AVA is committed to strengthening food diversification to facilitate a steady flow of a wide variety of food at stable prices. We also put in efforts to improve the productivity of Singapore’s farming industry, so that local produce can act as a buffer against any sudden and unexpected disruptions to supply.

To help enhance local farming, AVA supports our farmers through technical advice and technology transfer, to upgrade farming capability. The Vertical Farming System (VFS), a public-private project between AVA and DJ Engineering is one such example. The VFS consists of a tall aluminium frame with multiple tiers of growing troughs for leafy vegetables. The troughs rotate around the aluminium frame to ensure that the plants obtain uniform sunlight, eliminating the need for artificial lighting. This rotation system is powered by a low carbon hydraulic system.

Building on the successful co-development of a vertical farming prototype with AVA, DJ Engineering commercialised the project through its spin-off company, Sky Greens Pte Ltd. The commercial farm was established and officially opened by Senior Minister of State for Ministry of Trade and Industry & Ministry of National Development, Mr Lee Yi Shyan, on 24 October 2012.

Construction of the farm began in late 2011, where the first phase of 120 vertical towers was completed a year later. Currently, the farm supplies three types of leafy vegetables (nai bai, xiao bai cai and Chinese cabbage) in retail packs at selected NTUC FairPrice Finest outlets.

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Being the first of its kind in Singapore, there is no precedence or practical experience for Sky Greens Farm to draw upon, and there will be new challenges that are different from those that conventional farms face. Moving forward, AVA will continue to work closely with Sky Greens Farm to identify solutions to overcome such challenges, and work towards boosting local leafy vegetable production.

More Support for Innovative Local Farms

The Sky Green farm is a significant agrotechnology milestone in land-scarce Singapore, as it demonstrates how different disciplines, such as engineering and agronomy, can come together to develop an innovative, productive and commercially viable solution. Looking beyond this achievement, AVA is open to collaboration with other local farmers or companies with such similarly good projects that may provide technological solutions for ensuring food supply resilience.

Already, AVA has been working with the polytechnics and farms to improve local productivity. For example, a joint project between AVA, Ngee Ann Polytechnic and Kok Fah Technology Farm, which enables solar energy to power lights and fans in greenhouse to increase crop yields, was recently completed.

Apart from technical assistance, AVA has also been supporting local farming through initiatives such as the Food Fund. Farmers are encouraged to leverage on the Food Fund to help them improve farming technology and boost production capability. More information on the Food Fund is available at www.ava.gov.sg/foodfund.htm.

As the farm expands, Sky Greens expects to supply about 2 tonnes of leafy vegetables per day by early 2013.

Currently, three types of leafy vegetables (nai bai, xiao bai cai and Chinese cabbage) are supplied in retail packs and are available at NTUC FairPrice retail outlets.
Engineers Net Significant Progress in Fish Farming

Blue Ocean Harvest’s background in engineering, combined with AVA’s technical assistance, helped the farm net the Food Fund and achieve improvements in yield.

Local production is an important secondary strategy in ensuring food supply resilience for Singapore, complementing our key strategy of source diversification. To this end, AVA has been actively working with our farmers to increase productivity through R&D, technical advice and funding from our Food Fund, as well as promoting local produce to consumers.

Our collaboration with local farmers is seeing good progress, as contribution of Singapore’s production of food fish to total consumption has increased almost twofold – from 4.5 percent in 2009 to an expected eight percent by the end of this year. This means we are on track to achieve our target of 15 percent self-sufficiency in fish.

A Case Study: Blue Ocean Harvest

Blue Ocean Harvest (BOH) is an example of a farm that AVA has been working closely with to boost productivity. As a new farm set up less than a year ago by a group of engineers, BOH initially faced challenges such as inexperience in farm management protocols and high mortality of its fish stock.

Despite the lack of familiarity with the trade, BOH’s founders applied their analytical, experimental, and engineering training to good use in the farm. Coupled with technical assistance from AVA, BOH now has in place good farm management practices, such as fish culture protocol and fish health management, which have increased survival rate and stabilised production.

For example, BOH developed an innovative ‘cage’ to facilitate its fish health management protocol. The DIY canvas cage allows fish to be bathed in a less stressful manner, while the net cages are disinfected to eliminate parasites. Bathing the fish also helps remove parasites, which are the primary cause of diseases. Through this process, fish health is enhanced and survival rate has vastly improved.

In addition, BOH is one of the recipients of AVA’s Food Fund. With the Food Fund, BOH introduced the following equipment to improve farming technology and boost production capability:

- **Modular floating high density polyethylene cube cages**
  With the modular cube cages, BOH reduced its manpower needs by 20 percent and increased its stocking capability by eight times. The farm size has expanded by 40 percent and production is expected to reach eight tonnes by end of 2012. Projected production for 2013 is 30 tonnes.

- **A solar panel system**
  The solar panel system has enabled BOH to be less reliant on its generator power supply and reduce their carbon footprint. Its lights and chest freezer are solely...
powered by solar energy, resulting in cost savings of about S$4,000 annually.

• Water monitoring equipment
As part of good farm management practices, BOH conducts routine monitoring of its waters to ensure good culture environment for the fish. The dissolved oxygen metre helps monitor the water quality and determines the feed quantity for the day. This way, fish health is enhanced and cost is optimised (i.e. lesser likelihood of over-feeding).

• A chest freezer
The chest freezer allows for storage of ice, which is essential during harvesting, to ensure freshness of fish from farm to retail.

With AVA’s Food Fund, BOH also purchased vaccinated sea bass fry, which have higher survival rates compared to non-vaccinated fry, for stocking. BOH’s sea bass were sold in selected supermarkets, as part of the SG Fish brand’s promotion.

Singapore’s production of food fish to total consumption has increased twofold – from about four percent in 2009 to an expected eight percent by the end of this year.

While AVA continues to work closely with the industry to bolster our food supply resilience, we also encourage consumers to buy home grown produce.

In November 2012, local farms Rong-Yao Farm, Blue Ocean Harvest Farm, Oseme Trading, and Tiberias Harvest came together for a joint marketing promotion at NTUC FairPrice, Giant and Sheng Siong supermarkets. Marketed under the “SG Fish” brand, consumers were offered a variety of fishes such as golden pomfret, sea bass, and milkfish at these supermarkets.

AVA organised a series of cooking demonstrations at selected supermarkets. Point-of-sale materials and recipe sheets were also distributed to shoppers during these demonstrations.
During the annual Eid-ul-Adha, a ‘Festival of Sacrifice’ observed by Muslims, sheep and goats are sacrificed for the meat to be distributed to the poor. This Korban (sacrificial slaughter) ritual is an important religious event for the local Muslim community, and typically involves up to 6,000 animals imported solely from Australia.

Stories of cruelty towards Australian cattle in Indonesian abattoirs in June 2011, led to public demands to ban livestock export in Australia. This resulted in Australia’s Department of Agriculture, Fisheries and Forestry putting in place an Export Supply Chain Assurance System (ESCAS) in March 2012. The ESCAS provides assurance that livestock from Australia would be treated according to international animal welfare standards.

To comply with the new standards stipulated in ESCAS and secure sheep for Korban this year, AVA worked closely with the Islamic Religious Council of Singapore (Majlis Ugama Islam Singapura), Australian High Commission, Australian exporters, as well as local mosques, Malay/Muslim organisations, and importers. A Code of Practice for Animal Welfare was drafted and numerous training seminars and onsite assessments were conducted by AVA officers.

Following successful independent audits of the Aqiqah (ritual slaughter to celebrate the birth of a newborn baby) from April to July 2012, Singapore was allowed to import sheep from Australia under ESCAS for the Korban ritual. As a result, some 2,500 sheep were successfully imported for the Korban ritual, which proceeded smoothly in September 2012 at 18 venues. AVA will continue to work with all stakeholders to ensure animal welfare and secure a continued supply of livestock for Korban.

AVA Ensures Welfare of Ritual Livestock during Korban

By working closely with stakeholders, AVA spared no effort in ensuring a successful Korban in Singapore.
A quarterly publication

VA has been stepping up its collaboration with various government agencies and animal welfare groups in strengthening our pet ownership and animal welfare policies. The Taskforce on Pet Ownership and Stray Management, led by the Ministry of National Development (MND), together with AVA and HDB, had spent a fruitful year gathering feedback from the ground. Extensive consultations and focus group discussions with the animal welfare groups, Town Councils, grassroots leaders, the pet industry, various public agencies and the public, were conducted.

Opening the Responsible Pet Ownership (RPO) Roadshow at the Singapore Expo on 10 November 2012, Acting Minister for Manpower and Senior Minister of State for National Development, Mr Tan Chuan-Jin gave an update on the initiatives proposed by the taskforce and the significant milestones made within the year.

Firstly, the Taskforce has recommended proceeding with the two pilot projects – on rehoming stray dogs in HDB flats, and on cat ownership in Chong Pang. These two pilots were proposed by the Society for the Prevention of Cruelty to Animals (SPCA), Action for Singapore Dogs (ASD) and Cat Welfare Society (CWS).

**Rehoming Stray Dogs in HDB Flats**

Project ADORE (which stands for ADOption and REhoming of dogs), led by ASD and SPCA, was launched in April 2012. Since then, 15 dogs have been successfully adopted and rehomed.

"From what I understand, the dogs have been very obedient. That is because both the owners and dogs have attended training courses, which is one of the preconditions of responsible dog ownership for the pilot participants," Mr Tan added.

**Cat Ownership in Chong Pang**

With full support from Member of Parliament (MP), Mr K Shanmugam, in October 2012, the two-year pilot project on cat ownership in Chong Pang was also introduced.

Some of the Animal Welfare Groups brought animals for adoption to the roadshow in hopes of finding new homes for the pets under their care.
This pilot is now called Project Love Cats and is led by CWS. It complements the ongoing Stray Cat Sterilisation Programme in Chong Pang, which involves CWS, AVA, and the Sembawang-Nee Soon Town Council. Residents from the 123 blocks in Chong Pang will be allowed to own one pet cat per flat. A pet cat can be adopted from CWS or SPCA.

Maintaining a Harmonious Living Environment

In his speech, Mr Tan also addressed concerns about the condition of the animals after adoption, other animals that also need a home, and the slow pace in policy changes.

“My response is a simple one. Let us take one step at a time,” Mr Tan said, adding that while many of us love pets in Singapore, there are also Singaporeans who feel very strongly and are uncomfortable about having some of these pets in, and amidst them. “We need to work together and move forward at a pace that is comfortable for all concerned.”

Being considerate to the people around us is the same approach adopted for Project ADORE and Project Love Cats. Both projects carry with them a community management framework, which focuses on ensuring pet owners are responsible, setting up a mediation mechanism to resolve pet issues, and providing a rigorous screening process for pet owners. All adopters will need to comply with ownership conditions and a Code of Responsible Behaviour.

Animal Welfare Legislation Review

The formation of the Animal Welfare Legislation Review Committee (AWLRC) in April 2012 is another noteworthy development. Chaired by Mr Yeo Guat Kwang, MP for Ang Mo Kio GRC, the AWLRC brings together members from the veterinary profession, animal welfare groups, the pet industry association, and grassroots leaders.

As with the community-centric approach of the two pilot projects, members of the AWLRC work together towards the shared objective of strengthening and raising the standards of animal welfare in Singapore, while balancing the very diverse interests of the community at large.

Mr Tan said that the AWLRC is finalising its recommendations under four key thrusts:

i) Ensuring reasonable care and welfare of animals

ii) Stepping up action against wrong-doers

iii) Fostering greater responsibility in industry to ensure animal welfare

iv) Fostering greater responsibility amongst pet owners and for the community at large to have a better sense of the community space and to have a greater awareness of animal welfare issues

Animals and Our Community

AVA’s RPO roadshow, aptly themed “Animals and Our Community”, is a key event in promoting harmonious co-existence between animals and those who love them or are uncomfortable with them.
ASEAN Moves Forward

ASEAN continues good cooperation in areas of food, agriculture and forestry during meetings in Laos.

Dr Mohamad Maliki Bin Osman (Senior Parliamentary Secretary, Ministry of National Development & Ministry of Defence), accompanied by Ms Tan Poh Hong (CEO of AVA), led a six-member Singapore delegation to the 34th Meeting of the ASEAN Ministers on Agriculture and Forestry (34th AMAF) and its Related Meetings.

Ministers and Senior Officials deliberated on issues pertaining to food, agriculture and forestry, as well as discussed the progress of various initiatives during the meetings held from 24 to 28 September 2012 in Vientiane, Laos.

The Ministers also considered and endorsed the following documents relating to crops, livestock and fisheries, among others:

a) List of proposed twelve Maximum Residue Limits for nine pesticides:

b) ASEAN Standards for Wax apple, Chico (Sapodilla), Eggplant, Pumpkin, and Sweet Corn.

c) Revised ASEAN Standards for Mango, Pineapple, Banana, and Durian.

d) Guidelines and audit check list for ASEAN Nursery Certification Scheme for Export.

e) Intra-ASEAN Phytosanitary Guidelines for Importation of Paddy, Oil Palm and Banana.

f) Additional Role and Functions of ASEAN Sectoral Working Group on Livestock and Senior Officials Meeting-AMAF in the Utilisation and Management of the ASEAN Animal Health Trust Fund.

g) Executive Report on Highly Pathogenic Avian Influenza.

h) Terms of Reference for the Steering Committee of the ASEAN Rapid Alert System for Food and Feed.

i) Terms of Reference of the ASEAN Sanitary and Phytosanitary Contact Points.

j) Revised Framework for ASEAN Fisheries Consultative Forum.

k) Strategic Plan of Action for ASEAN Cooperation in Fisheries (2011-2015)

Ministers also noted the entry-into force of the ASEAN Plus Three Emergency Rice Reserve Agreement and agreed to enhance existing mechanisms or explore new initiatives to enhance food security in the region. The 35th Meeting of the AMAF will be held in Malaysia in 2013.

Animal Agenda

Following the successful runs at Jurong Point in June 2012 and Causeway Point in August 2012, the RPO Roadshow at Singapore Expo attracted close to 22,000 visitors. Besides interactive displays, e-games, and seminars, the crowds were also educated and entertained by the various stage programmes, competitions, and dog obedience demonstrations and competitions, and animal meet-and-greet sessions by our participating organisations.

Our next “Animal and Our Community” event will be held in March 2013 at the HDB Mall in Toa Payoh. Find out more details from www.petsforlife.com.sg
Singapore is a highly urbanised nation with limited land space for agriculture. This, however, has not restricted AVA in sharpening our agricultural R&D expertise to optimise resources, and sharing our know-how with our ASEAN neighbours, such as Laos.

A decade ago, Laos sought to boost the income of its rural farmers and provide much needed animal protein to its local population. With technical assistance from AVA and funding from the Ministry of Foreign Affairs, Singapore helped to set up the Lao-Singapore Fish Hatchery in Vientiane in 2002. The objective was to enable Laos to use appropriate technology and local materials to produce one million fish fry annually for local farming.

In September 2012, when Dr Mohamad Maliki Bin Osman (Senior Parliamentary Secretary for Ministry of National Development & Ministry of Defence) visited the hatchery at the sidelines of the ASEAN Agriculture and Fisheries Ministers, the hatchery’s annual production of fish fry had already crossed four million.

To Singapore, by sharing our agricultural R&D knowledge with our neighbours, we are not only strengthening regional ties. As these nations build up their farming capability and output, they also become additional and possible sources of safe food for us.

This is why, over the years, AVA has continued to offer assistance to Laotian officials and farmers to improve various hatchery operations such as fry production, feed preparation, and brood stock selection. Moving forward, AVA will conduct a training course in modern tilapia culture and post-harvest technology for the hatchery. The course will include more advanced topics, such as good aquaculture practices, fish health management, and proper post-harvest handling.

### Food Sourcing in Myanmar and Vietnam

Mr Lee Yi Shyan (Senior Minister of State for Ministry of Trade and Industry & Ministry of National Development), accompanied by CEO of AVA, led a delegation of officers and businessmen to Myanmar on 8 to 13 October 2012 for a food sourcing trip. With abundant natural resources, Myanmar has been a long-time trading partner of Singapore.

Agenda for the sourcing trip included business matching sessions between Singapore’s traders and local companies, with aims to further increase food imports from Myanmar. The delegation also visited the Thiri Mingala wholesale market for vegetables and fruits; Annawa Aung Landing Site for fisheries; seafood processing and surimi processing plants; as well as Port Thilawa.

In another sourcing mission, Deputy CEO of AVA Mr Lee Kwong Weng led representatives from AVA and Singapore’s vegetable and fruit importers to Vietnam on 12-16 November 2012. Visits to the Vietnam-Singapore Industrial Park, as well as vegetable and fruit processing factory, farms, and packing houses were made. It was also a good networking opportunity for the delegation, Vietnamese government officials, and Singapore business groups operating in Vietnam.
Towards Safer and Higher Quality Food

A revised Food Establishment Inspection Checklist, together with a new series of industry training programmes, is introduced to raise food safety and hygiene standards in licensed establishments.

Food safety is a shared responsibility that requires everyone, including the government, industry, and consumers to play their part. On the part of AVA, we adopt a farm-to-fork approach, including inspections and grading of food establishments, to ensure that stringent standards are met.

All food establishments in Singapore are inspected and graded into four categories – A (Excellent), B (Good), C (Average), and D (Pass) – based on their food hygiene and food safety standards.

Through this grading system, food manufacturers are made aware of the hygiene and food safety levels in their establishments, and any need for improvements. It also creates an environment for food manufacturers to constantly upgrade their facilities and competencies to strive for higher grades. This would in turn mean safer and higher quality food manufactured or processed locally.

Taking reference from international standards, with an aim to raise food safety and hygiene standards in licensed establishments, AVA has since April 2012 revised the inspection criteria used during our routine inspections, as well as the annual grading assessment of the local food establishments.

The revised Food Establishment Inspection Checklist was developed in consultation with our food associations, who provided useful inputs to ensure that the checklist is practical and clear for use. The checklist is now available for download from www.ava.gov.sg.

Training Programmes for Local Food Industry

With an increase in the number of inspection criteria in the revised checklist, it would also mean that requirements are now more stringent. AVA recognises that licensees with limited resources may find it challenging to find personnel with the relevant technical expertise or fork out additional funds to train their food handlers.

As such, AVA has introduced a series of food safety management training programmes to help industry members develop the necessary capability to meet the high standards of food safety. These programmes, consisting of technical seminars and onsite trainings, will also assist poor-performing food establishments to upgrade their facilities and processes.

Our technical seminars cover topics such as Hazard Analysis and Critical Control Points (HACCP), Good Manufacturing Practices, and Good Warehousing Practices. Trade-specific food safety management topics, encompassing food safety and HACCP systems for central kitchens, bakeries, and confectioneries have been conducted so far. To meet the needs of the food industry, similar sessions were also conducted in Mandarin.

In addition, AVA provides support and customised consultation for establishments that require assistance in upgrading their food safety standards. Where possible, we also deploy the AVA Food Safety Bus – a mobile exhibition with interactive displays on food safety tips such as the proper ways to handle food. These initiatives will contribute towards helping establishments consistently maintain high standards of food safety.
Amendments to the Food Regulations

New additives and new uses to additives were added to the Food Regulations. Maximum limits for certain contaminants and a more stringent limit for vinyl chloride were also incorporated.

AVA implements stringent food safety requirements to ensure food safety and protect consumer health in Singapore. At the same time, standards in force have to be up to date and in line with international practice, so as to facilitate trade.

These standards are enforced through the Food Regulations, a set of legislation stipulating food safety requirements, such as permitted food additives and their corresponding maximum permitted levels, food contaminants and their maximum limits permitted in foods, food standards, as well as labelling requirements.

The Food Regulations were amended on 3 September 2012, with the gazettal of the Food (Amendment No. 2) Regulations 2012. In this set of amendments, 19 new food additives have been incorporated into the Food Regulations as permitted food additives. In addition, new uses have been permitted for 10 existing food additives. These proposed changes are in line with international practice, namely that of the Codex Alimentarius Commission, and/or major developed countries, and are trade facilitating measures.

Maximum limits for certain contaminants have been incorporated into the Regulations. In addition, a more stringent limit for a food packaging material – vinyl chloride – has been adopted, in line with Codex’s recommendation. These limits serve to safeguard consumer health, and provide greater transparency to the industry on Singapore’s requirements.

An updated copy of the Food Regulations can be obtained from www.ava.gov.sg/Legislation/ListOfLegislation/.

Updates on 35th Codex Alimentarius Commission

The Codex Alimentarius Commission (CAC) held its 35th Plenary Session in Rome, Italy, on 2-7 July 2012. A total of 20 new or revised Codex standards, related texts, or amendments to these texts were adopted, along with many new or revised provisions for additives and Maximum Residue Limits (MRLs) for pesticides and veterinary drugs. These include:

- Guidelines on the application of general principles of food hygiene to the control of viruses in food
- Revision of the standard for food grade salt (CODEX STAN 150-1985)
- Maximum level for melamine in liquid infant formula (ready to consume)
- MRLs for narasin (cattle tissue), amoxicillin (cattle, sheep and pig tissues and cattle and sheep milk), and monensin (cattle liver)

Importers and manufacturers are encouraged to download the adopted standards and texts from www.codexalimentarius.org/meetings-reports/en/ for reference. For further assistance regarding Codex matters in Singapore, please write to us at AVA_LabelsAndClaims@ava.gov.sg.
AVA Builds New Food Safety Screening Capability

As a complement to our current testing strategy, the new non-target approach helps to identify rare or unanticipated compounds in food.

Singapore has been lauded for having a world-class food safety system that is based on risk analysis, encompassing legislation and standards, accreditation, import control, inspection and surveillance, as well as laboratory testing. Not resting on our laurels, AVA, as the national authority for food safety, continues to stay on guard against emerging threats.

Traditionally, AVA, like most food safety agencies worldwide, tests food samples for a list of hazards that are commonly detected in food. The testing procedure is optimised to be highly reliable in screening these hazards.

However, the possibilities are endless when it comes to the type of adulterants that could be added to food. From excessive antibiotics to mycotoxins, the list of contaminants to look out for is ever-expanding. In addition, with the use of unanticipated substances in food – such as melamine in milk products and phthalates (plasticisers) in bubble tea – we have a bigger challenge to overcome. These adulterants were previously not targeted for testing because they had never been used in food production until recent years, and were thus not part of the list of known food-borne hazards.

To identify rare or unanticipated compounds in food, AVA set up facilities for the establishment of non-targeted testing capability at our Veterinary Public Health Laboratories (VPHL). This non-target laboratory utilises the High Resolution Mass Spectrometry (HRMS) technology, which complements our current testing strategy for food-borne hazards and strengthens our laboratory testing capabilities. Besides VPHL, other laboratories involved in similar development are mostly from the EU, US, and Japan.

Since 2010 when facilities for this technology were set up, AVA has been developing and fine-tuning the analytical procedures, as well as building a database, which now contains references for about 11,000 compounds. This has enabled us to take a more proactive stance in food testing. For example, using the non-target analytical technique, we were able to detect and identify disinfectants (benzalkonium chloride and didecyl dimethyl ammonium chloride) in certain cultured fish, as well as a flavouring substance (2-ethyl maltol) in some sausage products.

AVA’s non-target laboratory utilises High Resolution Mass Spectrometry technology to identify rare or unanticipated compounds in food.

6th Asian Conference on Food and Nutrition Safety

Pro-activeness in food testing is indeed crucial. With globalisation and international trade, regulatory agencies worldwide now face new and greater challenges in ensuring food safety.

To provide a platform for officials, scientists, and researchers in Asia to share and leverage on each others’ expertise, AVA and the International Life Sciences Institute (Southeast Asia Region) co-organised the 6th Asian Conference on Food and Nutrition Safety on 26-28 November 2012 in Singapore. During the Conference, international experts spoke on several topics related to nutrition, food safety, and risks that are pertinent to the region. To find out more, visit www.ilsiacfns2012.com.