crossing between local varieties of Varaniya, and Thalakiriyagama contributing to seed production

Bandarawela, Nuwaraeliya, Badulla and Kandy area, by providing them the technical knowhow and capital investment of 50-60% as a matching

grant and 40% as credit facilities through banks to construct and operate automated protected houses. The program demonstrated to be a successful model for University Enterprise Collaboration (UEC) in Sri Lanka which is increasingly perceived as a way to enhance innovation through knowledge transfer and

exchange.



of 5,000 kg per annum. The variety has the yield potential of 32 mt/ ha (Chilli, 2015).

Commercial level chilli hybrid seed production by attracting and encouraging leverage investments from farmer producer organizations and agribusinesses to produce high-quality seeds by providing the enabling environment, incentives, and access to finance for such investments through matching grants, technical assistance support, by creating clusters. At present around 25-30 number of farmers have completed first cycle of production. Even though the program has to undergo unseen difficulties linked to COVID-19 pandemic such as price escalation, shortage of materials etc., the project moves forward to reach the targets in early 2022.

In summary the expected increase of Hybrid chilli seed production would be around 1,850 kg by 2024 and it would be 37% contribution of the required seeds for cultivating additional 10,000 hectares in Sri Lanka. Expected outcome of the chilli seeds through this program is given in the table (Table 1) below.

Table 1: Expected outcome of the polytunnel project

	Year		
	2022	2023	2024
Expected production of chilli seeds through the project (kg/annum)	1,000	1,395	1,863
Estimated hybrid seed requirement for proposed cultivated area (kg/annum)	3,000	4,000	5,000
Contribution of the project for hybrid seed production	33%	35%	37%
New employment generation	375	450	561
Expected increase in fresh chilli production (tons)	13,600	18,972	25,337
Expected increase in dried chilli production (tons)	3,400	4,743	6,334
Expected foreign exchange saving due to increased chilli production by the project (US\$ Mn/ annum)	7	10	14

ustainable development is a global objective that aims to address the societal challenge of climate, the environment, the resource efficiency and the raw materials. In this sense, an important strategy is the promotion of green packaging, that is the use of sustainable materials and design for the packaging goods. In recent years there was growing worldwide consideration on environmental protection. In this sense green packaging is an aspect of great importance in order to reduce the impact of waste and pollution and promote sustainable development. Packaging sustainability concept have co-evolved with increasing in cooperation of principles of sustainable development at various levels within industrial platforms.



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# Luffa Infusion Tea Bags

# SUSTAINABLE ECO FRIENDLY PACKAGING

Currently pollution from plastic packaging related waste has caused declining of air, soil, water quality, climate change and other contemporary challenges. Sustainability has become one of the integral functions of packaging in addition to ensuring food quality and safety, facilitating transportation and logistics, and enabling communication. Despite the recent efforts in packaging sustainability there are opportunities, and improvements similar to other industries and platforms. Packaging industry now at nexus of environmental protection and social justice and economic growth issues which characterized the early business and social frameworks. The next generation of sustainable solutions can be motivated by effort that fused positive consumer attitude towards sustainable packaging.

# ARTIFICIAL INFUSION TEA BAGS VS ECO FRIENDLY INFUSION TEA BAGS

Tea bags have been in existence for over a century offering consumers a convenient alternative to enjoy their favorite tea, fruit infusions, herb infusions etc. However, in the last decade, the industry has seen a dramatic shift in the solutions from the nylon pyramid sachet which responded to the premium market to sustainable materials. Due to the plastic content, conventional tea bags cannot completely decompose. This makes them a bad option for compost material and the environment. When looking at the sustainability of the materials, ease in manufacturing and the efficiency of materials including that the material taste neutal, plastic free, biodegradable alternative should consided.



HOW TO PREPARE LUFFA

**INFUSION TEA BAGS** 



## AS A SOLUTION



Instead of nylon pyramid infusin tea bags we can use biodearadable Sustainable Product; NATURAL LUFFA SPONGE INFUSION BAGS" which is made out of matured luffa pod from luffa gourd plant as a sustainable solution. This material have natural perforated structure that is convenient for infusion process.

## IN ADVANCE,

Following a minimal process we can obtain bio degradable luffa infusion tea bags. Main aim of this sustainable packaging is to reduce the Carbon Foot Print from the environment and to design in a reusable and recyclable mannar. When considering this sustainable solution allow us to achieving environmental goals by increasing brand value that builds today and tomorrow. This innovation will indirectly improve income of smallholder farmers' and effectively safe for human health and environment. Protecting the nature and the resources of the earth is crucial than any individual requirement. ශී ලංකා වේ කාබනික

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ଚଅଞ୍ଚୟୁଷ୍ଟ

3000%

*ବ୍ୟୁ*ଏଡି,



මහාචාර්ය පුෂ්පා මල්කාන්ති කෘෂි වසාපාර කළමනාකරණ අධසනාංශය කෘෂි විදසා පීඨය ශී ලංකා සබරගමුව විශ්වවිදසාලය කාබනික කෘෂිකර්මාන්තය යනු පාරිසරික හා ආර්ථික හේතුන් මත පදනම් වන තිරසර කෘෂිකර්මාන්තයකි. පසුගිය දශකය තුළ ලෝකයේ කාබනික කෘෂිකර්මයේ සංවර්ධන පුවණතාව ධනාත්මක වර්ධනයක් පෙන්නුම් කරයි. ශුී ලංකා අපනයන සංවර්ධන මණ්ඩලයේ දත්ත වලට අනුව ඇමරිකා එක්සත් ජනපදය සහ කැනඩාව 20% ක සීගුයෙන් වර්ධනය වන කාබනික ආහාර වෙළඳපොළක් ඇති අතර යුරෝපයට වසරකට 7.8% ක කාබනික වෙළදපොළක් ඇති මෙරට ආහාර නිෂ්පාදනය පිලිබඳ සලකා බලන විට බොහොමයක් ආහාර නිෂ්පාදන වල පලිබෝධනාශක අඩු වැඩි වශයෙන් පවතී. සාමානායයන් කාබනික ආහාර වල පලිබෝධනාශක හෝ කෘතීම පොහොර වර්ග අඩංගු නොවේ. ඒ අනුව පරිසරයට හිතකර ආර්ථිකව තිරසාර කෘෂිකාර්මික හුම භාවිතයෙන් නිපදවන ආහාර කාබනික ආහාර ලෙස සැලකිය හැකිය.

ශී ලංකාවේ මිනිසුන්ගේ ජීවන තත්වය, විලාසිතා, තාක්ෂණය, ආහාර පුරුදු හා ආකල්ප ආදියේ සීගු වෙනස් වීමක් දැකිය හැකි අතර නිෂ්පාදන මිලදී ගැනීමේදීද එම තත්වය ඒ ආකාරයෙන්ම බලපායි. කාබනික ආහාර මිලදී ගැනීමේදී හා පරිතෝජනයේදී පාරිභෝගික ආකල්ප පුධාන කාර්යභාරයක් ඉටු කරයි. ආකල්ප යනු කිසියම් සිදුවීමකට හෝ වස්තුවකට අදාලවල අත්දැකීම් හා වෙනත් බලපෑම් හේතුවෙන් පුද්ගලයෙකු තුල ඇතිවන මානසික හා ශාරීරික සුදානම් භාවයයි. තිරසාර කෘෂිකාර්මික හුම පිලිබඳ පවතින ධනාත්මක ආකල්පය, කෘෂිරසායනික භාවිතයෙන් සෞඛ්යට ඇති අතිතකර පුතිවල පිලිබඳව හා පරිසර සංරක්ෂණය පිලිබඳ දැනුම්වත් භාවය සහ ආරක්ෂිත ආහාර වලට පාරිභෝගිකයා තුල පවතින යහපත් ආකල්පය වැනි හේතු නිසා කාබනික ආහාර සංකල්පය මෙරට පුචලිත වීම වැඩි වෙමින් පවති.

එමෙන්ම විවිධ මාධා සිස්සේ පලිබෝධනාශක යෙදූ ආහාර හා ජාන වෙනස් කරන ලද ආහාර වල සෞඛාව හා පරිසරයට ඇති අතිතකර බලපෑම් පිලිබඥ සිදුකරන දැනුවත් කිරීම් නිසාද සැලකිය යුතු ලෙස කාඛනික ආහාර පිලිබඳ පාරිභෝගිකයන්ගේ අවධානය යොමුවෙමින් පවති. එහි පුතිඵලයක් ලෙස කාඛනික ආහාර සදහා ඉල්ලුම ලොව පුරා වැඩි වෙමින් පවති. මිනිසුන්ගේ ආදායම් වැඩිවන වනවිට සහ ජීවන තත්ත්වයන් වැඩිදියුණු වීමත් සමඟ සිවුන් සෞඛා සම්පන්න පරිභෝජනයක් කරා ගමන් කරමින් සිටිති. සිවුන් පුමාණයට වඩා ආහාරවල ගුණාත්මකතාවය කෙරෙහි වැඩි අවධානයක් යොමු කිරීමට පටන් ගෙන ඇති අතර එබැවින් කාඛනික වෙළඳපොළක් සඳහා විශාල අවස්ථාවක් නිර්මාණය වෙමින් පවති.

කාබනික ආහාර පරිභෝජනය සහ ඉල්ලුම පිළිබද පරීක්ෂණ ගණනාවක් සිදු කර ඇති මුත් කාබනික ආහාර පරිභෝජනයේ මෙම කුමානුකුල වර්ධනය හා මිලදී ගැනීමේ ස්වභාවය පිළිබඳවල පුකාශයට පත් කර ඇති බොහොමයක් පර්යේෂණ වලින් පුමාණවත් ලෙස කරුණු අනාවරණය කරගෙන නොමැත. 2016 නොවැම්බර් සිට 2017 මැයි දක්වා ශී ලංකාවේ පුධාන දිස්තික්ක 06 ක (ගාල්ල, කොළඹ, ගම්පත, නුවර, කුරුණෑගල, රත්නපුර) එක් දිස්තික්කයකින් අහඹු ලෙස පාරිභෝගිකයන් 100ක් වන පරිදි සුපිරි වෙළඳසැල් 24කින් සමස්තය 600ක් වන,

පාරිභෝගිකයන් සංඛාාවක් යොදාගෙන සිදු කරන ලද පර්යේෂණයකට අනුව ශුී ලංකාවේ නාගරික මට්ටමේ ජනගතනයෙන් බොතොමයක් දෙනාට කාඛනික ආහාර පිලිබඳ සැලකිය යුතු අවබෝධයක් පවතින බව සොයා ගෙන ඇති අතර ඔවුන් සෞඛා සම්පන්න ජීවන රටාවක් සදහා වැඩි අවධානය යොමු කිරීමේ පුතිඵලයක් ලෙස මෙලෙස කාඛනික ආහාර පරිභෝජනය සදහා යොමු වීමට පෙළබී ඇති බව මෙම පරීක්ෂණයෙන් අනාවරණය වී ඇත. ශී ලංකා සබරගමුව විශ්වවිදහලයේ මහාචාර්යවර්යක වන පුෂ්පා මල්කාන්ති මහත්මිය සිය කණ්ඩායම සමඟ සිදු කරන ලද ඉහත පර්යේෂණයට අනුව නාගරික ජනගහනයෙන් වැඩි දෙනෙක් සතුව හොඳ අධ්හපන මට්ටමක් හා ඉහල මාසික ආදායමක් පවති. සුපිරි වෙළඳසැල් වලින් ගනුදෙනු කරන පාරිභෝගිකයන් අතුරින් බොහොමයක් දෙනා කාන්තාවන් වන අතර එම නිසාම ආහාර මිලදී ගැනීමේදී සෞඛ්ර හිතකර බව පිලිබඳ ඔවුන්ගේ අවධානය වැඩි වශයෙන් යොමු වේ. වර්තමානයේ පාරිභෝගිකයන් කෘෂි රසායනික තෝර්මෝන හා සත්ව නිෂ්පාදන තුල අඩංගු ඖෂධ වර්ගවල ජාන වෙනස් කරන ලද නිෂ්පාදන සහ කෘතීම රසකාරක ආදිය පිළිබඳව සැලකිලිමත් වීම පෙරට වඩා වැඩිය.

මෙම පර්යේෂණයෙන් අනාවරණය වූ වැදගත්ම සිදුවීම වන්නේ සාම්පුදායික ආහාර වල ඇති සෞඛාය ගැටළු නිසා බොහොමයක් පාරිතේගිකයින් මේ වන විට කාඛනික ආහාර පරිතෝජනය කෙරෙහි යොමුවීමක් දක්නට ලැබීමයි. මෙරට නාගරීක පුදේශවල බොහොමයක් දෙනා නිරන්තරයෙන් කාඛනික ආහාර පරිතෝජනයට තුරු වී සිටින අතර බොහොමයක් දෙනා මේ වන විට අවුරුදු 2 -3 ක පමණ සිට කාඛනික ආහාර පරිතෝජනය කරයි. ඉතා සීගුයෙන් පැතිර යන පිළිකා වැනි බෝ නොවන රෝග තේතුවෙන් මේ වන විට බොහොමයක් පාරිතෝගිකයන් සෞඛාය සම්බන්ධ සාධක කෙරේ අවධානය යොමු කර ඇත. එම සාධක කාඛනික ආහාර පිලිබඳ පාරිතෝගිකයන් තුල යනපත් ආකල්ප ගොඩ නැගීමට තේතු වී තිබේ.

වර්තමානයේ හොඳ හා නරක ආහාර ලෙස වෙන් කරගැනීමේ දී ආහාරයේ රසයට වඩා ගුණාත්මකතාවයට මුල තැන දෙන තත්වයකට පැමිණ තිබේ. තවද බොහොමයක් දෙනා සිය ආහාර අවශාතා සපුරා ගැනීමට මෙතෙක් පුරුදුව සිටි සාමානාය අලුවිසැල් වෙනුවට ගුණාත්මක කාබනික ආහාර අලෙවි කරන ස්ථාන වලට මාරු වීමද දක්නට ලැබේ. එමෙන්ම තත්වය තරාතිරම නොබලා තමන්ට තැකි අයුරින් වස විස නොයොදා ගෙවත්තක් පවත්වා ගෙන යාමට උත්සහ දැරීමද බොහෝ නාගරික ජනතාව අතර දක්නට ලැබෙන නව පුවණතාවයකි.

තවදුරටත් ඉතත පර්යේෂණයෙන් පැතැදිලි වුයේ මේ වන විට බොහොමයක් පාරිභෝගිකයන් සතුව පරිසර හිතකාමී බව පිලිබඳ ඉතා යහපත් ආකල්පයක් ගොඩනැගෙමින් පැවතන බවත් ඔවුන් ඒ සඳහා ද සිය ආහාර රටාව වෙනස් කර ගැනීමට උත්සහ දරන බවත් ය.

එමෙන්ම එම තත්වය ඉදිරියේදී වර්තමානයේදීටත් වඩා වැඩි වන අතර එය ශූී ලංකාවේ ආහාර සංස්කෘතියේ හැරවුම් ලක්ෂයක් වන බව පැහැදිලිය. මෙම තත්වය ශූී ලංකාවේ දැනට ආහාර කර්මාන්තයේ යෙදී සිටින පුද්ගලයින්ටත් ඉදිරියේදී ආහාර කර්මාන්තයේ නියැලී සිටීමට සිටින පුද්ගලයින්ටත් ඉතා වැදගත් අවස්ථාවක් වන අතර ඔවුන්ගේ වහපාර අනාගතයේදී කුමන දිශානතියකට යොමු විය යුතු ද යන්න එයින් නිගමනය කල හැකි ය.

කාබනික ආහාර පිලිබඳ පාරිභෝගිකයන් තුල පවතින යහපත් ආකල්ප වලට එරෙහිව පවතින සාධක වෙළඳපොල තුල කාබනික ආහාර වල අඹණ්ඩ සැපයුමක් නොමැති වීමත් ඒවා වෙළඳපොල

තවදුරටත් සමීක්ෂණයෙන් හෙළි වූ පරිදි කාබනික ආහාර පිලිබඳ පාරිතෝගිකයක් සතු විශ්වාසවන්තතාවය අඩු බව හා විවිධ දුර්මත කාබනික ආහාර මිලදී ගැනීමේ කැමැත්ත අඩු කරන සාධක වේ. එම නිසා දිගුකාලීන පාරිතෝගක විශ්වාසයක් පවත්වාගැනීමට කාබනික ආහාර පිලිබඳ සියලු නිරවදා තොරතුරු විනිවිදතාවයකින් යුතුව ලබා දීම අතාාවශා වේ. එමෙන්ම සහතිකකරණ තුම පවත්වාගැනීම මඟින් මෙම තත්වය මඟ හරවා ගත හැක. නමුත්, වර්තමානයේ සමහර ආහාර වර්ග සඳහා යොදා ඇති සාවදා ලේබල්කරණය හේතුවෙන් මේ වන විට සහතිකකරණය සම්බන්ධයෙන්ද පාරිතෝගිකයන් අතර විශ්වාසය අඩු වීමක් දක්නට ලැබේ.

එම නිසා රජය හා අනෙකුත් වගකිව යුතු පාර්ශවයන් මෙම කිුයා සම්බන්ධව කඩ්නම් කිුයාමාර්ග ගතයුතුව පවති.

ඉහත සියලු කරුණු සලකා බැලූ විට සෞඛායමය සාධක, පෞද්ගලික සාධක, වෙළඳපොල හා අලෙවිකරණ සාධක කාඛනික ආහාර කෙරෙහි ඍජුවම බලපාන සාධක ලෙස කියා කරයි. එමෙන්ම කෘෂි රසායනික භාවිතයෙන් සැලකිය යුතු තරමේ සෞඛාය ගැටළුල පාරිසරික ගැටළු මෙරට ඇති වී තිබුනද, තවමත් කාඛනික ආහාර පරිභෝජනයට යොමු වී සිටින පිරිස අවම මට්ටමක පවතින අතර බලධාරීන්ගේ පුමාණවත් තරම් අවධානයක් මේ සම්බන්ධයෙන් යොමු නොවීමේ දුර්වලතාවයක්ද පවතී.

පර්යේෂණ වලින් හෙළි වී ඇති පරිදි ඉතල යන කාබනික ආතාර ඉල්ලුම තා පාරිභෝගික අවශායතා සලකාබලා නිෂ්පාදකයින් තා අලෙව්කරුවන් වඩ වඩාත් නව තාක්ෂණික කුම භාවිතා කරමින් මෙරට කාබනික නිෂ්පාදනය තා අලෙව්ය නියමිත පුම්තියකට රැගෙන ආ යුතු කාලය එළඹ ඇත.



තුල සුලබ නොවීමත් කාබනික ආහාර කෙරෙති යහපත් පාරිභෝගික ආකල්පය අඩු කිරීමට හේතු වී තිබේ. මෙම තත්වය පාරිභෝගකයන් තුල කාබනික ආහාර අකුමවත්ව මිලදී ගැනීමේ රටාවක් නිර්මාණය කිරීමට හේතු වේ.

කාබනික ආහාර වල පවතින මිල අධික බව මෙයට පුධානම ගැටලුව ලෙස කියා කරයි. පාරිභෝගිකයන් සඳහන් කරන ආකාරයට ඔවුන් කාබනික ආහාර මිලදී ගැනීමට වෙළඳපොළට පිවිසුන ද, ඒවායේ ඇති මිල අධික බව නිසාම ඒවා මිලදී ගැනීමට ඔවුන්ට නොහැකි වේ. ඒ අනුව මිල යනු, කාබනික ආහාර කෙරෙහි පාරිභෝගික ආකල්ප වෙනස් කරන වැදගත් සාධකයකි. ශුී ලංකාව දියුණු වෙමින් පවතින රටක් නිසාම පාරිභෝගිකයන් හට ඔවුන්ගේ සීමිත මුදල් සෞඛ්ය පුතිලාහ ලබා ගැනීමට අධික ලෙස වියදම් කිරීමට හැකියාවක් නොමැත. මන මන මන නැත නැවුම් දියර ක්ර අගෙවත්තෙන් නිහදවමු

මස්ත ලෝකයම දරුණු ආර්ථික අර්බුදයකට ඇද දමමින් පැතිර යන COVID-19 වසංගත තත්වය සමඟ අප ශී ලංකාවද අතිශය බැරෑරුම් ලෙස ආර්ථික අපහසුතාවයන්ට මුහුණ දී සිටී. එහි එක් පැතිකඩක් ලෙස අප රට මේ වනවිට උගු විදේශ විනිමය හිඟයකට මුහුණ පා සිටින අතර මේ හේතුවෙන් අපට විදේශ රටවලින් ආනයනය කළ යුතු අතකවශක ආහාර දුවක පවා ගෙන්වා ගත නොහැකි තත්වයකට පත් වී ඉතා අසරණ වී ඇත. එසේ අපට අවශක පමණට ගෙනවා ගත නොහැකිව රට තුල ඉතා දරුණු හිඟයකට පත් වී ඇති එක් අතකාවශක අහාර වර්ගයක් ලෙස කිරිපිටි දැකිය හැකිය. අපේ රටේ ජනතාවට අවශක තරමට කිරි රට තුළම නිෂ්පාදනය කර ගැනීමට අප තවමත් අසමත් වීම තුළ මෙම දුක්බිත ඉරණමට මුහුණ දීමට අපට සිදුවී ඇති බව පැහැදිලිය.

දීර්ඝ කාලයක් තිස්සේ වියලි කිරි පිටි භාවිතය අපගේ පීවිතයේ එක් අනිවාර්ය දෛනික අංගයක් බවට පත් කරලීමට බහු ජාතික කිරි පිටි සමාගම් සමත් වි තිබීමේ පුතිඵලයක් ලෙස "කිරිපිටි භාවිතා කල නොහැකි නම් අපි කුමක් පානය කරමුද?" යන උභතෝකොටික ගැටළුවට සියළු ජනතාව මේ වන විට මුහුණ දී සිටී. එහෙත් අ<u>පේ සෞභාගෘමත් අතීතය</u> පිළිබඳව යළි සිතා බලන්නෙකුට ඉතා පහසුවෙන් අවබෝධ කර ගත හැක්කේ කිරි පිටි නොතිබූ අතීත කාලයේ අපේ මුතුන් මිත්තන් දියර එළකිරි හා ඒ ආශිත නිෂ්පාදන භාවිතය තුලින් සිය සත්ව පොටීන අවශෘතා සම්පූර්ණ කර ගැනීම ඉතා සාර්ථකව සිදු කරගත් බවත්, වර්තමාන ගැටළුවට ද සුදුසු පිළියමක් ලෙස නැවතත් අප දියර එළකිරි භාවිතයට හුරු වීම ඉතා කාලෝචිත බවත්ය. තම පවුල් ඒකකයේ පරිභෝජනය පිණිස නැවුම් දියර එළකිරි නිපදවා ගැනීමට එළගවයෙක් ඇති කිරීමෙන් හැකියාව ලැබෙන අතර අවශය පහසුකම් පවතී නම් එළගවයින් කිහිප දෙනෙකු ඇති කිරීමෙන් තමාගේ පරිභෝජනයට මෙන්ම අසල්වැසියන්ට අලෙව් කිරීම උදෙසාද කිරි නිපදවිය හැකි බව බොහෝ දෙනා තේරුම් නොගන්නා කරුණකි.

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කිරි ලබා ගැනීමට ගව පට්ටියක් ඇති කිරීමේදී මූලින්ම සුදුසු ගව වර්ග තෝරා ගැනීම කළ යුතුය. පීෂියන්, අයර්ෂයර් හා ජර්සි වැනි යුරෝපීය ගව වර්ග වල කිරි නිෂ්පාදන හැකියාව වැඩි වුවද රෝග වලට ඔරොත්තු දීමේ හැකියාව මෙන්ම අධික උෂ්ණත්වය ආදී අහිතකර කාළගුණික තත්ත්වයන් දරා ගැනීමේ හැකියාවද අඩු මට්ටමක පවතී. අනෙක් අතර සහිවාල්, සින්ඩි වැනි ඉන්දීය ගව වර්ග වල කිරි නිෂ්පාදනය අඩු වන අතර රෝග වලට හා අහිතකර දේශගුනික තත්ත්ව වලට ඔරොත්තු දීමේ හැකියාව ඉහලය. එබැවින් අළුතෙන් කිරි ගව ගොවිපලක් අරඹන අයෙකු තම පුදේශයේ දේශගුණික තත්ත්වය හා තමා සතුව ඇති සත්ත්ව පාලන පහසුකම් පුමාණය පිළිබඳව සලකා බලා සුදුසු ගව වර්ගයක් තෝරා ගැනීම කල යුතුය. මෙහිදී යුරෝපීය හා ඉන්දීය ගව වර්ග වල දෙමුහුම් ලෙස බිහිකරගත් සතුන් ලංකාවේ බොහෝ පුදේශ වලට සුදුසු බව සඳහන් කල යුතුය. එසේම ලංකාවේ දේශීය ගව වර්ග අධික උෂ්නත්වයක් සහිත පුදේශ <u>වල</u>ට ගැලපෙන බව ද සඳහන් කල හැක.

සතුන් තෝරා ගැනීම සමගම නිමා කරගත යුතු අනෙක් කොටස වන්නේ එම සතුන් සඳහා ගව ගාල ඉදිකිරීමයි. මෙහිදීද පුදේශයේ දේශගුණික තත්ත්වය <u>සලකා</u> බැලීමත් ඇතිකරන සතුන් ගණන පිළිබඳව අවධානය යොමු කිරීමත් වැදගත්ය. වියලි දේශගුණයක් පවතී නම් ගාල විවෘතව තැබිය යුතු අතර ශීතල පුදේශ වල ගාල බිත්ති බැඳ ආවරණය කිරීම සිදු කල හැකිය. සතුන් ගාල තුලම බැඳ තබා ගනිමින් සූක්ෂම කුමයට පාලනය කිරීම මගින් වැඩි නිෂ්පදනයක් ලබා ගත හැක. නමුත් මෙහිදී සතාට අවශය සියළුම ආහාර වර්ග ගාල තුලට ගෙනැවිත් සතාට ලබා දීම සිදු කල යුතු බැවින් යෙදවිය යුතු කාලය හා ශූමය වැඩි වේ. සතුන් යම් කාලයක් ආහාර පිණිස නිදැල්ලේ තබා රාතියට ගාල තුලට ගැනීමේ කුමයද අනුගමනය කල හැකි අතර මෙහිදී සැලකිය යුතු තෘණ බිමක් තිබීම අතුන්වශය වේ. සතුන් සුක්ෂම කුමයට ඇති කරන විට එක සතෙකුට අඩි 5 - 6 ක් පමණ දිග හා අඩි 3 - 4 පලල ඉඩ පුමාණයක් වෙන් කර සතා ගැට ගැසීමට හැකි සේ ගාල සකස් කල යුතුය. සතාගේ හිස පිහිටන කෙලවරේ ආහාර හා ජලය දැමීම සඳහා සිමෙන්තියෙන් සාදන ලද බඳුන් ඉදිකල යුතු අතර අනෙක් කෙලවරේ ගොම හා මුතුා එකතු කර ගත හැකි වන සේ නොග ැඹුරු කානුවක් ඉදිකල යුතුය. මෙම ආකාරයට සකස් කරගත් ගාලේ බිම හොඳින් කොන්කීුට් හෝ සිමෙන්ති යොදා රළු පෘෂ්ටයක් ලෙස සැකසිය යුතු වන්නේ සතාව ලිස්සා යාම් වලින් ආරක්ෂා කර ගැනීමටය.

සතාට අවශය ආහාර පිළිබඳව සැලකීමේදී දැනගත යුතු මූලිකම කරුණ වන්නේ සංකීර්ණ අමාශයක් සහිත වන ගවයාට සිය දේහ බරෙන් සියයට දහයක පුමාණයක් තණකොල දිනකට ලබා දිය යුතු බවයි. මෙම තණකොල ගුණාත්මක බවෙන් ඉහල CO - 3 (සී-ඕ - තුන) හෝ නේපියර් වැනි වර්ග විය යුතු අතර මල් පිපීම ඇරඹෙන විටම කපා ගත් තණකොල විය යුතුය. තණකොල වලට අමතරව සතාගේ දේහ තත්ත්වය හා විශේෂයෙන් කිරි නිෂ්පාදන තත්ත්වය ගැන සලකා බලා සාන්ද ගව ආහාර කිලෝගුෑම් 2 - 3 පමණ දිනකට ලබා දිය යුතුය. ඉහල කිරි නිෂ්පාදනයක් ඇති සතුන්ට හා ගර්භණී සතුන්ට මීට අමතරව බණිජ මිශූණ ගුෑම් 10 - 15 පමණ දිනකට සැපයීම ද වැදගත් වේග ආහාර පිණිස එළිමහනේ දිවා කාලයට බැඳ තබන සතුන් හට නම් රාතී කාලයේ පමණක් ගාල තුල එක වරක් ආහාර ලබා දිය හැකිය.

කිරි ගවයින්ගේ උපරිම නිෂ්පාදන ධාරිතාව ලබා ගැනීමට නම් ඔවුන් නිරෝගීව සිටීම අතාවශාම වෙයි. ඔහුලව සෑදෙන පණු රෝග හා පරපෝෂිත ආකාදන වලින් කතුන් මුදවා ගැනීමට සුදුසු පරිදි පණු බෙතෙත් හා බාහිර පරපෝෂිතයන් වන කිනිතුල්ලන්, මැක්කන් ආදිය ඉවත් කිරීමට සුදුසු රසායනික දාවන නිසි කලට යෙදීම වැදගත්ය. පණුතරනය නිසි කලට යෙදීම වැදගත්ය. පණුතරනය නිසි පරිදි සිදු නොවුන තොත් නිරක්තිය ඇතිවීම හා ඔඩයාම වැනි තත්ත්වයන්ට මුහුණ දීමට සිදුවන අතර කිනිතුල්ලන් මගින් සතාට ඇතුළු කරන Babesia bovi (බැබීසියා බෝවිස්) නම් පරපෝෂිතයා හේතුවෙන් අධික ලෙස රුධිරයේ රතු රුධිරානු විනාශ වී සතා ඉතා දුර්වල වී මරණය ඇති වීම පවා සිදුවිය හැකිය. මීට අමතරව මූඛ හා කූර රෝගය සහ ගව රක්තාශුවය සඳහා රජය මගින් නොම්ලේම එන්නත් ලබා දීම පශු වෛදා කාර්යාල හරහා සිදු කරයි. කිරි නිෂ්පදනයේ යෙදෙන වැස්සියන් හට වැළඳිය හැකි මූලිකම රෝග වනුයේ බුරුළු පුදාහය (මැස්ටයිටීස්) හා කිරි උණයි. බුරුළු පුදාහය වැලැක්වීමට කිරි දෙවීමේදී අනුගමනය කල යුතු නිසි සෞඛ්යාරක්ෂිත පිළිවෙත් නිසි පරිදි සිදු කිරීමත් ගාල පවිතුව තබා ගැනීමත් වැදගත් වේ. කිරී උණ ඇතිවීම වැලැක්වීමට නම් කිරි සමඟ සතාගේ ශරීරයෙන් ඉවත්වන කැල්සියම් පුමාණය ආහාර මගින් නැවත ලබා දීමට කටයුතු කල යුතුය. මේ සඳහා ඛණිජ මිශුණ ලබා දීම සිදු කල හැකිය.

මේ ආකාරයෙන් පවත්වාගෙන යන කිරි ගව ගොවිපලකින් නැවුම්, පිරිසිදු දියර කිරි ලබා ගෙන ඒවා තම නිවසේ පරිභෝජනයටත්, අතිරික්තව පවතී නම් අසල්වැසියන්ට අලෙව් කිරීමටත් මෙන්ම යෝගට් වැනි කිරි අතුරු නිෂ්පාදන නිපදවීම මගින් ඉහල ලාබයක් සතිත ආදායම් මාර්ගයක් සකසා ගැනීමටත් හැකියාව පවතී. තමා විසින් ඇතිකරන කිරි දෙනුන්ගෙන් ලබා ගන්නා කිරි වල මෙලමයින්, ඩී සි ඩී තෝ ක්ලොස්ටුිඩියම් බොටියුලිනම් වැනි බැක්ටීරියා නොමැති බවට තමාට සහතික බැවින් කිසිදු චකිතයකින් තොරව තම පවුලේ සාමාජිකයන් සමග එක්ව පරිභෝජනය කිරීමේ භාගxය උදා වේ. කිරි වලට අමතරව ගව ගාලෙන් එකතු වන ගොම භාවිත කර ජීව වායුව නිපදවිය හැකි අතර එය මුළුතැන්ගෙයි ආහාර පිසීමට භාවිත කිරීමෙන් ඔජ වායව මිලදී ගැනීමට වැයවන අධික මුදල අඩුකර ගත හැක. එසේම එම කියාවලියෙන් පස ඉතිරි වන ගොම පොහොර යොදා එළවළු හා පලතුරු වගා කිරීමෙන් රසායනික පොහොර නොයෙදු, වස විස නැති එළවළු හා පලතුරු තම ආහාරයට එක් කර ගැනීමේ වාසනාව ද ඔබට උදා කරගත හැකි වනු ඇත.



මහාචාර්ය වෛදා වී. සංජීව පුසාද් ජයවීර පශු සම්පත් නිෂ්පාදන අධායනාංශය කෘෂි විදාා පීඨය ශූ ලංකා සබරගමුව විශ්වවිදාහලය



පී ඒ තර්ෂණ ගලතිටිගම කෘෂි අපනයන අධායන අංශය කෘෂිවිදාා පීඨය ශී ලංකා සබරගමුව විශ්වවිදාාලය

## ආරක්ෂිත භෝග වගාව යනු

ආරක්ෂිත භෝග වගාව යනු පුශස්ත ශාක වර්ධනයක් උදෙසා කෘතිම ලෙස සකසන ලද පරිසරයක් තුල භෝග වගා කිරීමයි. මෙවැනි ආරක්ෂිත ගෘහ සාමානය වසවහරයේදී හරිතාගාර (Green House) ලෙස හැදින්වේ. මෙවැනි ගෘහ තුළ භෝග වගා කිරීමේදී පුධාන ලෙස වායව සහ පාංශු පරිසරය යන කොටස් දෙක කෙරෙහි අවධානය යොමු කරයි. එක් එක් භෝගය සඳහා අවශය කරන වායව සහ පාංශු තත්ව එකිනෙකට වෙනස් වේ. උදාහරනයක් ලෙස සළාද වගාවක් සඳහා අවශය වනුයේ සෞමස හෝ සීතල උෂ්ණත්ව පරාසයකි. (16 °C - 18 °C.) නමුත් ගර්කින් හෝ බෙල් පෙපර් වගාවක් සඳහා තරමක් ඉහළ උෂ්ණත්ව අවශය වේ. (25 °C - 26 °C.) නියම්ත උෂ්ණත්ව ලබා දීම මගින් භෝගයේ කායික කිුයාකාරී බව වැඩි වී වැඩි අස්වනු ලබා දෙයි. උෂ්ණත්වයට අමතරව සාපේක්ෂ ආර්දුතාවය, කාබන්ඩයොක්සයිඩ් සාන්දුණයි, ආලෝක තීවතාවය සහ ගුණාත්මය වැනි සාධක කුමාණුකූලව පාලනය කිරීම මගින් ඉහළ ගුණාත්මක අස්වැන්නක් ලබා ගත හැක. පාංශු සාධක වන පාංශු තෙතමනය, පාංශු ආම්ලිකතාවය (pH),විදයුත් සන්නායකතාවය (EC) යන පරාමිතියන් නියමිත පරාසයන් හී පවත්වා ගැනීම තුළින් භෝගයේ පුශස්ථ වර්ධනය ලබා ගැනීම ඉවහල් වේ.

## විවිධ ආරක්ෂිත ගෘහ වර්ග

ආරක්ෂිත ගෘහ වර්ගීකරණයේදී මූලික ලෙස එහි නිමැයුම් අමුදුවය සහ හැඩය අනුව ආරක්ෂිත ගෘහ වර්ග බොහොමයක් දැකිය හැකිය. ආරක්ෂිත ගෘහය සම්පූර්ණයෙන්ම වීදුරු භාවිතයෙන් සාදන්නේනම් එය වීදුරු ගෘහයකි. මීට අමතරව පොලිතීන් ආවරණය ගෘහ පොලිතීන් ගෘහ (පොලිටනල්) ලෙසටද ගෘහයේ වහල දැල් වලින් පමණක් ආවරණය වූ විට දැල් ගෘහයක් හෝ සෙවන ගෘහයක් ලෙසද හැඳන්වේ. මේ අතරින් භෝග වගාව සඳහා ශිු ලංකාව තුළ වැඩි වශයෙන් භාවිතා වන්නේ පොලිතීන් ගෘහ වේ. පොලිතීන් ගෘහයන්හී විශාලත්වය මුලික ලෙස වගාකරුගේ ආර්ථික තත්වය මත රදා පවතින අතර | මෙහිදී ගෘහය තැනීමට සැලිකිය යුතු මුදලක් වියදම් වේ. මීට අමතරව භෝග සඳහා අවශය පුශස්ථ තත්ව ලබා දීමට අවශぉ කරන ඇටවුම් ( බිංදු ජල සම්පාදන කට්ටලය, විසිරුම් කට්ටලය, පොහොර දිය කරවනය ) සඳහා අමතර පිරිවැයක් දැරිය යුතුය. එහෙත් වසර 6-8 අතර කාලයක් මෙවැනි ගෘහයක් සාර්ථකව වගා කටයුතු සඳහා යොදා ගත හැක.

## පොලිතින් ගෘහ තුළ භෝග වගා කළ යුතුතේ ඇයි?

වර්ථමානයේදී ආහාර සුරක්ෂිත තාවය පිළිබඳ වැඩි අධානයක් සෑම රාජකයක් විසින්ම යොමුකර ඇත. මෙහිදී රටක ආහාර නිෂ්පාදනය කරන භූමි පුමාණය පිළිබඳව මනා අවබෝධයක් තිබීම වැදගත් වේ. මන්ද යත් වැඩිවන ජනගහණයට අවශය ආහාර නිපදවිය යුත්තේ මෙම භූමි වලය. මෙහිදී වගා කල හැකි භූමි පුමාණය සීමා සහිත වන අතර ඒකක භූමි පුමාණයකින් වැඩි අස්වැන්නක් හෙවත් ඉහළ භෝග ඵලදාවක් (crop production) ලබා ගත යුතුය. මේ



සඳහා ඇති යෝගතම තුමයක් වනුයේ ආරක්ෂිත භෝග වගාවයි. විවෘත පරිසරයක් තුළ භෝග වගාවේදී භෝග යට අවශය පුශස්ත තත්වය පාලනය කිරීමට නොහැක. එහෙත් පොලිතින් ගෘහයක් තුළ එම තත්ව හොදින් පාලනය කළ හැක. නිදසුනක් ලෙස කාන්තාරමය හෝ ශුෂ්ක දේශගුණයක් සහිත පුදේශවල සෞමත භෝග (temperate crop) වන සලාද, බොකලි, ගෝවා ආදිය සාර්ථකව වගා කළ හැක. මීට අමතරව අධික සුළං සහ වර්ෂාව සහිත පුදේශ අධික රෝග සහ පළිබෝධ සහිත පුදේශ මෙන්ම අහිතකර පාංශු තත්ව සහිත පුදේශ වුවද වගාවන් සඳහා සාර්ථකව යොදා ගත හැක.

## කාළගුණික විපර්යාස (Climate Change) සහ ආරක්ෂිත භෝග වගාව

පෙර කාලයන්ට සාපේක්ෂව වර්තමානයේදී කාළගුණ ව්පර්යාස වැඩි වශයෙන් දැකගත හැක. මේ සඳහා පුධාන ලෙස ගෝලීය උෂ්ණත්වය ඉහළ යාම සැළකිය හැක කෘෂිකර්මාන්තයද මේ සඳහා යම්තාක් දුරට බලපාඇති බව මෑතකදී සිදුකල පර්යේෂණ වාර්ථා වලින් තහවුරු කර ඇත. කාලගුණ විපර්යාස මගින් පුධානතම බලපෑමක් සිදු වනුයේ භෝග වගාවටයි. මෙහිදි අධික නියන් කාල සහ අධික වර්ෂාව වසරේ විවිධ කාල තුළ සිදු වීම මගින් භෝග වගාවට අවශය පුශස්ථ තත්ව සැපයීමට බාධාවන් ඇති කරයි. එබැවින් ශාකයේ වර්ධනය අඩු වේ. මීට සමගාමීව අහිතකර පාරිසරික සාධක නිසා බොහෝ විට භෝග සඳහා ලෙඩරෝග සහ කෘමි සතුන්ගේ හානි වැඩිවේ. උදාහරණයක් ලෙස අධික වර්ෂාව නිසා පසේ අඩංගු පෝෂක සේදීයාමද, පෙර සහ පශ්චම අංගමාරය, මුල් කුනුවීම, ආදි දිලීර රෝග වහාප්ත වීම නිසා අස්වනු පුමාණය මෙන්ම අස්වැන්නේ ගුණාත්මයද අඩුවේ. එබැවින් මෙම පාරිසරික තත්ව යාමනය කිරීමට ආරක්ෂිත භෝග වගාව යොදා ගත හැක. මෙලෙස දේශගුණික විපර්යාස මඟහරවා ගනිමින් උසස් පුමිතියෙන් යුතු ඉහළ අස්වැන්නක් වසර පුරා ලබා ගත හැකි වීමද මෙම තෝග වගා කුමයේ ඇති තවත් වාසියකි. සාමානෘ විවෘත පරිසර තුළ වගාවේදී මෙලෙස ඒකාකාරී වගාවක් සිදු කළ නොහැක. එබැවින් හිගයකින් තොරව ඒකාකාරී සැපයුමක් ගොවි මහතා විසින් වෙළඳපොලට ලබා දිය හැක (මෙම නිෂ්පාදන සඳහා වර්ථමානයේදී සුපිරි වෙළඳ සැල් වල විශේෂිත ලේබලයක් යටතේ ඉහළ මිළකට අලෙවි කරනු ලබයි). මෙම තත්වය වඩාත් වැදගත් වනුයේ අයහපත්



කාළගුණය පවතින කාලවලදී එළවළු මිළගණන්හී සිදුවන උච්චාවචනය අවම කරගත හැකි වීමයි. පොලිතින් ගෘහ සාදා ගැනීමේදී පැති බිත්ති ආවරණය කිරීමට යොදා ගන්නා කෘමි දැල (insect proof net) මගින් පළිබොධකයන් වන කුඩිත්තන්, පැල මැක්කන්, මයිටාවන් වැනි කුඩා පළිබොධකයින්ට පවා ගෘහය තුළට ඇතුළු වීමට නොහැකි වේ. මීට අමතරව පොලිතීන් ගෘහයේ වහලය සඳහා භාවිතා කරන UV පුටිකාරිත පොලිතීනය මගින් සුර්යාලෝකයේ ඇති අහිතකර පාරජම්බුල කිරණ ගෘහයට ඇතුළු වීම වළක්වයි. මෙම UV කිරණ ශාකයේ වර්ධනය අඩාල කරන අතර UV පුටිකාරිත පොලිතීනය මගින් අවශෝෂණය කරයි. එමගින් ශාකයේ වර්ධනය UV කිරන මගින් සිදුවන බලපෑම ඉවත් කළහැක.

## ආරක්ෂිත භෝග වගාවේ අමතර වාසි

ආරක්ෂිත ගෘහ තුළ භෝග වගාව මගින් ඉහත 🖛 සඳහන් කර ඇති වාසි වලට අමතරව පහත සඳහන් අමතර වාසිද ලබා ගත හැක.

- ඒකක කාලයකදී ඒකක භූම් පුමාණයකින් ලබා ගත හැකි අස්වැන්නක් වැඩිකර ගැනීම.
- දේශිය සුපිරි වෙළදසැල් සහ අපනයනය සඳහා ගුණාත්මයෙන් ඉහළ එළවළු නිෂ්පාදනය සහ එමගින් දේශීය ආර්ථිකය පෝෂණය කිරීම.
- කෘමි පළිබෝධ සහ රෝග සඳහා යොදන රසායනික දුවන අවම කිරීම මගින් පරිසර හිතකාමී (eco friendly) තෝග නිෂ්පාදනය.
- සීමිත සම්පත් උපරිම ලෙස පුයෝජනයට ගනිමින් තිරසාර කෘෂිකර්මාන්තයට (sustainable agriculture) අඩිතාලම සැපයීම.
- භෝග වගා කළ නොහැකි භූමි සාර්ථක වගාවන් සඳහා යොදාගත හැකි වීම.
- කන්නය දීර්ඝ කිරීම මගින් ඒකාකාර නිෂ්පාදනයක් වසර පුරා ලබා ගැනීම සහ ශුමිකයන්ට ආදායම් මාර්ගයක් වීම.
- තෝග විවිධාංගීකරණය යටතේ ( එළවළු, කැපුම් මල් සහ පතු ) වගාව මගින් ආදායම් මාර්ග පුළුල් වීම.

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M.D. Nandana Gunaratne Agriculture Sector Modernization Project

# Climate Change and Financial Risk in Agriculture Sector

any scientists explain climate change as a periodic variation of the climate due to changes in the atmosphere and its interactions between physical, chemical, and biological factors etc. within the earth. According to that, the air, water and soil are interacted with the atmosphere through the exchange of gases. However, the climate has changed continuously over earth's history as a natural process. But as the global warming is being faster since the 1980s, the climate change has become a global challenge which presents a serious threat to nature and people at present and in the future. Climate change is happening right before our eyes and significant climate changes over last few decades such as rapid global warming (land and ocean), diminishing ice sheets (e.g. Greenland and Antarctic ice sheets), and melting of arctic sea ice, sea level rising and ocean acidification etc. Climate change is expected to directly influence agricultural productivity, hydrologic balances, input supplies and many other components of agricultural systems and the earth will increase the occurrence of extreme weather events such as drought and heavy rainfall. On the other hand, as per the world Food and Agriculture Organization (FAO) the world population would be 9.1 billion people in 2050, which implies significant increases in food production and at least \$80 billion annual investments will be needed to meet this demand. Therefore, agriculture in the 21st century faces a big challenge to adopt more efficient and sustainable production measures to adapt to climate change.

Agricultural assets and agricultural infrastructure can be severely damaged due to extreme events and other hazards due to climate change, and this may lead to social well-being of people and food security of people. World food program reveals that more than three quarter of the food unsecured people live in countries where frequent natural hazards are experiencing in the world. Assets can be damaged directly and indirectly. For example, floods, droughts and severe storms can make direct damages and portfolios can also be harmed indirectly, through weaker growth and lower asset returns etc. Further, the agriculture contributes to 14% to 30% manmade greenhouse emission globally because of its intensive use of land water and energy. Activities like farm mechanization, irrigation, indoor facilities of livestock production, application of nitrogen fertilizers are some reasons to increase greenhouse gas in agriculture. Therefore, the need to conduct financial risk analyses to mitigate the possible financial losses due to climate change is more pressing than ever and agriculture associated risk is being more widely recognized as a vital aspect.

There are many uncertainties in different value chains of production and different activities. The said vulnerabilities/aspects can cause wide swings in income while exposing of different types of risks. Production risk, price risk, market risk, financial risk, institutional risk, health and human resource related risk are some of the different types of risk. Financial risk is universally recognized when the business obtain money and creates and makes obligation to repay money. Therefore, it very important component in corporate finance in agribusiness. Increasing lending rates, the probability of making scheduled payments, and controls over credit facilities are some of the main associated matters with financial risk.

Risk management involves selecting best option that reduces financial risks due to above mentioned uncertainties and it is important to managing physical risk as well as transition risk. Physical risks include hazards or dangers that pose a threat to physical assets, including fields, buildings, equipment and people etc. Climate risks could be extreme weather and climate change events such as sea level rising, ocean acidification, storms, flooding etc. These physical damage can present a risk to any business in many ways, from production losses, time lost and repair costs, loss sales, to legal action and reputational harm etc. Many businesses will have to learn to deal with the future as the climate change. This is because the physical effects of climate change will impact significantly on agribusiness process. Therefore, physical risks are clearly a big aspect of climate risk and managing transition risk also plays a vital role in agriculture.

Transition risks can occur when moving towards a less polluting, greener economy. To avoid the worst impacts of climate change, many countries in the world are going to have to not just remake the energy sector but renew much of the infrastructure that supports all economic growth. That might happen in a quite orderly, planned way. But more likely, these changes will come from disruptive technologies and business model innovations that catch some industries by surprise. Example : There is an increasing trend of producing machinery with minimum emissions.

However, the real question is, is there enough certainty in the market to unlock the capital which is needed to transition the economy to minimize the financial risk due to climate change globally? The importance of low carbon economies are more widely identified with the increasing pressure of the impact of climate change.





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gribusiness Venture Creation is an innovative course introduced by the Department of Agribusiness Management in 2019. This course unit offers an applied approach, allowing students to work through a new venture creation process. The module includes identifying opportunity concepts, the market potential of the new venture, developing appropriate strategies for planning and managing growth, and identifying and assessing critical resources for the proposed new venture.

The current students in the Department of Agribusiness Management have developed innovative business ideas into ventures in food and beverage, agro-chemical and ornamental plants areas. A few have been able to raise their ventures to a commercial level by signing agreements with the industry.

The following are some highlighted products developed by students:





Beetroot Sandwich Spread

**Bio Pesticide** 



Spicy Chocolate Coated Cookies



Mushroom Tomato Soup





Fruit infuses

Spicy Seasoning Cubes

Passionate Youth Got an Industry to Sparkle: Take the Initiative in

# Event Management

G.M.S.P.S. Godaudawaththa Department of Agribusiness Management Faculty of Agricultural Sciences Sabaragamuwa University of Sri Lanka Two years ago, generally, an event used to be a physical arrangement of things linking people and facilitating their participation physically. The global outbreak of COVID-19 pandemic has changed the shape of the general rules, processes and procedures in hosting events and event management. Even though the event management was a new concept initially, it had to break its brand new procedures, norms and traditions suddenly by going out of the normal and sequent transformation and come up with radical and innovative event structures and procedures to deal with the chaos. For, there was a huge vacuum to fill – the absence of a platform to host certain events like seminars, conferences, competitions, auditions, musical shows etc. By considering this vacuum, the existing players in the event management industry came up with virtual structures of event hosting to saturate the emergent demand.

With this opportunity of desperate market, a group of my schoolmates started a small venture of event management to support hosting events in the virtual platforms as well as managing the event from the planning stage to the end. After the postponement of exams, I joined them as a designer of promotion tools, virtual banners, flyers etc. The event management team consisted of the team leader, two coordinators under the leader, finance manager, IT operator, marketing manager, main designer and assistant designer. The leader, while steering the team, integrates operations, communicates with the clients, coordinates the suppliers and supportive service providers and works as a moderator or presenter in events when needed with his two assistants helping him out in his duty. The finance manager manages the resources throughout the event and all the related activities in the firm, and the marketing manager, apart from his duty, manages media operations of the event and the firm. IT operator manages the event hosting platforms (software), social media and all the IT related activities.

I was dominating as an assisting designer at the beginning and, as the main designer for a physical training and sports related organization, developed one webinar project. My task was to design social media posts, advertisements and flyers because the client firm was mainly targeting its customers and the potential customers in social media. In the preevent stage, according to the client's requirements, we figure out the part we have to do as the event management partner and the degree of the role which each of the team mate has to play. Up until the event is done, the teammates have to be fully informed of each step we take. Eventually, the status of the progress is reported to the client for a feedback to draft the perfect outcome as well as to know further requirements of resources and directions to minimize imperfections. Having enough finance resources is also an important aspect at the pre-event stage. Further, possible malfunctions, communication effects and other barriers should be anticipated setting flexible solutions and alternatives at this stage.

When it comes to the ongoing event, smooth integration and transition between the segments of the event is necessary, so having a strong communication is a must; especially, in a virtual environment. For example, during the previous webinar, there was another video conference running parallel to the main session among the team members to ensure proper communication. At the post-event stage, we prepare financial statement on expenses and other financial activities, and hand over it to the client before finalizing payments. Further, if the client requires the information and the profiles of the participants, they are given a collection of information. For example, in the previous case, a participant had to follow the link in bio? and fill a small questionnaire which is set to obtain the required information and that participant redeem the link? to the webinar in return of successful submission?.

The whole process is elaborated further; what we find here is only an extract of it; yet, the most important fact was that we got the initiative in new and strange concept without any knowledge in professional field. As a small scale venture, the team conducted successful projects within a short period of time, and it was quite a victory for a bunch of immature, young and passionate event managers. If such an opportunity and initiative was given at school or undergraduate level by the education system, it would be much effective in producing quality professionals, entrepreneurs and leaders for the nation.



## Global crises, SMEs, and Entrepreneurship: the Need for a New Agenda for the Future

The Covid-19 global pandemic situation put the global economy in a crisis while many of the nations were suffering from unfavourable events such as extreme weather, climate change, unstable economics, political instability, and even terrorism. The situation caused loss of millions of human lives and disrupted livelihoods. Prolonged locked-down situations due to Covid-19 recently put everyone in predicament of fulfilling their basic needs and wants. Continuous lockdowns worsened the situation which severely affected both the physical and mental wellbeing of the people and even deprived them of their basic human rights. These continuous past and present threats on human wellbeing which affected at national, regional, and even at global levels, have opened up a common platform for the world leaders of the United Nations (UN) to take action at every and possible level to become resilient and adaptive towards such situations. The UN has addressed these global threats through their Sustainable Development Goals (SDGs) which will be the watershed blueprint of peace and prosperity for people and the planet, now and in the future. The 2030 agenda on global challenge for government transparency and SDGs included a total of seventeen goals of which No Poverty, Zero Hunger and Climate Action are considered in this article as especially important for the developing countries as these are prominent issues to be addressed by the developing world.

The SMEs have been defined by Bayraktar and Algan (2019) as firms with 200 or less employees. Their contribution and the importance to the world economies have been well researched. They are important for developing and developed economies alike. The World bank (WB) (2021) confirmed that the SMEs represent around 90 per cent of businesses and over 50 per cent of the employment worldwide. The WB estimates that the formal SMEs contribute to around 40 per cent of national income (in GDP terms) in emerging economies. The World Trade Organization (WTO) reported (2016) with respect to the developed world that over 90 per cent of the business population; 60 – 70 per cent of employment; and 55 per cent of GDP were contributed by the SMEs. Their key importance lie in many areas such as wealth creation and employment generation. These are expected to assist Sri Lanka to win its battle against no poverty and zero hunger towards a sustained development. Country's economic development needs significant thrust from the focal areas of SDGs.

Enterprises

Small & Medium



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Many SMEs display unique features. They use local technology, resources, and manpower; bridge market gaps left by the large-scale corporate enterprises; facilitate the movement of products and services from small markets to large-scale markets; and can produce niche products more successfully than large firms. Also, they actively mobilize savings to create livelihoods which signals the entrepreneurial activity in them. Therefore, promoting entrepreneurship has been identified as quite important for the SMEs to not only to identify and strategically address the market gaps with their limited resources but also to act responsibly in crises mentioned above. As these crises and threats continue to hammer the developing nations the most, SMEs in the developing world may show higher vulnerability towards such conditions. The reasons behind this are that, many developing countries are prominently located at climatically vulnerable geographical locations; take fewer providence actions to address such threats; limited capital and resources to build strong buildings and infrastructure; being overlooked from relevant recovery programs and insurance schemes; and sometimes their poor management skills restrict the operations and reactions. However, their flexible operating nature provides rapid adaptability in dynamic operating environments enabling them to take up the adaptations quickly with less cost to change. The recent global pandemic and lockdown situation provided best examples of the flexible nature of SMEs in adapting to the changing business environment to address the market gaps created by the situation. Their ability to take a considerable amount of risks to exploit the opportunities innovatively during such a predicament period as entrepreneurs was quite remarkable. They were able to make use of new business opportunities as individuals or by interlinking with the products and service chains both vertically and horizontally. Rapid adoption of digital strategies to communicate with their customer base; adding up a variety of services including electronic banking facilities and home delivery services; and provision of customized products and services were the other advantages of their presence during a pandemic.

As evidenced, the importance of the presence of SMEs in our economy during this global challenge, it is the responsibility that lies in our hands to protect and support them for sustainable business operations. The pathway is challenging and contains lots of obstacles. But to make the SMEs more adaptive and resilient in future events, the government and the relevant authorities, the private sector as well as the Non-Governmental Organizations (NGOs) should work collectively. Inclusion of the SMEs in recovery programs including credit programs and insurance schemes; facilitating them to develop strong buildings and infrastructure against the physical damages; interlinking the SMEs with local and export chains to explore the market opportunities, engaging them with relevant production, management, and marketing training programs for knowledge and skill development will be the pragmatic approaches to protect and strengthen the SME against the future threats and for sustainable operations. Therefore, protecting the SMEs is vital for the economy and is yet to be explored.

## **Reference:**

- Bayraktar, M., and Algan, N. (2019), The importance of SMEs on world economies, Proceedings of International Conference on Eurasian Economies, 11<sup>th</sup> 13<sup>th</sup> June, 2019, Turkish Republic of Northern Cyprus, Fumagusta, pp 56-61.
- The World Bank (WB), (2021), Small and Medium Enterprises (SMEs) Finance improving SMEs' access to finance and finding innovative solutions to unlock sources of capital, https://www.worldbank.org/en/topic/smefinance. Accessed on 12.12.2021.
- The World Trade Organization (WTO), (2016), World Trade Report 2016; Levelling the trade field for SMEs, https://www.wto.org/english/res\_e/publications\_e/wtr16\_e.htm Accessed on 12.12.2021.

United Nations, (2015). The seventeen goals 2015 https://sdgs.un.org/goals Accessed on 09.12.2021.







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## Effect of Organic Inputs to Control Banana Ripening Rate ("Kolikuttu Banana") Based on Ambient Temperature and Time Taken to Reach End Consumers

Banana (Musa sp.) is a one of fruit crops in Sri Lanka and it gives high income to the farmers. Most of the Asian and African countries export banana to the world market. Banana has a high putrefaction nature, and it causes significant economic loss in export market due to the quality deterioration of banana that affects consumer perception. This quality deterioration can happen with ripening.

Banana is the main exporting fruit in Sri Lanka. Large, medium and small scale banana exporters involve in banana exporting. Bananas for long distant export markets should be harvested at pre-climacteric mature green stage and should remain green until reaching their destination. However, long distant involved in export markets could not supply quality green color bananas due to the fruit ripening in transit and spoilage. Therefore, the banana shelf life should be extended by using ripening control methods. Many researchers have investigated ways of extending the green life of fruit with modifying packaging, ethylene absorbents and storage at cooling condition. These methods are beneficial for both exporters and retailers. Prolonged freshness and controlling ripening process of bananas can be maintained through these methods. However, small scale exporters cannot bear the expenses of the methods such as storage at cooling condition due to high cost of these methods. Therefore, this research introduces low cost treatment for the delay banana ripping. It may be a better solution for controlling banana wastage in export and domestic markets. In here, sweet orange peel mixture is used as treatments (Figure 1 and 2). This treatment is applied for the banana comb as a paste. Through this research, an attempt has been made to increase the self-life of bananas, especially to reduce banana wastage during exporting small and middle scale exporters. This treatment can be a huge advantage to the Sri Lankan export fruit market.



Figure 1: Sweet orange peel



Figure 2: Sweet orange peel mixture

## The Horrendous Impacts of the Coronavirus and the Tragedy of Fishing and Fisheries in Sri Lanka



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## Introduction

During the year 2020 and early 2021, fishing has been hit dreadfully by the coronavirus. During the first wave of the epidemic, the issues were low prices, low production and incomes due to curfews, lockdowns, etc., while during the second wave, they were the increased risk of spread of the disease, reduced fish consumption, low demand and falling incomes. These incessant multiple shocks have crippled the fisheries sector, torturing especially the small scale fisheries. On top of the alarmingly high rate of spread of the virus, curfews and lockdowns, the recently surfaced issues such as congestion in markets, imprudence of diverse actors in abiding by health guidelines, incapacity of government facilities in handling fish surpluses, myths about fish being a carrier of the COVID-19 virus and the failure of authorities in exonerating this myth, have all contributed sturdily to this tragedy.

## The First Blow of The Coronavirus Pandemic

With the reporting of the first case of COVID-19 on the 11th of March 2020, the Corona pandemic has had varying effects on the small scale fishing community, depending on the seasonality, availability of supporting services (fuel, ice supply and marketing), alternative livelihood opportunities and state regulations. The pandemic affected all links in the fish value chain, dismantling almost all of them; fish landings, marketing, distribution, processing, etc. Closure of retail outlets, the limited number of merchants present at landing sites to buy fish, inadequate number of transport vehicles available, lack of effective demand etc. were the demand side



issues, while curfews and lock downs, avoidance of social gatherings and poor fishing (low fishing effort), were the supply side issues affecting the SSF sector dreadfully (Amarasinghe, 2020). Sri Lanka's fish exports were hit by a merciless blow, when all international trade links were shattered in April 2020.

It is well known that fishing is characterized by extremely high income fluctuations and fishers have historically being engaged in diverse non-fishing activities to smoothen consumption in a context of inter-temporal fluctuations of fishing incomes. Coir industry, net mending, ornamental fisheries, fish drying (by women), working as crew workers in multiday crafts, agriculture, animal husbandry, tourism activities (as guides, providing home stay facilities, fishing tours in lagoons), running boutiques, etc. are some of the activities fishers and their families have undertaken to earn supplementary incomes and to smoothen income fluctuations. Evidently, COVID-19 has made most of these activities defunct, threatening the wellbeing of the fishing community because the major sources of income (fishing), supplementary sources of income and assistance were not available to them.

The sector recovered slowly by June 2020 but at a slow pace. Yet, debts were getting accumulated and

recovery required more loans for replacement and repair of crafts and gear. However, by the end of June, the sector had recovered to a fair extent, in respect of production and prices. While it was true that fishing recommenced, the fishers were still repaying their accumulated debts and their sources of alternative livelihoods were yet to regain their strength. Regrettably, this story of painful recovery did not last long, because the second wave of the coronavirus hit the country with a ravaging force in September 2020.



## The Second Blow: Emergence of The Peliyagoda Cluster

A new COVID-19 cluster originated from Peliyagoda wholesale fish market in September 2020, at a time when the new strain of the coronavirus: SARS B142 was razing though every corner of the country at an alarmingly high speed with a heavy virus load. Frighteningly high numbers of COVID cases found in the Peliyagoda cluster prompted immediate closure of the market to contain the spread of the virus. Several major fishing harbours and a number of fish markets and retail stalls in the country were subject to temporary closure. Generally, within the Peliyagoda wholesale market premises, there is very close interaction among the buyers and sellers who number around 3,000 during a particular day. Similar to the large number of sellers bringing fish from all over the country, the buyers (or retailers) too come from every corner of the country, providing the environment for the operation of a near-perfect competitive market. During a rush, people generally tend to forget to strictly adhere to guidelines issued by health authorities, causing rapid dissemination of the virus.

The impact of the pandemic on people's life was dreadful. The closure of the Peliyagoda fish market with a large number of fish traders being diagnosed as COVID-19 positive and the resulting panic created among the public, disrupted the fish supply chain. The Ceylon Fisheries Cooperation (CFC), had no capacity of handling large quantities of fish. Having no other alternative, most of the fishers handed over their harvest for dried fish and maldive fish production at very low prices.

Owing probably to a misconception that the Corona virus could be transmitted via fish, many fish consumers of the country refrained from consuming fish, putting fishers out of the frying pan into the fire. Small scale fishers grieved that their fish were being rejected by consumers, although such fish were not landed in large harbours, which were considered to be the springs that diffused the virus. The prices came down tremendously and fishing became a net cost to the fishers. These fishers form the poor among fishing communities and they were hit strongly by multiple shocks; first by the COVID-19 and the health risk and, then by the livelihood threat.

## Fish Being a Carrier of Coronavirus: The Myth

Scientists and authorities across the world were monitoring the spread of the virus and there was no evidence that food is a source of coronavirus (COVID-19). According to the World Health Organisation (WHO, 2020) and European Food Safety Authority (EFSA, 2020), it is highly unlikely that people can contact the virus from food or food packaging. In point of fact, people carried an ambivalent opinion towards the consumption of fish as their fears and doubts were not dispelled by the authorities. However, the Ministry of Health reaffirmed that fish and related products were safe for consumption, provided that they are cooked in a hygienic manner. Yet, in a theoretical sense, the coronavirus virus could thrive on many surfaces, including uncooked fish (especially on the mucus layer on the skin of the fish) for a considerable amount of time, unless it is thoroughly washed off. As reported by The Hindu newspaper of India on November 2020 (The Hindu, 2020), a group of Japanese doctors has found that the coronavirus could remain on human skin for about 9 days. Although not researched yet, it is likely that food items such as vegetables and meats, may also carry the coronavirus on their skin, a fact that has not received much attention.

The year 2021 also saw a sudden upsurge of the pandemic, which rose to alarmingly high levels after the Sinhalese and Tamil New Year. Curfews enforced in August and September 2021 and strict restrictions imposed on travel among provinces, etc. caused severe hardships on the livelihoods of people, especially those self-employed groups and fishing communities were no exception to these threats.

## Other Impacts Compounding The Covid- 19 Impacts

It is to be emphasized that, even in the absence of the COVID-19 pandemic, the livelihoods of small scale fisheries are under threat due to a number of factors, some which are inherent in fisheries, such as the seasonality and uncertainty of catches, and others caused by diverse anthropogenic forces. Due to Malthusian influences, fishing pressure (increase in the number of fishers) is on the rise pushing down the catch per boat. In the context of lack of alternative livelihood opportunities, many fishing families have been pushed into the dumps of poverty. Another issue is the use of environmentally destructive gear leading



to the present situation of rising fishing crimes. When those hit by various vulnerabilities have no access to livelihood capitals to make their livelihoods sustainable, they are likely to fall back on common resources exploiting them more intensively, using destructive fishing gear that brought in higher catches in the short run, but causing resource degradation in the long run.

Some of the most notable impacts observed recently have been the injustices caused by the process of Blue Economic Growth. Complains of exclusion communities from development decision of making, absence of any community consultation in implementing development projects, coastal land grabbing by tourism interests (land tenure issues), marginalization of small scale fishers, etc., were heard from all around the country. Conflicts among fisheries and tourism stakeholders have risen to prohibitive levels. Many fishers have lost their beach seining sites, craft anchorage sites and fish drying sites, first, as a result of climate-induced sea erosion and second, as a result of land grabbing by tourism interests. While coastal waters traditionally provided livelihoods to thousands of small scale fisheries who had customary rights to fish resources in such waters, today the 'small fry' has been chased away and the coastal waters have become the arena of sea sports and leisure. The public beaches have become private and some beach access roads have become private property of tourism stakeholders. These are all injustices emerging from the unregulated growth of the blue economy which have pushed the small scale fishers to the margins.

## **Concluding Remarks**

COVID-19 pandemic continues causing devastating impacts on the lives of all and fishers are no exception. As a self-employed group of people in this country, fishersneedtohelpedinrecoveringfromtheCOVID-19 impacts, such as repayment of accumulated debts. However, due to various vulnerabilities that tend to push small scale fishers to the margins, the pandemic's impact on fishers have been compounded. Thus, what is important is to strengthen the resilient capacity of fishing communities to external shocks, which would involve, among other things, strengthening community sources of insurance (fisheries cooperatives, cooperative savings), promoting selfinsurance strategies (savings, alternative livelihoods, women employment), and addressing social injustices caused by the process of Blue Economic Growth.

## References

- Amarasinghe, O. (2020). The Impact of COVID-19 Pandemic on Coastal Fisheries in Sri Lanka. Report Submitted for World Bank.
- European Food Safety Authority (EFSA) (2020). Coronavirus: no evidence that food is a source or transmission route. Retrieved October 12, 2021, from https:// www. efsa. Europa .eu/en/ news/ coronavirus-no-evidence-food-source-or-transmission-route
- The HINDU. (2020). Coronavirus India lockdown. Retrieved August 26, 2021, from https://www.thehindu. com/news/national/coronavirus-india-lockdown-november-11-2020-liv e-updates/article33071539. ece
- World Health Organisation (WHO) (2020). COVID-19 and Food Safety: Guidance for Food Businesses: interim guidance. https://apps.who.int/iris/bitstream /handle/10665/33170 5/WHO-2019-nCoV Food\_Safety-2020.1-eng.pdf

Study on Developing Breakfast Cereal from Jackfruit Seed Artocarpus heterophyllus) Flour, Brown Rice (Oryza sativa) Flour & Arrowroot Flour (Maranta arundinacea)

B reakfast cereal is a breakfast food prepared from cereal grains that have been processed. In the market we can find various type of breakfast cereal products such as Samaposha, Kellogg's Corn flakes, Nestle Cerelac...etc. Most of these products are made from wheat, corn, rice, soya etc.

Taking this into account an attempt has been made to develop breakfast cereal (nutritious flour) from Jackfruit seed flour, brown rice flour and arrowroot flour. This product is also like Samaposha, but all three types of flour that have been used are gluten free. So, it will benefit the people who are allergic to gluten or who have symptoms of celiac diseases. This new precooked cereal can be prepared as porridge or aggala. Further, it can be eaten directly by adding sugar and salt.

Jackfruit seeds and arrowroot is powerhouse of healthful nutrients. However, in the market, we can find few value added products related to jackfruit seeds flour and arrowroots. Thus, the aim of this study is to develop nutritious breakfast cereal (nutritious flour) from jackfruit seed flour, arrowroot flour mixed with brown rice flour.

The base of the breakfast cereal premix consists of jackfruit seed flour, brown rice flour and arrowroot flour (Figure a, b, and c). To prepare the breakfast cereal, 3 main ingredients mixed in the same ratio as 1:1:1 (for 150 g, 50 g of jackfruit seed flour, 50 g of brown rice flour and 50 g of arrowroot flour were used). The target group of this product is the children and adults (all the people who consume cereal products).

The study seeks to promote the use of underutilized jackfruit seed flour and arrowroot flour among people and develop nutritious breakfast cereal from those two flours mixed with brown rice flour.



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Figure a: Brown rice



Figure b: Arrowroot



Figure c: Jackfruit seed

## Does Floriculture Industry Improve the Livelihood of Small Scale Farmers?

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ri Lankan floriculture industry is a blooming industry from past twenty five years, playing a considerable role in the field of agriculture and economy of the country. Major production regions in Sri Lanka are Up country, Western province and some districts in North-western province and capable to expand the production into Sabaragamuwa province and the Southern provinces too. Especially up country region is highly contributed for the production than the other regions. Main floriculture products are cut flowers (*Gerbera sp, Rosa sp, Lilium candidum*), ornamental foliage (*Draceana sanderiana, Draceana maasageana, Cordyline, Agalonema*), aquarium plants, landscaping plants (*Plumeria, Gardenia, Codiaeum*), seeds and tissue culture plants (*Musa sp, Cordyline, Dracaena sp*). Rich soil for the cultivation, climate, geography, socio economic and cultural changes of the country are blessings to expand the production to higher level rather than the current production margins.



Figure 1. Cut flowers and foliage varieties

In the current scenario floriculture industry offers over 5000 direct and 15,000 indirect employments. Floriculture is the major income source for the livelihood of the grassroots level small scale producers especially in the up country region. Mainly the women involvement in planting, maintaining, harvesting and packaging are higher. Most of the women involve in floriculture industry related activities as self-employment since it is more flexible for them to manage their household activities and the business activities. There are linkages who buy products from the farmers at the farm gate level. So those farmers can easily sell their products to the buyer or the next stage of the supply chain. Some farmers are involving in flower cultivation along with the vegetable cultivation as an extra income generation source. Once farmers are strengthen with social capital and the physical capital they can go for the higher productivity in the cultivation. There are some farmer based communities which are driven by the government and non-government associations to strength farmers with social capital and physical capital. Floriculture Produce Exporters Association and Bingiriya Agri Export Zone are some producer clusters mainly driven in relate to the floriculture industry and there are many more small scale farmer clusters. Those clusters strengthen the farmers exposing them to the novel technology in cultivation, management, harvesting, storage and marketing. So well-structured extension services, guidance and financial support will uplift the production and the living standards of the grassroots level floriculture farm families.



Major drawbacks to overcome in floriculture industry

Figure 2. Major drawbacks to overcome to small scale producers

## Suggestions for the floriculture industry development

- Build up skilled grass root level producers who are well equipped with modern technology, practical knowledge and management practices through extension services.
- Build up producer clusters and organization through intervention of the government or private sector companies.
- Well established communication network is essential for effective performances of the supply/value chain.
- Establish pricing mechanism with transparency in each level of the supply chain.
- Improve the facilities for the research and development in the floriculture sector for win the competitive export market through inventions.
- Increase the market access of the grassroots level producers with modern marketing strategies.
- Encourage foreign direct investments in the floriculture sector.
- Develop policy and legislations to regulate the production and the export.
- Promote value added products and related ventures with the floriculture industry.
- Supply subsidiary facilities for development of the venture such as for vertical integration.



Figure 3. Modern technology application in the floriculture industry

# How to Become an Exporter?

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If you intended to export any commercially valuable items from Sri Lanka, you must first register with one of the following institutions:

- 1. Inland Revenue Department
- 2. Sri Lanka Customs

You must submit the original Business Registration Certificate or Certificate of Incorporation as well as other necessary documents along with the correctly filled application forms to register with the above institutions. The applications are available there.

## Products that require registration/license /certificates for export

If you wish to export any product from the following, you are required to get registration/license /certificates for export from respective institutions.

Tea, Diamonds, Gems and Jewellery, Food and beverages (meat products, beer, alcoholic beverages, nonalcoholic beverages, cashew kernels), Spices & Allied Products (all spices, cinnamon), Ayurveda and herbal products, Coconut and coconut-based products, Fruits and vegetables, Minerals, Wooden products, Fish and fisheries products.

If you export the following commodities, you should be registered with the authorities concerned annually:

- 1. Tea: Tea Exporters are required to register with the Sri Lanka Tea Board
- 2. Coconut & Coconut Related Products: Coconut exporters are required to register with the Coconut Development Authority (CDA) annually.
- 3. **Gems & Jewellery:** The exporters of Gem & Jewellery should obtain a Gem Dealers License from National Gem & Jewelry Authority (NGJA).
- 4. **Textile & Readymade Garments:** If you wish to manufacture garments and have a buying office in Sri Lanka, you should register at the Textile Division of the Ministry of Industries.


You are **Prohibitted** / **Restricted** from exporting:

Dead or live animal or its parts (Permits are issued for research purposes and for exchange with foreign zoos and museums); Antiques/ Cultural Property, Dangerous drugs, Explosives, Live fish (Prohibited), Mineral - raw form, Obscene publication and literature, Protected plants listed under the Fauna & Flora Protection Ordinance

- General terms important for exports: Sales contracts and delivery terms between sellers and buyers should be prepared before going to the next step. Sales contracts include product description, quantity, price, terms of payments (L/C, D/P, D/A, etc.), terms of delivery (FOB, CFR, CIF, etc.), packing & marking details. The delivery terms include FOB, CFR, and CIF.
- Now, you can choose the method of payment (E.g.: Advance payment, Letters of Credit (L/C), Documentary Collection, Open Accounts, and Consignment Accounts) that minimize the risk and meet the buyers' needs.
- Then, if your buyer asks you to send him samples, you have to send them, and samples are usually sent by airmail to avoid undue delays.
- Now you are at the stage of packaging:

The exporter should ensure that; the packages are properly packed to resist rough handling in the transportation by sea/air; the packaging has been done according to the buyer's requirements as specified in the trade contract, the shipping marks, and the port – if the destination is marked on all packages – the packages are loaded in such a way to facilitate an inspection by customs officials.

• Let's reserve a cargo space (Air Cargo or Sea Cargo): in this regard, you have to contact a shipping agent or an airline agent to reserve your space.

**Certificates required for exporters:** Certificate of Origin (GSP Certificate), Quality certificate, Health certificate, Phytosanitary certificate, Fumigation certificate / Pest control certificate.

• Before the final stage, you have to follow some **custom procedures** and **port procedures** 

#### **Custom Procedures**

- i. Making customs declaration,
  - a. Customs Goods Declaration (CUSDEC)
  - b. Preparing the commercial invoice
  - c. Preparing the packaging list
  - d. Direct Trader Input (DTI) registration
- ii. Paying export duty & cess charges, customs examination)
- iii. Customs examination

#### **Port Procedures**

- i. Paying port charges
- ii. Moving cargo to the port
- The final stage of shipping is to submit documents to the commercial bank

For more details read : https://www.srilankabusiness.com/pdf/export-procedure-2020.pdf



# Heirloom Paddy in Sri-Lanka

Heirloom rice varieties are also known as traditional rice varieties. These rice varieties proved to perform better with natural farming methods and with sustainable practices from their inception, as well as records having higher nutritional value. They have medicinal properties that are unique to them. Ancestral farmers played a major role in preserving the gene pool of these varieties from generation to generation. Later with the green revolution, high yielding paddy varieties were introduced making the cultivation of heirloom paddy a substandard. Present, majority of Sri-Lankan farmers cultivate improved varieties owing to the high productivity and due to the shorter bearing time. But these new improved paddy varieties demand high doses of chemical fertilizer, intensive labor and have a negative impact on the environment. Still 8-10% of Sri-Lankan farmers record to cultivate heirloom paddy varieties solely or as a part of their cultivated land. Moreover, with the current situation of banning chemical fertilizer importation and the emergence of a health concern market segment, traditional rice varieties seem to be receiving more attention and demand than before.

Literature records the existence of over 1500 traditional rice varieties. Due to the scarcity of scientific studies, the same variety had been repeated with different names a few times. According to the government statistics *Pachchaperumal, Suwadel, Rath suwadel, Murungakkyan, Madathawalu, Mudu kiriel, Kalu heenati, Sudu wee, Kuruluthudu wee, Batapola el,* and *Sudu hennati* are the varieties cultivated abundantly. Figure 01 depicts few varieties of heirloom paddy and rice varieties cultivated in Sri-Lanka.

Non-Governmental organization like *Gurusinghe foundation*, *Porabowa foundation* and *Akshata farming heroes* involve in popularizing traditional rice farming throughout Sri-Lanka. These organizations provide consultancy services in cultivation, provide quality seed paddy, facilitate obtaining group organic certifications and ensure market access through buy back system. They play an intermediary role and main functions are purchasing the traditional rice harvest, milling, cleaning, and packaging, labeling and marketing.

Though the productivity of heirloom rice is low, the average price per kilogram of rice in local market place is around 400 LKR. The average price of seed paddy is 100-120 LKR/kilogram. There is a high demand for traditional rice varieties both locally and internationally. Traditional rice brands like *Rankema, Greenfiled farm organic life, Suvimie Associates, Nirogi, CIC-Golden crop, Cargills* and *Kelani Komposta organic* have their own physical and online selling platforms where customers can online order the products to their doorstep.



Figure 1 Traditional rice varieties Image source: Ginigaddara, 2018

Exporters market destination for heirloom rice inlude Canada, USA and Australia. Some exporters of traditional rice varieties establish transparency throughout the value chain by generating traceability in their final produce. Thus, the consumers of higher end export markets are able to trace their product back to the original producer. Examples of such traceability enabled produce inlude *Cha's* organics, marketed under the brand heirloom rice (figure 02). In order to better access the international marketplaces, manufacturers are now obtaining quality certification such as USDA organics, EU organics, fair trade and country specific organic certification from Japan and from other market destinations.

With the existing demand and the market trend, Sri-Lanka has a high potential for promoting heirloom paddy varieties targeting both the health benefits and the export earnings to the country. Figure 03 depicts the marketing strategy of traditional rice in Sri-Lanka.



Ceyton Pearl Rice - 900 g \$11.35



Ceylon Red Rice - 900 g \$11.35



Ceylon Pearl Rice - Rice 3 kg \$34.15



Ceylon Fragrant Rice - 900 g \$11.35

**Figure 2 Heirloom rice at international market** *Image source: https://chasorganics.com/collections/heirloom-rice* 



Figure 3 Marketing strategies of traditional rice





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Delicia de Ceylon is a legally registered home-based company in Sri Lanka which is specialized in cashew-based products. Specifically, cashew jars, cashew cookies and cashew milk with different flavors which are currently available at both online market and conventional grocery stores. Where we mainly focuse on vegan and fitness-based customers (high-end) mainly

in texture, color, and taste in comparison to other varieties of cashew.

but on the whole, it for everyone as it's a healthier option than dairy.

Premium Cashews

Our products stand out from the rest because we are the only manufactures of cashew milk in Sri Lanka as per our knowledge. Further, our products are of high quality and are 100 percent natural. From the beginning to the end, the entire process uses only human hands and we can guarantee that our products are superior to most of other products available in the market as we take extra care in producing our products.



#### MISSION

"In the years to come plant based is definitely the way forward, with more and more people becoming lactose intolerant and here is where we come in to the picture to make your lives easier! Deliciae De Ceylon is committed to providing healthier plant-based alternatives which are dairy free, cruelty free, and to promote good health and wellness."



#### VISION

"Our vision is to make sure people have more healthy options in the market that would encourage people to be more conscious of their health and also the impact it has on the environment, with the food we consume Our goal is to keep introducing more and more healthier natural, plant-based options for our customers in the years to come to help them make the right sustainable choices before it's too late."



#### Products

- ★ Cashew milk (sweetened)
- ★ Cashew milk (unsweetened)
- ★ Cashew milk (chocolate)
- ★ Cashew milk (strawberry)
- ★ Almond milk (sweetened)
- ★ Almond milk (unsweetened)
- ★ Peanut milk (sweetened)
- ★ Peanut milk (unsweetened)
- $\star$  Cashew cookies (6pc)
- ★ Tamarind juice



#### **Cashew Milk**

Our cashew Milk is a unique delicate vegan product introduced to the Sri Lankan market. With many people switching to sugar free, plant based and dairy free options our cashew milk is an ideal choice. Moreover, with its creamy rich consistency it is packed with nutrition and is also delicious hence it has the best of both worlds.

We have cashew milk in four flavors- original, dates, strawberry, chocolate.





#### **Peanut Milk**

Peanut milk is ideal for customers who are fitness based to build body muscle and maintain healthy weight. Our peanut milk is made out of the best-chosen peanuts which are blended smoothly to give rise to perfect rich concoction.

#### **Almond Milk**

This vegan beverage is a wonderful alternative to regular milk. Of course, it's vegan-friendly and great for those who are lactose intolerant or simply don't want to consume milk at all. Besides, almonds are higher in calcium than cow's milk.

#### **Cashew Cookies**

Our Cashew cookies are scrumptious and super soft which will soon be your go-to-treat. Our crumbly pile of happiness is made out of the best cashews and a drizzle of premium chocolate chips incorporated with creamy butter and flour to bring out the best of the best.



CEYLON









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# Transformation in Sri Lankan Agriculture; Organic Agriculture

The most important natural resource we have is the soil. It is important to preserve the humus top soil and maintain or increase its organic matter content to increase the nutrient providing ability and to carry on an environment-friendly nutrient management. To achieve this, the use of organic fertilizer is important. The accumulation of inorganic fertilizer results in soil structure destruction, environmental pollution whilst contaminating the soil and water.

Paddy and other agricultural crops support rural and urban population both in terms of subsistence and income generation. Those cultivations are full of problems that can be reduced with the use of organic fertilizers. So, there is a need to assess the use of organic fertilizer among Sri Lankan farmers as it directly affects yield of crops. But it cannot be done in a quick deal. According to my opinion, it should be given a considerable time to change the fertilizer policy in our country.

The sudden ban on chemical fertilizers would hit the small farmers most, reduce production, increase prices and low-income earners would be most affected. It will also reduce export earnings. The entire country prays that president's initiative to organic fertilizer would be a success. Otherwise poor farmers will end in starvation and they will have to suicide in the future. Composting is the natural process of decomposition of organic materials by microorganisms under controlled conditions. Raw organic materials such as plant residue, animal waste, green manure, aquatic plants, food garbage, kitchen waste etc. are suitable to use as compost or humus of agricultural value. Farmers need to be taught the proper manufacture of quality compost on their own. If not they are in a big trouble of producing organic fertilizers. After harvesting, all left-overs could be used for composting, thus the farmers need to be educated to start immediately for the next season. In using vegetable matter for composting, fresh leaves are the best. Allowing the leaves to dry results in losing value. Thus, the material needs to be kept wet, away from direct sunlight. These things should be taught to rural farmers before introducing policies.

Organic materials can be broadly divided into those produced with local waste and bio-s produced by large manufacturers or imported. The major issue would be the quality of compost manufactured under different conditions and the quantity and time of application to each crop. Also, would the compost give sufficient amounts of chemical requirement of each crop? With reference to possible organic imports, the relevant parties revealed that there are no laboratory facilities in the country to analyze any organic material to determine whether it is harmful or not. It may be a big problem. If fertilizers include poisonous matters, it will destroy whole cultivation and the damage may not be corrected for years. Before any organic matter is imported, the Government should take steps to

ensure laboratory facilities accessible for testing organic fertilizer before using them. But how about those manufactured by local industries?

The biggest issue in the proposed move over to organic manure is non-conducting of proper testing prior to implementation. Here, a series of research was conducted by three scientists in Rice Research and Development Institute, Bathalagoda, Ibbagamuwa during 2003 to 2014 to study the influence of organic manure and chemical fertilizers on rice yield and soil fertility in doublerice cropping system, under organic manure only, chemical fertilizer only, organic manure plus chemical fertilizer and no manure or chemical fertilizer would be relevant.

The research showed the output as follows: Without any fertilizer: 100% Using organic manure (OM) only: 130% Using chemical fertilizer only: 170% Using chemical + OM: 192%

This shows using exclusive organic fertilizer resulted in only 30% increase, whereas chemicals with organic gave the highest increase of 92%. Local organic fertilizer manufacturers numbering 27 were licensed by the National Fertilizer Secretariat, but how many have conducted field tests on yields of paddy and other crops as recommended by the manufacturers? Also, were these tests conducted under independent supervision? Thus, all organic fertilizers by local producers or imported need to be tested under dry zone, wet zone and intermediate zones, also under irrigated and rain fed conditions, prior to being used on a large scale.

Was there a clear plan in place prior to taking the decision?

All actions of the government, since the implementation of the fertilizer and agrochemical ban, clearly demonstrates a complete absence of an alternative plan prior to the decision. A major decision, such as this, necessitated a comprehensive analysis of its costs in terms of potential reduction of crop yields, its economic implications and social livelihoods, farmer on national food supply and the entire social fabric. The perceived environmental and human health benefits should have been weighed against the risks of disrupting the food production and supply chain and the ensuing social instability.

However, the farmers now are in a big trouble and our country may fall to the bottom with this crisis situation if the policies are not introducing to make the farmers satisfied with agricultural inputs. The best method I suggest is to use a mixture of organic and chemical fertilizers as the initial step. Our country could produce both organic and inorganic food items separately. Through next steps we will able to go for improved techniques step by step.



# யாழ் மாவட்ட சில்லழை வியாபாரத்தின் வளர்ச்சி

இந்த கட்டுரை சில்லழை வியாபாரத்தின் வளர்ச்சி நோக்கி...

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உணவு தொடர்பான வணிகம் என்பது நுகர்வோர் நோக்கி உணவுப் பொருட்களை விற்பனை செய்வதாகும்.

குறிப்பாக யாழ் மாவட்டத்தினை கருவாக எடுத்து நோக்குகையில் உள்நாட்டு போருக்கு முன், உள்நாட்டு போருக்கு பின் என இரு பிரிவுகளாக எடுத்து நோக்கலாம். ஆரம்ப காலங்களில் (1940-1950) ஊருக்குள் ஒரிரு சில்லறைக் கடைகள் மாத்திரமே இருந்தன. இக்காலகட்டத்தில் சங்கம் முறைமையே நிலவியது. சங்கம் முறைமை என்பது உணவுப் பொருட்கள், ஆடைகள், மற்றும் வீட்டுப் பொருட்கள் என்பன குறித்த கட்டிடத்தின் கீழ் ஒரே ஒருவரின் நிர்வாகத்தின் கீழ் விற்பனை வியாபார கருமங்களில் ஈடுபடுதல் என பொருள்படும்.

பின்னர் ஒரு சில கடைகள் ஆங்காங்கே முளைக்கத் தொடங்கின. பெரும்பாலும் கிராமப்புற சில்லறை வணிகர்கள் நகர்ப்புரு கடைகளுக்குச் சென்று பொருட்களை ஏற்றி வந்து தத்தம் கடைகளில் விர்பனை செய்தனர். பொருட்களை கொள்வனவு செய்து ஏற்றி வர மற்றும் விநியோகம் செய்ய கால்நடைகளையே (மாட்டு வண்டில்) அநேகமானோர் பயன்படுத்தி வந்தனர். உதாரணமாக உள்ளுர் சோடாக்களை விநியோகம் செய்வதற்கு மாட்டு வண்டிலையே பயன்படுத்தினர். மக்கள் குறிப்பாக அதிகமான பெண்கள் வீட்டுத் தோட்டங்களை அமைத்து அதில் விளையும் காய் கறிகளை தமது தேடவடைப் பூர்த்தி செய்தது போக எஞ்சியதை வாடகைக்கு எடுத்த அரச கடைகளில் வைத்து விற்பனை செய்தும் வந்தனர். யாழ் மாவட்டத்தின் பாரம்பரிய உணவுகளான பருத்தித்துடற (பருத்தித்துறை வடை), நல்லெண்ணெய் போன்றன அன்றிலிருந்து இன்றுவரை பாரம்பரியம் குன்றாது தனித்துவம் வாய்ந்ததாகவே இன்றளவும் காணப்படுகின்றன. நம் முன்னோர் உடல் ஆரோக்கியத்திற்கு உகந்த உணவுப் பொருட்களை (குரக்கன்,ஒடியல் மா, மரவள்ளி மா) ஆரோக்கியமான முறையில் விளைய செய்தே நுகர்வுக்கு பயன்படுத்தினர். இதனாலையே நம் தாத்தா, பாட்டிமார்களால் தமது வயோதிப பருவத்திலும் திடகாத்திரமாக இருக்கவும் தமது நாளாந்த கருமங்களை தாமே செய்யவும் முடிந்தது. மலயான் கபே, ரியோ, கல்யாணி கூல் பார், மற்றும் லிங்கம் இவையே அன்றைய மக்கள் அறிந்த கடைகள். இவற்றில் பல கடைகள் கால ஒட்டத்தின் விளைவால் இருந்த இடம் தெரியாமலே போய்விட்டது. லிங்கம், ரியோ மற்றும் மலாயன் கபே ( சேவை நோக்கம்) போன்றன அவற்றின் தனித்துவம் காரணமாக இன்றளவும் இயங்குகின்றன. அன்றைய பெண்களின் வேலைப்பங்கு மிக மிக அரிதாகவே இருந்தது. சூழலில்



போர்க் காலங்களில் பாதைகள் மூடப்பட்டதால் விநியோகத்தடை மற்றும் பொருட்களின் விலை உயர்வாக இருந்தது. 2002 களில் ஒரே ஒரு சிறப்பு அங்காடி மாத்திரமே சிறந்து இருந்தது.

2009 களின் பின்னரான காலப்பகுதியில் தொழில்நுட்ப யுகத்தில் ஏற்பட்ட மாற்றம் காரணமாக வர்த்தக வியாபாரங்களில் பெரிதளவிலான மாற்றம் ஏற்பட்டது. அதாவது விநியோக வழிமுறைகள் என்பன விரிவடைந்தன இதனால் வாகனங்களில் விநியோகம் மூலை முடுக்கெல்லாம் பரவி தெருவுக்கு ஒரு கடை என மாறியது. இன்று சிறப்பு அங்காடி கூட சில்லறை வணிகம் போல ஆகிவிட்டது. யாழ் மாவட்டத்தைப் பொருத்தமட்டில் உணவு விற்பனை, விநியோகம் படித்தவர்களின் சுயவேலைத்துறை பெரிய அளவில் அதிகரித்துள்ளது.அத்தோடு இவ் வியாபாரங்களில் பெண்களின் பிரதிநிதித்துவமும் முந்தைய காலத்துடன் ஒப்பிடுகையில் உயர்வடைந்துள்ளது எனலாம். பல இலாப நோக்கம் கொண்ட உணவு வணிகங்களின் நடுவே சேவை நோக்கம் கொண்ட மலாயன் கபே போன்றனவும் தமது இருப்பை தக்க வைத்திருக்கின்றது. அன்று இல்லாத தெருவோர கடைகள் (அப்பம், காளான்) இன்று நம் மாவட்ட மக்களால் பெரிதும் நாட்டம் உடையதாக வீதிகள் முழுதும் வியாபித்து நிக்கின்றன.

Pizza hut அங்கீகார வணிகமாக இருந்ததாலும் O pizza, My pizza, the pizza என சிறு உள்ளூர் உணவு தொடர்பான வணிகங்களும் காரசாரமாக போட்டிக்கு நிற்கின்றன. அத்தோடு பாரம்பரிய தொழிற்சாலைகள் உணவுத் தரச்சான்றிதழ்களை வழங்கி மக்களுக்கு நம்பிக்கையை ஊட்டிக்கொண்டேள இருக்கின்றன ( VESTA, Anna Coffee, VTS Gingerly oil). மக்கள் வீடுகளிலேயே பிறந்தநாள் சர்ப்ரைஸ் நிகழ்வு, பரிசு வழங்குதல் என பல வகை சேவைகளை பௌதீக இடம் இன்றி இன்று இணைய வழியினூடாகவே வழங்கிக் கொண்டு இருக்கின்றன. இன்று மக்களின் தேவைகளை விட சார்பு உற்பத்திகள் பல வகைப்பட்ட போட்டி நிறுவனங்களால் முன்டியடிக்கப்பட்டு விற்கப்படுகின்றது. திருப்பி பார்த்தால் அபார வளர்ச்சி. இவற்றையெல்லாம் ஒருதரம் கேட்டுத்தான் பாருங்களேன் உங்கள் மூதாதையரிடம்.

# Digital Marketing

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# Digital Marketing Tools & COVID-19 Pandemic

While the development of the technology, agriculture and agricultural marketing strategies were developed along side with other sectors in the world. The digital literacy among the farming community increased with user friendly applications. The pandemic limited the physical activities and promoted the activities of digital telecommunications. After the national lockdown was announced travel restrictions were enabled for all the movements but essential workers. Because of the rules and regulations of the pandemic season digitalization of the agriculture and agriculture market was rapidly developed.

Due to the highly contagious nature of the pandemic it paves the way to improvement of digital agricultural market along with smart farming systems which provide value chain actors more efficiency, profit and safety. Especially the farmer's point of agricultural supply chains were strengthened with various digital applications including smart planting and yield monitoring, climate forecasting, field mapping and livestock monitoring. These are some of the newest farming systems emerged along with the COVID 19 pandemic. The trends and findings after the pandemic can be explained three main points.

- 1. New solutions launched by companies and individuals.
- 2. Accelerated, adapted and increased their existing digital services.
- 3. Introduced new digital solutions to the to the companies.

At the first wave of the pandemic the people had adapted to Facebook platform and posted their agriculture related issues on social media. Also in beginning of the time period, social media marketing strategies were implemented widely with the effect of the pandemic. With the affect of the social media influence farmers were intended to increase their computer literacy in order to familiarize with modern technology. Since the extension services were heavily disturbed due to the pandemic, social media groups of farmers, government officers, and input suppliers plays a vital role in managing the field level issues, and sharing price and market information. The entrepreneurs started new value added food productions during this pandemic season and sold them through online platforms. These entrepreneurs developed coping strategies to minimize the losses and vulnerabilities of the pandemic by initiating digital networks through smart devices, mobile apps, social media, web sites, etc. These entrepreneurs also directly contacted farmers to collect raw food materials for processing purposes through the government initiated data bases developed on agricultural supply chains to connect farmers with rest of the supply chain

It is fair to say that the pandemic has created a new window for marketing through digitalization by filling the void of digital marketing that has been an issue for several years.



# Healthy, Safe Locally Produced Plant Food **Coconut oil** Market Landscape

oconut oil which is an important constituent in the Sri Lankan diet is the most widely consumed edible oil. Accordingly, there is a steady demand that exists throughout the year in the local market. In recent years, coconut oil has emerged as a miracle superfood that contained around 90% of saturated fats which has attracted attention around worldwide. Many specialists assure that this fat is capable of promoting health benefits such as prevention of weight loss, cholesterol, cardiovascular diseases, etc. These claims are also used as marketing tools for boosting sales by coconut oil companies. Moreover, consumers shift toward health and safety consciousness especially during the COVID pandemic arising new opportunities and growing substantial demand for the coconut oil sector has caused intense competitiveness in both local and global markets. However, this increased demand leads to stiff competition within and between coconut oil-producing countries and also with other alternative edible oil producing countries which also leads to several coconut oil control issues at national and international levels.

In Sri Lanka, we have recently witnessed some importers bring coconut oil with the presence of aflatoxin which is considered as a carcinogen harmful to the human body. It has become a major topic in both social and political disclosures. Thus, consumers were afraid to use imported coconut oil and in response, they tend to prefer locally produced coconut oil. Sri Lanka's government has banned import of palm oil and new palm plantations is a surprise move that baffled the edible oil industry to support the domestic coconut oil sector. These factors surge remarkable demand which results in inevitable pressure for the local coconut oil industry. However, the scarcity of raw coconut affects the coconut oil production and current production is insufficient to meet the annual consumption of estimated 240,000 metric tons.



Figure 1. Household consumption



Due to the inadequate supply, relative to the market demand for locally produced coconut oil products, several quality and safety issues had to be faced in the recent past. It is also identified that certain coconut oil products made in Sri Lanka using copra may also contain aflatoxin poses a health risk to consumers. Adulteration is another common major health implication to the Sri Lankan consumers to extend the quantity while reducing the quality by mixing with other low-cost vegetable oil. However, it does not pose a direct threat to public health but this will be harmful to local consumers who buy coconut oil for its potential health benefits and confidance in the product. Since Sri Lanka, coconut oil footprint in the global coconut oil sector is still significant as one of the best quality exporters globally However, these quality and safety issues also adversely affect the overall overseas demand for our products.

However, recent safety and quality issues acted as an eye-opener for local authorities and the public to carefully evaluate the existing legal and procedures and rectify the loopholes. For example, the Coconut Development Authority (CDA) apex body responsible for the coconut oil industry extends its operations toward testing the coconut oil in the market to ensure quality standards, registration of coconut oil manufactures, and give quality certification which can be displayed on the products by certified manufactures which provide consumers confidence on good quality and safe coconut oil products in the market. Not only that majority of manufactures voluntarily, try to design quality assurance programs on their manufacturing processes by coordinating with third-party certification bodies once more to ensure a supply of safe and healthy products for consumers.



However, the process of mapping recent safety and quality improvements integrated mainly with branded coconut oil products. Sri Lankan coconut oil industry is comprised of few large-scale coconut oil processors and more than 2,500 small and medium scale processors operating in both rural and urban areas of the country (DailyFT, 2021). Most of these small-scale processors run their processing in the backyard of residential areas with the complete absence of modern technology and hygienic practices These individuals have a little or no knowledge and it leads to the low quality and safety of both copra processing and oil milling.



Therefore, strengthening regulations and implementing policies to safeguard the health and quality along with the processes of the whole coconut oil value chain from primary production to final consumption is important. Accordingly, a traceability system is identified as an essential authentical tool It can be recommended for the entire coconut oil value chain from primary production to final consumption. Sri Lanka, already been implemented a traceability system for organic coconut oil products especially focusing on the export market. However, in this period, it is important to develop a traceability system that covers the entire coconut oil industry.





Technical and economic barriers, multilayered complex coconut oil value chain, highly interdependent product flows, perishability are some barriers that will cause interruption in collecting information and loss of traceability information about the origin of raw materials along the value chain. In such a scenario the government involvement is highlighted by setting up a series of regulations that encourage actors in the coconut oil value chain to maintain reliability through regular inspection, tighter controls over importation and exportation, clear definitions for coconut oil products, uniform labeling regulations, etc.

Developing a traceability system is essential for Sri Lankan coconut oil industry since welleducated markets always respond positively to products with a credible traceability system. As one of the leading exporters in coconut oil industry this will increase the global recognition and competitiveness for local coconut oil products.

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People's Organisation for Development Import and Export (PODIE)

## PODIE's Concealed Triumph During Covid-19

e, the PODIE, are a people's company based in Negombo, Sri Lanka, which has been engaged in exporting value-added organic spices for over the last 30 years. PODIE mainly work with small holder farmer & producer groups affiliated to our organization seven out of nine provinces in Sri Lanka. In addition to that, we providing a market for their products, provide assistance to develop their infrastructure to increase their productivity & to enhance the quality of their produce to suit the international markets while encouraging to go organic & thereby offer them a premium price for their organic produce. We mainly export to Fair Trade Organizations based in European & Scandinavian countries, Australia, New Zealand, Hong Kong, Taiwan, USA, UK & Canada. We are a guaranteed member of World Fair Trade Organisation (WFTO). There are more than 60 full time workers in our organization & they are mainly women. We also adhere to the standards set by WFTO, ISO 22000:2018, JAS, EU, USDA, HACCP in relation to working conditions & environment.

Since COVID-19 Virus was declared a global pandemic, it has brought about significant changes to everyone. Organizations have had to respond quickly to address these changes. As a manufacturing company, PODIE's manufacturing process deteriorated with the imposition of travel restrictions and curfews. Most of small holder farmers trapped with their massive harvests and felt helpless by seeing rotting of their fatigue. Nevertheless, black market brokers offering rock bottom prices and destroying the value of real market and condemn the valuable lethargy of poor farmers. Moreover, discovering number of employees and managerial personalities as affected patients by COVID-19 overall system and operations were crashed, number of shipments were reduced drastically, performance of production declined, to maintain required quality standards remaining employees have to work with extra effort, international freights were collapsed, met on time deliveries been a day dream. Seeing increasing number of patients become the worst part of the day. However, immediate answers to overcome these obstacles were obtained in a timely manner by the top management of the PODIE company.

As a result of that decision, our main strategy is to minimize contact of contaminated persons with healthy ones. Then, we isolated our plant for some time, entrance of outsiders were strictly limited, all the official meetings and business agreements were conducted via online platforms, all the employees were treated and provided with necessary materials such as dry foods, fresh vegetables, fruits, Medicines & Sanitizers and related items continuously to avoid outside visiting, private transportation is provided free of charge to all level of employees, done random PCR or Rapid antigen tests are performed at the company's expense. Nevertheless, we do care about our affected employees by providing all the necessities such as dry foods, medicines, perishables not only for them but also their whole family. Continue to that, we are maintaining oxygen tank facility if any of infected family required, since in Sri Lanka already capacities of ICU beds got overloaded. Further, three shoots of vaccination are 100% covered for all level of employees.





Our Valuable Staff & Working Members

Prompt decisions and actions taken against this epidemic, PODIE was able to convalesce within couple of months and came back to the previous operation levels with stunning production performance, enhanced customers requirements with better innovation products with on time deliveries and we do continue those good practices since prevent is always better than cure. PODIE will entitle and wish to achieve predicted harvest from our farmers since we have increased the distribution of farming facility such as equipment, materials, machines, Organic fertilizer, Organic pesticide and organic insecticides. We hope to expand the production capacity while enlarge the infrastructure withing this year. We wish that our treasured clients will place considerable number of order than previous years to empower us to continue our planed accordingly. We wish that COVID 19 will be eliminate and people can walk without masks, meanwhile to comfort our stakeholders who visiting us.





ඉන්දික කරුණාරත්න කෘෂි විදහ පීඨය ශීු ලංකා සබරගමුව විශ්වවිදහලය

මැස්සා විසින් නිපදවනු ලබන මී පැණි ඖෂධීය වටිනාකමකින් යුතු අගු ගණයේ ආහාරයකි. ලොව ඇන්ටාක්ටිකා මහද්වීපය හැරුණුකොට අනෙක් ඕනෑම මහද්වීපයක මී මැසි පාලනය ඉතා සාර්ථකව සිදු කළ හැකිය. වර්තමානයේ බොහෝ පුද්ගලයින් සෞබස සම්පන්න දිවි පෙවතකට යොමු වීම කරණ කොටගෙන දේශීය හා විදේශීය වශයෙන් මී පැණි සඳහා අධික ඉල්ලුමක් නිර්මාණය වී තිබේ. මී මැසි ජනපදයක් මගින් මී පැණි ලබාදීමට අමතරව ශාක පුෂ්ප පරාගනය කිරීම වැනි කෘෂි කෘෂිකර්මාන්තයට වැදගත් සේවාවන් ද සපයනු ලබයි.

ඉන්දික කරුණාරත්න වන මා වර්තමානය වන විට ඉතාමත් සාර්ථක අන්දමින් පැණි ලබාගනු පිණිස මී මැසි ජනපද දාහතක් නඩත්තු කරන අතර එමගින් රුපියල් පනස් දහසකට ආසන්න මාසික අමතර ආදායමක් උපයනු ලබයි. මා 1997 වසරේ පුථමයෙන්ම මී මැසි පාලනය ආරම්භ කෙරූ අතර මේ වන විට වසර 24ක පමණ මී මැසි පාලනයේ යෙදීමෙන් ලබාගත් අත්දැකීම් හා පුායෝගික දැනුම හැරුණු කොට වෙනත් කිසිදු ආකාරයක පුහුණු වැඩසටහනකට සහභාගී වී නොමැත.

ම මැසි පාලනය යනු ඉතාමත් කුඩා ආයෝජනයක් තුළින් සාර්ථකව පවත්වාගෙන යා හැකි වහාපාරයකි. මී මැසි පාලනය සඳහා පුථමයෙන්ම යොමුවන පුද්ගලයකුට අවැසි වන්නේ ඒ සඳහා උනන්දුව, දැනුම හා මී මැසි පෙට්ටි කිහිපයක් පමණි. මා ජීවත් වන බොරලන්ද පුදේශයේ වන ලැහැබක් තුළ තිබූ මී මැසි ජනපදයක් මුලින්ම මී මැසි පෙට්ටියකට ලබාගෙන මී මැසි පාලනය ආරම්භ කළෙමි.

ලිපි සැකසුම - ඒ.එම්.එස්.එම්.ආර්.එස්.පී. බණ්ඩාර කෘෂි වහාපාර කළමනාකරණ අධ්පනාංශය කෘෂි විදහ පීඨය ශී ලංකා සබරගමුව විශ්වවිදහාලය



ජායාරූපය 1 : මී මැසි ඡනපද සමගින්



ඉන් අනතුරුව මී පැණි සඳහා ඇති වූ අධික ඉල්ලුමත් මා තුළ තිබූ ආශාවත් හේතුවෙන් මෙය අමතර ආදායම් මාර්ගයක් ලෙස වැඩිදියුණු කර ගත්තෙමි. මා දැනට සේවය කරන සබරගමුව විශ්ව විදුහාලයේ කෘෂි විදුහා පීඨ සත්ව හා ශාක ගොවිපළේද මී මැසි ජනපද පාලනය මා අතින් සිදු වේ. සාමානෳයෙන් මී පැණි බහුල කාලයන්වලදී සතියකට වරක් මී මැසි ජනපදයකින් මී පැණි බෝතලයක පුමාණයක් රැස් කර ගත හැකිය. නමුත් වර්ෂා කාල වකවානුවලදී මී මැස්සන් පැණි එක්රැස් කිරීම සීමා කරන හේතුවෙන් එම කාලවලදී මී පැණි ඵලදාව සීමාසහිත වේ. එමෙන්ම වියළි කාලයන්වලදී ලබාගන්නා මී පැණි වල ගුණාත්මක බව වැසි සමයන්හිදී ලබා ගන්නා මී පැණි වලට වඩා උසස් වේ. වර්තමානයේ උසස් තත්වයෙන් යුතු මී පැණි බෝතලයක් රුපියල් 3000ක් වැනි මුදලකට අලෙවි වේ. ව්යාපාරයක් ලෙස සලකා ලාබය ගණානය කෙරූ විට යෙදවූ මූලික අයෝජනය හැර අන් සියල්ලම ලාභයක් ලෙස සැලකිය හැකිය.

පවතිනා අධික ඉල්ලුම හේතුවෙන් ඇනවුම් ලබා ලබා ගැනීම තුළින් පමණක්ම මී පැණි වෙළඳාම සිදුවේ. පාරිභෝගිකයා තුළ නිෂ්පාදන කෙරෙහි ඇති විශ්වාසය නිසා දිගින් දිගටම මී පැණි සඳහා ඉල්ලුම නොසන්සිදී පවතී. මීට අමතරව මම මීමැසි ජනපද එක් රැස් කර මී මැසි පෙට්ටිවලට ලබා දීම වැනි කායීන්ද ඉටු කරමි. මී මැසි පාලනය හේතුවෙන් පවුලේ ආර්ථිකය ශක්තිමත් වූ අතරම, මී මැස්සන් නිසා මා වගා කරනා අනෙකුත් බෝග වලද ඉතා උසස් ඵලදාවක් ලබා ගනිමි. මාගේ අනාගත බලාපොරොත්තුව වන්නේ මෙම මී මැසි පාලන වසාපාරය තවදුරටත් පුළුල් කර ස්වභාවික මී පැණි වෙළදපොළ තුළ පචලිත කිරීමයි.











ජායාරූපය 2 : මී මැසි ජනපදයක ඇති මී වද හා එයින් ලබාගත් මී පැණි



එස්. ටී. හංසිකා සහ මහාචාර්ය අච්නි ද සිල්වා කෘෂි වනපාර කළමනාකරණ අධනනාංශය කෘෂි විදහා පීඨය ශී ලංකා සබරගමුව විශ්වවිදහාලය

# ජංගම විදසාගාරය (Mobile Lab)

ශී ලංකා සබරගමුව විශ්වවිදයාලයේ කෘෂි විදයා පීඨය මගින් ලෝක බැංකුවේ ආධාර ඇතිව දියත් කරන ලද AHEAD වයාපෘතිය යටතේ "දැනුම බෙදා හැරීම හා සමාජ සුබසාධනය" අරමුණු කොටගත් වැඩසටහන් මාලාවේ එක් සන්ධිස්ථානයක් ලෙස පංගම විදයාගාරය සරසවි විදයාර්ථීන්ට, පුදේශයේ ගොවි ජනතාවට හා පාසල් ශිෂය ශිෂයාවන්ට හඳුන්වා දෙනු ලැබීය. මෙම පංගම විදයාගාරය සියලුම විදයාර්ථීන්ට, ගොවි මහතුන්ට හා පාසල් ශිෂයෙන්ට තම අධයාපන කටයුතු හා වගා කටයුතු සම්බන්ධ පරීක්ෂණ උදෙසා යොදා ගත හැක.











#### ජංගම විදාාගාරයක් යනු

පරීක්ෂකයින්ට එක් ස්ථානයක සිට තවත් ස්ථානයකට ගෙන ගොස් පරීක්ෂණ කටයුතු සිදු කළ හැකි විදාහාරයක් පංගම විදාහාරයක් ලෙස හැඳින්වේ. එහි ස්ථාපනය කර ඇති උපකරණ එම විදාහාරය තුළ සිදුකරන පරීක්ෂණ මත තීරණාය වන අතර ජීව විදාහ විදාහත්මක, රසායනික හෝ වෙනත් දත්ත නිර්ණාය කිරීම හා දැනුම් බෙදාදීමේ (අධහාපන) කටයුතු උදෙසා මෙම ප්ංගම විදාහාර භාවිත කරයි.

#### විශේෂිත සේවාවන්

- ∎ පාංශු සාම්පල පරීක්ෂාව
- ∎ පලිබෝධකයින් හඳුනාගැනීම
- ∎ ක්ෂුදුපීවී පරීක්ෂණ
- ∎ කෘෂි භෝගවලට අදාළ රෝග නිර්ණය කිරීම්
- ∎ රෝපණා මාධ්‍ය නිපදවීම
- ∎ කෘෂි රසායනික පරීක්ෂණ
- පාසල් දරුවන්ට විදහාගාර උපකරණ හඳුන්වා දීම
- පාසල් දරුවන්ට විදසාගාර උපකරණ භාවිතය හුරු කරවීම
- ගොවි මහතුන්හට විදසාගාර උපකරණ හඳුන්වා දීම

#### විමසීම්

කෘෂි වනාපාර කළමනාකරණ අධ්යනාංශය කෘෂි විදයා පීඨය සබරගමුව විශ්වවිදයාලය බෙලිහුල්ඔය දු.ක. - 045-2280073



### Resilient Lobster Value Chains of South of Sri Lanka



Sudhdeera Hewapathirna Department of Agribusiness Management Faculty of Agricultural Sciences Sabaragamuwa University of Sri Lanka and Upul Liyanage and K.B.S.S.J. Ekanayaka

National Aquatic Resources Research and Development Agency

obster are the most valuable commercial fish in the southern coastal waters of Sri Lanka. The lobster fishery has been identified as one of the major fisheries for small scale artisanal fishers along the southern coast of Sri Lanka. It is supporting to earn reasonable amount of foreign exchange through the fisheries exports. Over ninety five percent of the lobster catch are being exported to foreign market while rest 5 percent is consumed at the locally. The major importers are Japan, Hong Kong, the United Kingdom, Singapore and Korea.

According to the initial survey carried out in the Southern part of the Island, the coast from Tangalle to Kumana(122 Km in length) area identified as the most important lobster fishing area in Sri Lanka. The lobster fishery along the south coast of Sri Lanka is restricted to shallow (< 30 m) near shore waters. Six species of spiny lobster occur along the 250 km stretch of coast in the South Coast Lobster Fisheries. The dominant species in the sampled landings was *Panulirus homarus* & the least abundant species was *P. ornatus* in 2020.



**Figure 1**: Spiny Lobster species; A) *P. penicillatus* B) *P. versicolor* C) *P. homarus* D) *P. ornatus* E) *P. longipes* (Source; Adopted from Spiny lobsters of the Indian ocean occurring around Sri Lanka)



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# Development of Novel Beverage Types with Ceylon Cinnamon

Cevion Cinnamo

(Cinnamomum zeylanicum) RIC NO: 16

Sri Lanka is a country abundant with many natural gifts which have gained worldwide popularity from ancient times. Even nowadays the country popular among Europeans under "Ceylon" brand name, created by the power of natural products we exported with premium quality. Are just the raw material exports enough to bring the "Made in Sri Lanka" tag to the world? Meanwhile the Ceylon cinnamon must be positioned in the world with its true benefits which other types of cinnamons do not exhibit. We have recognized the necessity of making the awareness about how to differentiate Ceylon cinnamon (*Cinamonum zylanicum*) from the Cassia cinnamon (*Cinnamonum cassia*) that dominates the cinnamon industry which have been a very important industry in Sri Lanka for a long time. Ceylon cinnamon is a globally recognized valuable product made in Sri Lanka and majority of the product exported in non-value-added forms or minimal levels of value addition. Project was initiated with the objective of developing value-added cinnamon products to adhering international standards.

The project recognized as RIC NO:16 is a completive grant won by Sabaragamuwa University, Faculty of Agricultural Science, Department of Agribusiness Management under Accelerating Higher Education Expansion and Development (AHEAD) grants with the coordination of Prof. D.A.M De Silva. AHEAD is a World Bank funded Sri Lankan government operation to support the higher education and Research and Innovation Commercialization (RIC) programs will be developed and implemented for universities undertaking innovation activities of direct relevance for industrial and service sector development.

With the bigging of the project many research activities were conducted by the research team. Mainly targeted on developing beverages with health and functional properties such as high antioxidants rich products <u>boost the human health</u>.



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After many prototyping and branding efforts the project capable of developing "Ceylon Cinnamon Latte" and "Ceylon Cinnamon Leaf Tea". Both the products were developed with functional properties and a unique taste by targeting the Sri Lankan high-end market and international export market. Both the products were applied for the local patents and the Ceylon cinnamon leaf tea product has obtain the Patent Cooperation Treaty (PCT) by protecting the intellectual property rights.



Prototypes of Ceylon Cinnamon Latte and Ceylon Cinnamon Leaf Tea



International Publication PCT

Currently the project has claimed for five local patents for its innovations and one international patent which are in the progress.

Ceylon Cinnamon Latte and Ceylon Cinnamon Leaf Tea products were successfully commercialized with Cargills (Ceylon) PLC under a licensing agreement signed on 3rd of November 2021 at the Sabaragamuwa University of Sri Lanka, Belihuloya.



licensing Agreement Signing Ceromancy between SUSL & Cargills Ceylon PLC

The project has remarked another millstone by commencing the "Ceylon cinnamon beverage development laboratory" which is one of the objectives of the AHEAD/RIC NO: 16 projects. "Ceylon cinnamon beverage development laboratory" is equipped with valuable and advanced laboratory equipment to cater the needs of researches and it has the capacity to commercialize the products once the researches are completed. Laboratory opening was taken place on 19<sup>th</sup> of January 2021 and the event was graced by Prof. R.M.S.U.K. Ratnayake, Vice-Chancellor, Sabaragamuwa University of Sri Lanka among the invited leading academics and staff members.



Further, the project has contributed to the society by disseminating the knowledge with number of publications and participating in national exhibitions throughout the project period by enhancing the efficiency and effectiveness of the project.

#### Exhibitions

- Shilpa Sena Exposition 2019
- InnoTech 2020 National Innovation and Technology Exhibition
- Agriculture Invention Investor Linking Programme
- Agriculture Innovation Evaluation Programme Ministry of Agriculture 2021

#### Competitions

- 134<sup>th</sup> annual medical congress of Sri Lanka medical association innovation awards 2021
- ECOVATION AWARDS 2021

The project achievements were supported with Accelerating Higher Education Expansion and Development (AHEAD) a World Bank funded program, OTS office and University Business Linkage Cell at Sabaragamuwa University of Sri Lanka.

The project has come to its final phase of the duration and four more valuable products are yet to be commercialized in the near future. Few publications ready to be published to contribute new knowledge to the academia as well as focusing the general public.



#### The Project Team (RIC NO:16)



Prof. D.A.M. De Silva Coordinator



Dr. R.K.C. Jeewanthi **Co- Coordinator** 



W.M.T.B. Weddagala **Research Assistant** 



N.S.A. Senarathne **Research Assistant** 



W.B.C. Wijayamunige **Research Assistant** 



K.B.S.S.J. Ekanayaka Research Assistant (Former)



HEAD

මහාචාර්ය, වෛදස ටී සංජීව පුසාද් ජයවීර අංශ පුධාන/ AHEAD කියාකාරකම් සම්බන්ධිකාරක පශ සම්පත් නිෂ්පාදන අධ්යයනාංශය කෘම විදසා පීඨය ශුී ලංකා සබරගමුව විශ්වවිදසාලය

## AHEAD වෘපෘතිය හරහා සවිබල ගැන්වෙන සබරගමුව සරසවි කෘෂි ගොවිපොල නිෂ්පාදනය



ශී ලංකා සබරගමුව විශ්වවිදහාලයේ කෘෂිවිදහා ගොවිපල හෙක්ටාර 38ක පමණා භූමි පුමාණයකින් සමන්විත, පශු සම්පත් හා බෝග වගා නිෂ්පාදන සඳහා මෙන්ම කෘෂි වහාපාර කළමණාකරණ කටයුතු සඳහා පායෝගිකව සකස් වුන, අධහාපන හා පර්යේෂණ කටයුතු වලට සමගාමීව ගුණාත්මක කෘෂි නිෂ්පාදන ජනතාවට ලබා දීම සඳහා කටයුතු කරන ඉතා සුවිශේෂී ස්ථානයකි.

විශේෂයෙන්ම එහි සත්ව පාලන ඒකකය මගින් පශ සම්පත් නිෂ්පාදන විශාල පුමාණයක් බිහි කරමින් විශ්වවිදහාලයීය උපාධි අපේක්ෂක අපේක්ෂිකාවන්ගේ පායෝගික පුහුණු කටයුතු වලට තෝතැන්නක් වෙමින් අධ්යයන කාර්ය මණ්ඩලයේ හා සිසුන්ගේ පශු සම්පත් නිෂ්පාදන හා සම්බන්ධ විවිධ පර්යේෂණා වලට අවශා සම්පත් නොඅඩුව ලබා දෙමින් ඉතා අනගි අධ්‍යයන හා පර්යේෂණ කාර්යභාරයක් ඉටකරයි. එසේම එම අංශය ඉන් ඔබ්බට ගොස් ජනතාවට අවශය ගුණාත්මක පශු සම්පත් නිෂ්පාදන ඉහළ මට්ටමකින් නිපදවමින් අතිශය වැදගත් ජාතික කර්තවෳයක නියැලෙමින් සිටී. එළකිරි නිෂ්පාදනය, එළු කිරි නිෂ්පාදනය, යෝගට් නිෂ්පාදනය, බොයිලර් කුකුළු මස් නිෂ්පාදනය, බිත්තර නිෂ්පාදනය, විසිතුරු හා ආහාරමය මත්සෳ අභිජනනය මෙන්ම විසිතුරු ජලජ පැළෑටි නිෂ්පාදනය යන අංශ මගින් වර්තමානයේ ශී ලාංකේය ජනතාවට අවශා වී තිබෙන ගුණාත්මක පශු සම්පත් සැපයීම උසස් අධ්යාපන ආයතනයක ගොවිපලක් මගින් පායෝගිකව සිදු කරමින් රටට කාලීනව වැදගත් වටිනා මෙහෙයක් සිදු කරයි.











මෙම වැදගත් නිෂ්පාදන කියාවලිය වඩාත් ශක්තිමත් කිරීම සඳහා ශී ලංකා සබරගමුව විශ්වවිදහාලයේ කෘෂි විදසා පීඨය වෙත දිනාගන්නා ලද ලෝක බැංකු අරමුදල් මගින් පුදානය කරනු ලබන AHEAD වසාපෘතිය වෙතින් ලබා දෙන අත්වැල අතිශය ඉහල වටිනාකමකින් යුක්ත වේ. මෙතෙක් සිදු කරමින් පැවති එළකිරි නිෂ්පාදනය, බොයිලර් කුකුළු මස් නිෂ්පාදනය, බිත්තර නිෂ්පාදනය, යෝගට් නිෂ්පාදනය හා මත්සෘ නිෂ්පාදන කටයුතු වඩාත් ගුණාත්මකව ඉහළ ධාරිතාවයකින් යුතුව සිදු කිරීමට අවශා අභිජනන යන්තු සුතු හා මෙවලම් මෙන්ම ගුණාත්මක බව පරීක්ෂා කිරීමේ හා තහවුරු කිරීමේ විදුසාගාර උපකරණ විශාල පුමාණයක් මෙම වනාපෘතිය හරහා කෘෂි විදහපීඨ ගොවිපොල වෙත මෑත කාලයේදී ලබා දීම සිදුවිය. එමගින් මෙම ඒකකයේ නිපදවන ඉහත සඳහන් කල සියලු පශු සම්පත් නිෂ්පාදන වඩාත් සෞඛ්යාරක්ෂිතව ඉහළ පුමාණ වලින් නිපදුවීමට හැකියාව ලැබී ඇත. සිසුන්ගේ පුායෝගික කටයුතු සඳහා පමණක් අදාල වන ලෙස සිදුවුන බොයිලර් නිෂ්පාදන කටයුතු මේ වන විට අඛණ්ඩව සෑම සති දෙකකට වරක්ම ගුණාත්මක මස් ජනතාව වෙත ලබා දෙන වඩාත් ස්ථාවර කුමවේදයක් බවට පත්කර ඇත. ඉතා ඉහළ ඉල්ලුමක් පවතින බිත්තර නිෂ්පාදනයේ ධාරිතාව ඉහළ නැංවීමටද මෙම ව්යාපෘතිය හරහා කටයුතු සිදු කරයි. වාණිජ වශයෙන් යෝගට් නිෂ්පාදනය කර ඒවා විශ්වවිදසාලය අවට ජනතාවට පහසු මිලට ලබා දීම සඳහා අවශෘ නවීන යන්තු AHEAD වහාපෘතිය මගින් මේ වන විටත් ලබා දී ඇත. එළකිරි නිෂ්පාදනයේ දී අතින් සිදු කල කිරි දෙවීමේ කටයුතු වඩාත් සෞඛ්ෂාරක්ෂිත ලෙස යන්තු මගින් සිදු කිරීමට අවශා මෛවලම් ලබා දී ඇත. එසේ ම විසිතුරු මත්සා හා ප්ලප් පැලෑටි නිෂ්පාදන ඒකකය තුල අතිශය සවිශාල සංවර්ධන කටයුතු රාශියක් මෙම වනාපෘතිය හරහා සිදු වී ඇත. මේ සියල්ලෙන් නොනැවතී සත්ව ආහාර නිෂ්පාදන කාර්යය ගොවිපොල තුලම සිදු කිරීම ඇරඹීමට අවශා අති නවීන සත්ව ආහාර නිෂ්පාදන යන්තුද මේ වන විට AHEAD මගින් ලබා දී ඇති එමෙන්ම ගව ගාලේ අපදවය වලින් ඉහල ගුණාත්මක බවින් යුතු පීව වායුව නිපදවීමේ ඒකකයක් මේ වන විටද වසාපෘතියේ මූලය පුතිපාදන මත ඉදිවී සාර්ථකව ජීව වායව නිපදවීම සිද කරයි. ගොවිපොල තුල සත්ව ආහාර ලෙස පවතින තෘණ වගාව සිදු කිරීමට අවශා බිම් සැකසීමේ සිට සියලු කටයුතු වගාව සිදු කිරීමට අවශා පියවර ගැනීම සඳහා මෙම වහාපෘතිය මගින් ලබ දුන් අති මහත් ඉහල සහයෝගය මත ගොවිපොලේ සියල සතුන්ට අවශා තෘණ වර්ග ගොවිපොලෙන්ම ලබා ගැනීමේ හැකියාව ඇති කර පවතී. බිත්තර, බොයිලර් මස් සැකසීම හා අලෙවි කටයුතු වඩාත් සෞඛ්යාරක්ෂිත ලෙස සිදු කිරීමට වසාපෘතිය මගින් ලබාදුන් නා නා විධ සහයෝගයන් අතිශය ඉහල මට්ටමක පවති.

මෙම කටයුතු මගින් සරසවි සිසුන්ගේ පායෝගික කටයුතු ඉතා හොඳින් ඉටු කර ගැනීමට අවශෘ පසුබිම සැකසීම තුලින් ශී ලාංකේය උසස් අධ්පාපන ක්ෂේතුයේ ගුණාත්මක බව ඉහල නැංවීමට AHEAD වසාපෘතිය කටයුතු සලසා දී ඇති බව ඉතා පැහැදිලිය. එසේම ජනතාවට අවශෘ ගුණාත්මක හා සෞඛ්යාරක්ෂිත ආහාර නිපදවා අඩු මිලට ඒවා අලෙවි කිරීමට කටයුතු කරමින් සිදු කරන මහගු ජාතික කර්තවෳය ඉහල නැංවීමට AHEAD වහාපෘතිය ඉහල මට්ටමකින් දායක වී පවති. ඒ සියලු කරුණු අතර ලාභදායී ලෙස සත්ව පාලන ඒකක පවත්වාගෙන යන ආකාරය පිළිබඳ සිසුන්ට පුායෝගින දැනුමක් ලබා දෙමින් සෑම සත්ව පාලන ඒකකයක්ම ලාභදායී ඒකකයක් බවට පත් කිරීමට අවශෘ කටයුතු සම්පාදනය කිරීම සඳහා මෙම විහාපෘතිය සකියව දායක වෙමින් පවතින බවද සඳහන් කල යුතුය.













#### நீர்வாழ் உயிரின வளர்ப்பும் அதன் முக்கியத்துவமும் ஒரு சுருக்கமான கண்ணோட்டம்

மனித குலத்தின் வரலாற்றில் மீன்பிடித்துறையானது மிக நீண்ட காலம் தொட்டே நிலவிவருகிறது. இத்துறையானது மக்களுக்குப் போசணையுள்ள உணவை வழங்குவதற்கு மேலதிகமாக வேலைவாய்ப்புகளையும் மற்றும் பொருளாதார நன்மைகளையும் வழங்குகிறது. ஆனால், தொழில்நுட்ப வளர்ச்சியின் காரணமாக மீன்வள ஆதாரங்கள் அளவுக்கு அதிகமாகப் பயன்படுத்தப்படுவதால், இன்று அவற்றுக்கான தட்டுப்பாடு ஏற்படத்தொடங்கியுள்ளது. இதனால் மீன்பிடித்துறைக்கு மாற்றீடாக வேறு துறைகளை நோக்கிச் செல்லவேண்டிய அவசியம் ஏற்பட்டது.

இதன் விளைவால் நீர்வாழ் உயிரின வளர்ப்பின் தேவை உணரப்பட்டது. இத்துறையினை வளர்ப்பதன் மூலம் வருவாய் மற்றும் சத்துணவைப் பெருக்கமுடியுமென உணரப்பட்டது. உலகின் பெரும்பகுதி நீர்வாழ் உயிரின வளர்ப்பு வளர்ந்து வரும் நாடுகளில் மேற்கொள்ளப்படுகிறது. உணவுப் பாதுகாப்பு மற்றும் வறுமையை ஒழித்தல் போன்ற நோக்கங்களுக்கு நீர்வாழ் உயிரின வளர்ப்பு முக்கிய பங்களிப்பைச் செலுத்துகிறது. நீர்வாழ் உயிரின வளர்ப்பில் பல்வேறுபட்ட வகைகளைக் காணலாம். அவற்றுள் கீழ்வருவன முக்கியமானவை:

- 1. மீன் வளர்ப்பு (நன்னீர் மற்றும் உவர்நீர்)
- 2. கடற்பாசி வளர்ப்பு
- 3. இறால் வளர்ப்பு
- 4. நண்டு வளர்ப்பு
- 5. மொலஸ்க் வளர்ப்பு (mollusc)
- 6. கடலட்டை வளர்ப்பு
- 7. நீர்வாழ் தாவர வளர்ப்பு (குறிப்பாக நன்னீர் தாவரங்கள்)

#### நீர்வாழ் உயிரின வளர்ப்பின் சவால்கள்

நீர்வாழ் உயிரின வளர்ப்பானது ஏனைய பண்ணை வளர்ப்பு முறைகளைப் போல் பல சவால்களை எதிர்கொள்கிறது. அவற்றில் சில சவால்கள் இயற்கை காரணிகளால் ஏற்பட்டவை. ஏனையவை மனித நடவடிக்கைகளால் ஏற்பட்டவை. முக்கியமான சில சவால்கள் பின்வருமாறு:

- நிலம், நீர், உணவு இடுபொருளுக்கன கேள்வி அதிகரித்தல்
- பொருளாதார உதவியின்மை
- நிறுவன மற்றும் சட்ட ரீதியான உதவிகளின்மை
- தொழில்நுட்ப பற்றாக்குறை
- சுற்றுச்சூழல் மாறுபாடு (climate change)
- சூழல் மாசடைதல்
- உற்பத்திப் பொருட்களுக்கான சர்வதேச சந்தையில் ஏற்படக்கூடிய போட்டி நிலை
- நீர்வாழ் உயிரின வளர்ப்பு பற்றிய போதிய அறிவின்மை (குறிப்பாக வளர்ந்து வரும் நாடுகளில்)
- நீர்வாழ் உயிரினங்களில் ஏற்படக்கூடிய நோய்த்தொற்றுக்கள்
- வளங்களைப் பகிர்ந்துகொள்வதில் ஏனைய துறைகளுடனான போட்டித்தன்மை (சுற்றுலாத்துறை மற்றும் மீன்பிடித்துறை)

#### நீர்வாழ் உயிரின வளர்ப்பினால் ஏற்படக்கூடிய சூழல் பாதிப்புகள்

நீர்வாழ் உயிரின வளர்ப்பு என்பது இன்று உலகளவில் வியாபித்துக் காணப்படுகின்றது. அதற்குப் பிரதான காரணம், அத்துறையினைச் சார்ந்தவர்கள் அடையக்கூடிய பல்வேறு நன்மைகள் எனக் கூறலாம். இதனால் எதிர்காலத்திலும் பல புதிய தொழில்நுட்பங்களுடன் கூடிய நீர்வாழ் உயிரின வளர்ப்பு முறைகள் அறிமுகப்படுத்தப்படும். இத்துறையானது குறிப்பாக நகர்ப்புறங்களைச் சார்ந்திருப்பதை விட இயற்கை வளங்கள் நிறைந்த சுற்றுச்சூழல்களைச் சார்ந்திருப்பதைக் காணலாம். அதற்குப் பிரதான காரணங்களில் ஒன்றுதான் இயற்கை நீர்நிலைகளின் மூலம் இவ்வுயிரினங்களின் வளர்ப்புக்குத் தேவையான நீரைப் பெற்றுக்கொள்ளலாம். இயற்கை நீர்நிலைகளிலிருந்து நீரைப் பெற்றுக்கொள்ளும்போது பண்ணைகளுக்குத் தேவையான நீர்விநியோகத்தைக் குறைந்த செலவில் மேற்கொள்ள முடியும். இது மட்டுமன்றி வேறு பல நன்மைகளும் அடங்கும்.

எனினும், இயற்கைச் சூழலுடன் தொடர்புபடும் வகையில் இப்பண்ணைகளை அமைக்கும்போது சூழல் மீதான பாதிப்புகளைக் கருத்தில் கொள்வது முக்கியமானது. நீர்வாழ் உயிரின வளர்ப்புப் பண்ணைகளில் பயன்படுத்தப்படும் இரசாயனப் பதார்த்தங்கள் இயற்கைச் தூழலுடன் கலப்பதால் பல்வேறு விளைவுகள் ஏற்படும். அத்துடன் வெளிநாடுகளிலிருந்து கொண்டுவரப்பட்ட மீன் இனங்கள் உள்நாட்டு நீர்நிலைகளில் தெரிந்தோ தெரியாமலோ விடுவிக்கப்பட்டால் அவை காலப்போக்கில் உள்நாட்டு மீன் இனங்களுடன் இருப்பிடம் மற்றும் உணவு உட்பட பல்வேறு தேவைகளுக்காகப் போட்டிபோட முனையலாம். இதனால் காலப்போக்கில் உள்நாட்டு மீன் இனங்கள் அழிவடையக்கூடிய சூழ்நிலை ஏற்படும். அதுமட்டுமன்றி, பண்ணைகளில் வளர்க்கப்படும் மீன் இனங்கள் சுற்றுச்சூழலில் வாழக்கூடிய இனங்களுடன் இனப்பெருக்கத்தில் ஈடுபட்டால் காலப்போக்கில் இயற்கை நீர்நிலைகளில் வாழக்கூடிய மீனினங்களில் மரபணு மாற்றங்கள் ஏற்படக்கூடிய சாத்தியப்பாடு அதிகளவில் உள்ளது. அத்துடன், பண்ணைகளில் ஏற்படக்கூடிய நோய்த்தொற்றுக்கள் விரைவில் சுற்றுப்புறச் சூழலுக்கும் பரவக்கூடும். அதனால் அச்சூழலில் இருக்கக்கூடிய உள்நாட்டு மீனினங்கள் நோய்த்தொற்றுக்களால் பாதிக்கப்படலாம்.

#### நீர்வாழ் உயிரினங்களின் வளர்ப்பில் இலங்கையின் பங்களிப்பு

இலங்கையின் இயற்கை நீர்நிலைகளும் கடல்வளமும் இத்துறையினை முன்னேற்றுவதற்கு மிகவும் பயனுள்ளவையாக அமையும் என்பது குறிப்பிடத்தக்கது. ஆனால், சர்வதேச ரீதியில் ஏனைய நாடுகளுடன் ஒப்பிடும்பொழுது இலங்கையின் பங்களிப்பு குறைவாகவே உள்ளது எனலாம்.

குறிப்பாக அலங்கார மீன்வளர்ப்பில் இலங்கையின் பங்களிப்பு மிகவும் குறைந்த அளவிலேயே உள்ளது. எனினும் உணவுக்கான மீன்வளர்ப்பு என்பது இலங்கையில் குறிப்பிடத்தக்க அளவில் முன்னேறியுள்ளது எனலாம். அதிலும் குறிப்பாக, இறால் வளர்ப்பானது சிலாபம் உள்ளடங்கலாக நாட்டின் வடமேற்குக் கரையோரப் பிரதேசங்களில் மேற்கொள்ளப்படுகின்றது. இது தவிர நீர்கொழும்பு மற்றும் திருகோணமலை போன்ற இடங்களில் "கொடுவாய்" என்று அழைக்கப்படும் (Asian seabass- *Lates calcarifer*) உவர்நீர் மீனினம் வளர்க்கப்படுகிறது. திருகோணமலை கடற்பகுதியில் அமைக்கப்பட்டுள்ள இவ்வகை மீன் வளர்ப்பு கட்டமைப்பானது இலங்கையில் அமைக்கப்பட்டுள்ள முதலாவது ஆழ்கடல் நீர்வாழ் உயிரின வளர்ப்புக் கட்டமைப்பு (offshore aquaculture) எனக் குறிப்பிடலாம். இவற்றைத் தவிர அலங்கார மீன்வளர்ப்பானது நன்னீர் மற்றும் உவர்நீர் இனங்களைக் கொண்டு நாட்டின் பல பாகங்களிலும் மேற்கொள்ளப்பட்டு வருகின்றது.



#### இலங்கையில் நீர்வாழ் உயிரின வளர்ப்பினை மேம்படுத்தல்

பொருளாதார நெருக்கடி நிலையினை நாடு சந்தித்திருக்கும் இவ்வேளையில் அந்நிய செலாவணியை ஈட்டித்தரக்கூடிய இத்துறையினை மேம்படுத்துவதற்குப் பல்வேறு நடவடிக்கைகளை முன்னெடுப்பது காலத்தின் தேவையாகும். அந்தவகையில், பின்வரும் நடவடிக்கைகளை முன்னெடுப்பது பொருத்தமானதாக அமையும்:

- சிறிய மற்றும் நடுத்தர மீன் பண்ணையாளர்களுக்குத் தேவையான தொழில்நுட்ப மற்றும் இலகு கடன் வசதிகளை விரிவுபடுத்தல்
- உள்நாட்டு மீன்பண்ணை உற்பத்தியாளர்கள் மத்தியில் இலாபகரமான மீன்வளர்ப்பை மேற்கொள்வதற்குத் தேவையான அறிவூட்டலை வழங்குதல்
- மீன்வளர்ப்புக்குத் தேவையான மீன் உணவை உள்நாட்டிலேயே கிராமிய மட்டத்தில் உற்பத்தி செய்யக்கூடிய வசதிகளை வழங்குதல்
- பொருளாதார பெறுமதி கூடிய மீனினங்களை வெளிநாடுகளுக்கு ஏற்றுமதி செய்வதில் ஏற்படக்கூடிய சில சட்டச்சிக்கல்களை நிவர்த்தி செய்தல்
- மரபணுத் தொழில்நுட்பம் மூலம் பெறுமதி கூடிய அலங்கார மீனினங்களை உள்நாட்டில் உற்பத்தி செய்து ஏற்றுமதி செய்யக்கூடிய வழிமுறைகளை விஸ்தரித்தல்

மேலே குறிப்பிட்ட நடவடிக்கைகளுக்கு மேலதிகமாக இலங்கையின் நீர்வாழ் உயிரின வளர்ப்புத்துறையினை முன்னேற்றுவதற்குத் தேவையான அபிவிருத்தித் திட்டங்களைச் செயற்படுத்தினால் நீண்டகால அடிப்படையில் சமூக மற்றும் பொருளாதார நன்மைகளை அடையலாம் என்பது திண்ணம்.



"கொடுவாய்" (Asian seabass) எனப்படும் மீனினம் சந்தையில் அதிக கேள்வியைக் கொண்டுள்ளது



"கொடுவாய்" (Asian seabass) எனப்படும் மீனினம் வளர்க்கப்படும் நீர்கொழும்பு களப்புப் பகுதி. இது கூண்டு மீன்வளர்ப்பு (cage farming) முறை என அழைக்கப்படுகிறது





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## Impact of Covid 19 pandemic on Colombo City Region Food System (CRFS): Insights with Reference to the First Two Waves

#### Introduction

The first COVID-19 patient was reported in Sri Lanka on 27<sup>th</sup> January 2020. However, the first local Covid 19 case was detected on 10<sup>th</sup> March 2020. On 14<sup>th</sup> March all government schools and universities were shut down to prevent the spread of the disease. The lockdown style curfew continued for 52 days and measures were taken to deliver essential food items to homes with participation of supermarket chains and retailers. The second Covid 19 wave begun on 4<sup>th</sup> October with emergence of the Minuwangoda and Divulapitiya clusters. On 21<sup>st</sup> October with new cases reported at Peliyagoda fish market, it was shutdown with immediate effect. On 25<sup>th</sup> October, a quarantine curfew was imposed in some areas of Colombo, this curfew was extended to the entire Western province from 29<sup>th</sup> October to 2<sup>nd</sup> November.

The supply chain disruptions were among the most adverse impacts that the pandemic has precipitated causing negative impacts on food availability. The supply chain interruptions such as transport restrictions, labour mobility restrictions, import disruptions, input price volatility, decline in demand for agricultural products affects both production end and consumer ends. According to media reports, there were about 3million kilograms of vegetables stuck in Dambulla Dedicate Economic Center in early November 2020 and about 300,000kg of fish catch remained unsold in the fish market as result of the disruptions. Due to COVID-19, supply chain nodes of agricultural products have been more vulnerable causing negative impacts on food availability (Kumar *et al*, 2020).

#### Impact on food supply chains and price

The Peliyagoda fish market and the Manning market were identified as hotspots for spreading of Covid 19. The Peliyagoda fish market considered as the National Wholesale Fish market in Sri Lanka became one of the epicenters of Covid 19 disease spreading with serious implications for distribution of fish in the Colombo city region. Several fishing harbor operations were curtailed due to detection of close contacts of Peliyagoda fish market cluster.

The other major food distribution hub, the Manning market closure in April and November 2020 too impacted food distribution in the Colombo city region as the Manning market plays an important role in the distribution of food especially vegetables to the Colombo city region.

Both upcountry and low country vegetable prices remained below the 2019 averages (Figure 1). The low country vegetable prices dropped sharply compared to the upcountry vegetable prices.

This article aims to present the impact of the pandemic on the Colombo city region food system and identify interventions and priority actions to build food system resilience to the pandemic situation.



Source: Central Bank (2021)





The rice prices at the initial stages of the pandemic remained below the average of pervious year (Figure 02). The imposition of maximum retail price (MRP) in April 2020 did not have a significant effect on the retail prices although there were shortages of rice in the market. The MRP was revised upwards in May to manage the supply shortages. However, with emergence of the second wave in October 2020, the prices went up due to issues in the governance of the rice supply chain.





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Figure 02: Rice and coconut price fluctuation in Colombo during the pandemic period

The impact of the pandemic significantly affected the fish prices throughout 2020. The prices of sample fish types shown in Figure 03 are significantly below the average prices in 2019. This price drop can be attributed to the closure of Peliyagoda fish market and the perception of consumers that fish could spread Covid 19. As a result of the negative perception of fish and complete disruption of fish supplies to the Colombo city region fish consumption drastically dropped during both waves of the pandemic. The unsold fish was not sent for dry fish making because the dry fish industry did not operate due to Covid 19 restrictions as a result there was significant wastage of fish (Amarasinghe and Piyasiri, 2020).



*Source: Central Bank (2021) Note: the discontinuation of the scatter lines is due to unavailability of data* 

Figure 03: Fish price fluctuation in Colombo during the pandemic period

The drop in fish prices did not benefit consumers nor it had an impact on nutritional profile of the consumer as consumption remained low as discussed above. A survey findings reported that 81% of families did not have access to fish in April 2020. The impact of Covid 19 on fish production was very significant especially in the first wave and second wave. Production dropped by more than 40% compared to the previous year in months of April and May (Figure 04).



Figure 04: Fish production fluctuation during the pandemic period

The coconut production shows about 25% decline in the months of March and April 2020 compared to the same months of 2019 (Figure 05). This could be partially attributed to the seasonality and issues with mobilizing labour to harvest coconut due to the pandemic. Generally, the coconut prices were comparatively high during the pandemic period due to supply drop and disruption to the coconut supply chain.

<sup>1</sup>Impact of COVID-19: Health Emergency Rapid Assessment, World Vision Sri Lanka; telephone survey conducted between April 17-20, 2020



Figure 05: Coconut production fluctuation during the pandemic period

The Table 01 summarizes the impact of Covid 19 on national food production, distribution and prices which has clear linkages to the foregoing discussion on Colombo city region food system.

Table 01 Summary of impact of Covid 19 on supply chains from January to August 2020

Coconut	Paddy	Fish	Vegetable
<ul> <li>Total production declined by 11.3 % compared to the same period in 2019.</li> <li>Decline can be attributed</li> </ul>	•2019/20 Maha production increased by 4.0% to 3.2 million metric tons in comparison to the previous Maha season	•Production declined by 15.7% to 283,485 metric tons with marine fish production declining by 20.2% due to mobility restrictions and adverse	•Production during the 2019/20 Maha recorded an increase of 7.0%, year-on-year, to 893,930 metric tons.
to combined effect of the lagged effect of dry weather conditions that prevailed during mid 2019 and disturbances	<ul><li>due to favorable weather.</li><li>Paddy prices remain high despite sufficient production due to</li></ul>	<ul> <li>weather conditions.</li> <li>Considerable wastage took place due to fish market closures during</li> </ul>	•This can be attributed to combined effect of favorable weather and prices.
related to the COVID-19 pandemic.	competition among mill owners to purchase paddy.	<ul><li>the lockdown period.</li><li>The demand for fish dropped considerably</li></ul>	•COVID-19 related lockdowns affected inter seasonal cultivation in March and April
by 60.4% due to factory closures and mobility restrictions of COVID-19 outbreak.	•Average retail price of Nadu rice increased by 9.4%, average retail price of Samba rice declined	during the lockdown period as result the fish prices dropped.	ind ripril.
•The supply shortfall resulted in a sharp increase in prices of coconut and coconut- based products.	by 1.2% compared to the same period in 2019.	•Closure of hotels and restaurants and the drop in tourism sector hampered the fisheries sector.	
•The average retail price of a coconut increased by 39.4% to LKR 70.20 per nut compared to the same period of 2019.			

Source: Recent Economic Developments, Central Bank of Sri Lanka, 2020
## Impact of Covid 19 on Supermarket chains

The major supermarket chains reported issues with cross boarder transportation of vegetables from production regions to Colombo city regions despite government relaxing restrictions to transport food items during the curfew and lockdowns. Both major supermarket chains indicated production was not affected but procurements were affected due to the restrictions. The customer visits to outlets were significantly affected during the first wave but not during the second wave. Both supermarket chains effectively utilized the online platforms to facilitate home delivery, which received overwhelming demand during the curfew and lockdown periods.

## **Recovery and resilience**

The government provided a grant of LKR 5,000 during the initial lockdown in March 2020 to about four million Sri Lankans who make up the vulnerable population, including 416,764 senior citizens, 119, 300 people with disabilities, 160,675 farmers who are registered under the Farmers' Insurance Scheme, 39, 170 kidney patients and 2,443, 844 Samurdhi recipients to enhance household resilience to the pandemic ("Rs. 5000 each", 2020). During the second wave in October, the government allocated LKR 400mn to distribute LKR 5,000 each to those who have lost their livelihoods due to curfews in particular districts. Private companies, media institution, social organizations, voluntary groups and organizations distributed dry rations and vegetables to the needy people to upkeep their families.

The recovery and resilience of vulnerable communities were enhanced through various initiatives taken by the government.

The local food systems in the rural and peri-urban regions became active during the pandemic as home gardening and local food production received renewed attention. A survey conducted in the peri-urban area revealed that home gardeners shared surplus produce from their home gardens with neighbors and the community. It was also revealed that increased engagement of women in home gardening and food production.

The pandemic period led to the emergence of alternate food supply chains including self-organizing food distribution systems, e- commerce platforms and social media. Leading supermarket chains expanded their online platforms to cater to increasing demand during the lock down and curfew periods. The local authorities encouraged street vendors to sell their produce on roadsides and less congested areas to prevent people from flocking to traditional markets when lockdowns were relaxed.

## Conclusion

The investigation revealed that vulnerability of most of the food supply chains became apparent during the unfolding of the pandemic. The two food distribution hubs in the capital city were seriously affected with complete disruption to the main food supply and distribution channels feeding to the city region. There were some notable initiatives to cope with the pandemic such as government-initiated relief measures to support vulnerable groups, encouragement for home gardening and local food production, the emergence of alternate food supply chains and food sharing in the community. It was evident for a need to develop a mechanism to implement existing emergency preparedness plans focusing on coordinating, directing, and monitoring of preparation and implementation of actions at ground level. Further, policy level decisions had to be conveyed without delay to the ground level for implementation and information flow should be strengthened and made available to relevant stakeholder on a timely manner to act proactively.

<sup>2</sup>Dominish, E., Hettiarachchi, K., Samarkoon, D., Esham, M., Winterford, K. and Jacobs, B., (2020). *Social and market research on organic waste value chains in Sri Lanka*. Report prepared by Institute for Sustainable Futures at the University of Technology Sydney, Janathakshan (GTE) Ltd and Sabaragamuwa University of Sri Lanka.









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Nov 2020

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