



**AVA**  
Agri-Food & Veterinary  
Authority of Singapore

Annual Report  
2018/19

# Staying True to Our Values



ANNUAL REPORT

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## Vision

Safe food, healthy animals and plants for Singapore; trusted and respected globally.

## Mission

- Ensure a resilient supply of safe food;
- Ensure the health and safeguard the welfare of animals;
- Safeguard the health of plants;
- Facilitate agri-trade; and
- Nurture and inspire staff to be the best we can be!

## Values (ExCITE)

### Excellence:

- We strive to be the best in all that we do.
- We seek lifelong learning and continuous innovation.

### Care:

- We value and nurture our staff.
- We care for the community and the environment.

### Integrity:

- We serve with professionalism.
- We treat our customers fairly and honestly.

### Teamwork:

- We trust and respect each other.
- We work as a team and partner our stakeholders to achieve our goals.

# Awards and Accolades



**Singapore Quality Class (STAR)**  
re-certified in December 2016



**People Developer**  
re-certified in December 2016



**Innovation Class**  
re-certified in December 2016



**ISO/IEC 17025 SAC-SINGLAS Accreditation**  
received by:

- Veterinary Public Health Laboratory since 2000, with 9 new tests accredited in FY 2018
- Animal Health Laboratory since January 2005, with 2 new tests accredited in FY 2018
- Plant Health Laboratory since June 2005



**World Organisation for Animal Health (OIE) Collaborating Centre for Food Safety**

designation received by Veterinary Public Health Centre since May 2014



**ASEAN Reference Laboratory for Pesticide Residues**

designation received by Veterinary Public Health Laboratory since 2004



**ASEAN Reference Laboratory for Environmental Contaminants**

designation received by Veterinary Public Health Laboratory since 2014



**Minister's Award (Team) 2018**

received from the Ministry of National Development for the Management And Coordination of Storm Recovery Efforts for Farms in Murai



**Municipal Services Awards**

received from the Municipal Services Office for:

- Trap-Neuter-Release-Manage Efforts in Sembawang
- Resolution of Dakota Crescent Stray Dog Sighting Incidents
- Management of Pollution Incident at Chicken Farm
- Resolution of Segar Road Monkey Incident
- Collaboration with Ai Tong School to Educate Residents on 'No Feeding of Pigeons'
- Public Awareness Efforts against Pigeon Feeding
- Video Analytics Algorithm for Automatic Pigeon Detection



**Ong Teng Cheong Labour Leadership Institute Workplace Partnership Award (Platinum)**

received jointly with AUSBE-AVA

# Chairman's Message



*“Sharpening AVA’s efforts in dealing with these forces and enhancing our food security situation was rightfully one of the Board’s early priorities.”*

For FY 2018, I am happy to report that AVA made big strides in fulfilling its mission of ensuring food security and safety, safeguarding animal and plant health, and enhancing animal management and welfare. Our food supply is now more secure due to our efforts to further diversify our food sources and grow our local agri-food sector. Singapore was clear of animal diseases and plant pests that may disrupt food production, and impact public health and trade. Credit goes to our food safety team, who maintained round-the-clock vigilance. Considerable efforts were put in to build a culture of responsible pet ownership and to forge close partnership with stakeholders on animal management issues, but we are still some distance away from having a nationwide culture of responsible pet ownership. Let me now highlight our significant achievements in FY 2018.

## Food Security

Going forward, we face major challenges in safeguarding our food supply. By 2050, the world population is expected to grow by 30% to reach nearly 10 billion. But natural resources such as water and arable land are becoming increasingly scarce. These trends will increase pressure on food supply. Climate change and geopolitical developments will add to this pressure. A case in point was Malaysia’s announcement in December 2018 that it was considering limiting exports of eggs and a few types of seafood.

To improve our food supply resilience, we facilitate our importers to open up new food supply sources. AVA arranged business matching and networking sessions for our traders to network with food exporters from Thailand, Vietnam, and Ukraine for food products such as eggs, fruit, vegetables, and poultry. In November 2018, AVA and Enterprise Singapore (ESG) led a seafood sourcing mission to Andhra Pradesh, India. AVA also made trips to several countries such as Ukraine, Spain, Japan, Thailand, Brunei, and the Philippines to inspect their national regulatory systems, and meat and egg processing establishments. Last year alone, AVA approved 12 new farms in Australia, Thailand and Ukraine that can export eggs to Singapore.

Local production remains an important prong in our food security strategy. To this end, AVA ensures that land is available in the long term to support our local food production goals. In FY 2018, we conducted two land sales exercises and awarded a total of 13 plots of farm land on 20-year leases. In June 2018, for the first time, agriculture land parcels were put out to tender using the ‘Concept and Price’ tender method, where the concept was assessed in the first stage based on the strength of the proposal using criteria such as production capability, production track record, and innovation. Tenderers who passed the first stage were

further evaluated on price in the second stage. The outcome was good, as we saw successful tenderers submitting advanced farming systems that should lead to higher productivity in manpower and land usage.

In urban farming, creative use of space is important. These spaces include underutilised rooftops and vacant state buildings. Producing food where people live will be a trend as the world population becomes more urbanised. Putting Singapore’s underutilised urban spaces to good use presents opportunities for food production and test-bedding of innovative technologies for urban farming. It also serves to raise community awareness and support for local produce. Through the collaborative efforts of the Singapore Land Authority (SLA), Early Childhood Development Agency (ECDA), the Ministry of Health (MOH), and AVA, the former Henderson Secondary School will be housing the first-ever integrated space for childcare, healthcare and urban farming, to cater to the needs of the community living in the area.



By growing a larger and more competitive food and agri-tech sector, Singapore will have an opportunity to be a leader in urban agriculture and aquaculture technology. The food production model developed here could potentially be exported to other cities in the region. A competitive food cluster could become another engine of economic growth for Singapore. We are working with economic agencies to develop an Agri-Food Innovation Park (AFIP) in Sungei Kadut, which will bring together hi-tech farming and R&D activities, including indoor plant factories, insect farms, and animal feed production facilities.

To nurture a competitive food cluster with limited land in Singapore for farming, we will need to intensify our research, enterprise, and collaboration efforts. AVA worked with A\*STAR to put up an R&D programme for the Singapore Food Story, covering research areas in sustainable urban food production, future foods, and food safety science and innovation. In early 2019, \$144 million from the Research, Innovation and Enterprise 2020 (RIE2020) was allocated to support the R&D programme.



In July 2018, AVA increased its participation at the 6th World Cities Summit (WCS). In addition to our presence at the Singapore Government Pavilion where two local technology solutions providers showcased their technologies that were contributing to the vibrancy of our growing eco-system, AVA hosted a thematic forum “*Building and Growing a Thriving Urban Food Eco-system*”, which attracted a good turnout of about 200 people. The session brought together planners and experts in the field of cluster development and agri-technology innovation to discuss and provide insights on urban food solutions and their impact on the planning of cities.

Together with ESG, AVA participated in TechInnovation 2018 in September 2018 to showcase our technology and collaboration partners in the local urban agri-tech industry. Alongside the exhibition pavilion, participants benefited from a conference session featuring presentations and panel discussions on the latest trends, developments, and opportunities in the urban agri-tech sector.

For the first time, in October 2018, AVA co-organised the 5th International Rice Congress (IRC 2018) with the International Rice Research Institute. Held every four years, the Congress – also called the “Olympics of Rice Science” attracted some 1,500 participants from 40 countries including scientists, government officials, and representatives from international organisations such as the United Nations Food and Agriculture Organisation (FAO). They shared innovations, cutting-edge technologies, and policies shaping the future of rice. At the congress, AVA, A\*STAR, and Enterprise Singapore (ESG) also jointly organised a side event “*Rice for the Future: A Singapore Perspective*” to showcase Singapore’s research and innovation in rice.



Working closely with local industry partners is key to our effort to promote the growth of the local food sector. To this end, AVA works closely with the Singapore Agro-Food Enterprises Federation (SAFEF). In FY 2018, AVA and SAFEF co-organised five SG Farmers’ Market events, where our farmers showcased their locally grown vegetables, fish, seafood, eggs, and mushrooms. AVA and SAFEF also arranged for eight of our farms to exhibit their local produce for the first time at the Food & Hotel Asia 2018 – an international trade event for the food and hospitality industry. The event proved useful for our farms in reaching out to other businesses.

A vibrant and dynamic local agri-food ecosystem will need a pipeline of local talent in the agri-food sector. AVA has put in place an “Attract, Emplace and Retain” strategy to build local talent. To attract students to pursue a career in the agri-food sector, AVA has worked with farms and Institutions of Higher Learning (HLs) to develop an internship programme that allows students to gain real-life job experience. In 2018, 25 students were matched to 12 farms. AVA has also collaborated with Republic Polytechnic (RP) and SAFEF to develop a SkillsFuture ‘Earn-

and-Learn’ programme (ELP) for the agriculture sector. This ELP, leading to the Part-time Diploma in Applied Science in Urban Agricultural Technology, was launched in January 2019. It emplaces Institute of Technical Education (ITE) graduates into the industry, and equips them with the knowledge and skills to become agri-tech technicians. Under this programme, farms enjoy funding support from the government when sending their ITE graduate employees for diploma studies.



## Food Safety

To ensure the safety of our food supply, be it imported or produced locally, AVA continually benchmarks its laboratory testing capabilities with that of international laboratories, and develops new ones to detect emerging foodborne hazards.

AVA is one of World Organisation for Animal Health (OIE) Collaborating Centres (CC) for food safety. In this capacity, we contribute to the development of food testing capabilities in the region through research and capacity building collaboration with other international and regional organisations. In FY 2018, activities included the hosting of regional technical workshops on various aspects of food safety testing, including the analyses of pesticide residues, mercury, polychlorinated biphenyls (PCBs), mycotoxins, and genetically modified organisms (GMOs), with partners such as the Global Food Safety Partnership (GFSP). As Singapore imports a substantial amount of our food from the region, such regional training will translate to safer foods for Singapore.

AVA also regularly reviews our food safety regulations to ensure they keep abreast of the latest scientific and regulatory developments in international standard-setting bodies. In January 2019, the Food Regulations were amended to better protect consumers and to implement trade facilitating measures. Such reviews are necessary as the food supply chain becomes increasingly complex. In 2018, we engaged our stakeholders to better understand their views and concerns on implementing food traceability systems. In addition, we sought views on the proposed definition and scope of novel foods, as part of the development of a novel food regulatory framework.

## Animal Health

Singapore adopts a One Health approach that encourages professionals across various sectors to collaborate and tackle emerging infectious diseases. In line with this approach, AVA, in partnership with the Ministry of Defence

(MINDEF), MOH, and National Environment Agency (NEA), co-organised the One Health and Outbreak Surveillance Symposium with the NUS Saw Swee Hock School of Public Health's Centre for Infectious Disease Epidemiology and Research (CIDER) in July 2018. The symposium provided a platform for local and overseas experts to share current research and outbreak experiences. The event attracted some 300 participants from the government sector, healthcare agencies, and research institutions.

Following the launch of the National Strategic Action Plan for Antimicrobial-Resistance (AMR) in 2017, we started the surveillance of AMR for livestock and aquaculture in local farms. Samples were taken from local animal farms to detect the presence of AMR bacteria. We have also successfully completed the FAO Assessment Tool for Laboratory and AMR Surveillance Systems (ATLASS) assessment. The assessment helps us better understand Singapore's AMR surveillance system in the agricultural and food sector, and identify areas for improvement. In addition, Singapore continues to be the lead country in ASEAN that coordinates regional AMR-control activities for the livestock and aquaculture sectors. Going forward, we plan to strengthen Singapore's regulatory controls for veterinary medicines.

In August 2018, African Swine Fever (ASF) was detected in East Asia, in parts of China and in Vietnam. While this disease does not affect humans, it is extremely deadly in pigs. The risk of the disease spreading to ASEAN is high. To ensure that Singapore continues to remain free of this deadly virus, and yet ensure sufficient pork supply, we adopted a risk based zoning principle in suspending pork imports from affected countries. For instance, trade suspensions on pork and pork products were applied only to regions in China which were affected by ASF.

While Singapore is free from rabies and bird flu, we have not let our guard down as these diseases are endemic to the region and remain health hazards to humans. In this regard, we collaborated with our neighbours in the fight to curb these diseases. For example, in 2018, AVA

and Malaysia's Department of Veterinary Services (DVS) continued to conduct regular bilateral meetings to strengthen cooperation in dealing with transboundary animal diseases. We continue to work with our Indonesian counterparts to prevent and control bird flu in Kepulauan Riau (Kepri, or the Riau Islands). AVA also donated 29,000 doses of rabies vaccines to Thailand in August 2018 to help in their efforts in rabies control. Within Singapore, to build an immune population at high-risk areas, AVA conducted the fourth annual rabies vaccination exercise for dogs at our coastal fish farms and tested them to check that they were protected against rabies. The exercise was done in collaboration with private veterinarians and student volunteers from polytechnics in FY 2018. We also extended the vaccination programme to dogs at Pulau Ubin in partnership with NParks and local animal welfare groups.

On the international front, AVA continued to represent Singapore at the 86th General Session of the World Organisation for Animal Health (OIE). The OIE Delegate for Singapore, Dr Yap Him Hoo, was elected as a member of the OIE Council for a term of three years, in recognition of Singapore's active role in the development of animal health and welfare standards. The Council will be undertaking the important task of developing the new 7th Strategic Plan for OIE (2021-2025). At the 2nd Scientific Committee Meeting of the ASEAN Risk Assessment Centre (ARAC) on Food Safety held in March 2019, Singapore was re-elected as Chair of the Scientific Committee for a second three-year term. This ASEAN Centre was established with the aim to serve as a coordinating centre for risk assessment in the region on safe and quality food, as well as facilitate food trade within ASEAN.

## Animal Management

For animal management, AVA works closely with various stakeholders, such as government agencies, animal welfare groups and the community. This collaborative approach ensures a balance of views, and achieves amicable and practical outcomes. For instance, to address the different concerns that stray dogs may pose to



the public, AVA launched the nationwide Trap-Neuter-Release-Manage (TNRM) programme initiative in November 2018, as a humane and scientific method of managing the stray dog population. Developed in close collaboration with 11 animal welfare groups, the AVA-funded programme aims to sterilise more than 70% of the stray dog population over five years. AVA has appointed the Society for the Prevention of Cruelty to Animals (SPCA) as the lead coordinating animal welfare groups partner in this initiative.



In May 2018, AVA appointed the Cat Welfare Society (CWS) as its third-party mediator for cat-related issues for a period of one year, another example of AVA's collaborative approach. Mediation plays an important role in achieving desirable outcomes in cat-related disputes. AVA's partnership with CWS in managing cat-

related issues on the ground helped to promote responsible pet ownership and harmonious living with community cats.

Public education is indispensable in promoting animal welfare and responsible pet ownership. AVA conducts regular outreach activities such as free pet health checks, walkabouts and talks, to raise community awareness on animal-related matters and promote peaceful co-existence of humans and animals.

AVA's approach to collaborative efforts was strongly recognised at the Municipal Services Awards 2018. AVA received a total of 14 awards across community, team and individual categories. These awards are a testament to the strong support that AVA has received from various stakeholders over the years. One such award recognised AVA for working closely with Ai Tong School and Thomson Sin Ming Court Residents' Committee to educate residents on pigeon feeding. Primary 5 students designed recycled bags which carried messages on pigeon feeding. Together with the grassroots leaders, they reached out to about 500 residents to raise awareness on the issue. These efforts made a huge difference, with the number of feedback cases on pigeon feeding in the estate decreasing by 80% after the outreach.

This collaborative approach also applies to the management of wild animals including birds. AVA collaborated closely with NParks and the Town Council to explore ways to better manage myna issues at the Potong Pasir constituency. In December 2018, AVA in consultation with NParks, deployed roost nets to trap the mynas. This was conducted in tandem with NParks' habitat modifications efforts, which involved works such as the directional pruning of trees to disperse the birds to locations away from residential areas. In the longer term, we will study the types of trees and landscaping that are less conducive for birds to roost or forage.

To combat the illegal trade in ivory and other wildlife, AVA, the Immigration and Checkpoints Authority (ICA) and Singapore Customs have put in place a whole-of-government approach. In March 2018, AVA, ICA and Singapore Customs

seized more than 60 bags of elephant ivory tusks worth about US\$2.5million. The illegal shipment was detected as a result of Singapore's robust risk assessment framework.

In October 2018, AVA attended the London Conference on Illegal Wildlife Trade (IWT), which brought together in the United Kingdom leaders from over 80 countries, and many other key players. AVA delivered Singapore's position in support of the London Conference Declaration, which renewed global commitment to fight illegal trade in wildlife. The Declaration was adopted by participating countries, including Singapore.

### Staff Achievements

Over the years, AVA staff's commitment in achieving excellence in delivering our mission has been regularly recognised by numerous awards. These included the Singapore Quality Class, People Developer Standard, Singapore Innovation Class, Excellent Service Award, Leading HR Practices Awards and Human Resource Excellence Awards.

For FY 2018, I am happy to report that AVA had won one Star Manager and one Star Service Award at the Public Sector Transformation (PST) Awards. AVA won the Minister's Team Award for the management and coordination of storm recovery efforts for farms in Murai. This award recognises impactful and innovative team-based projects that contribute to the Ministry of National Development's (MND's) vision. We were also awarded the Ong Teng Cheong Labour Leadership (OTC) Institute's Workplace Partnership Award (Platinum), which



recognises the joint sustained effort to forge and strengthen understanding and cooperation between Management and the Union through training programmes organised by the OTC Institute.

### Preparing for the Future

On 1 April 2019, AVA will be reorganised into a new Statutory Board, the Singapore Food Agency (SFA) under the Ministry of the Environment and Water Resources (MEWR), with Animal and Veterinary Service (AVS) put under the National Parks Board (NParks). SFA will take over AVA's food-related functions, while AVS will take over all plant and animal matters that are unrelated to food.

With these changes, all food-related resources and capabilities across various agencies will now be consolidated in one organisation, thereby sharpening the focus on regulating food safety and ensuring food security, from farm to fork. Likewise, the transfer of AVS to NParks will reap synergies with NParks' current work in wildlife conservation and horticultural science, as NParks becomes the lead agency for animal and wildlife management, as well as animal and plant health. These changes should lead to greater effectiveness in the planning and execution of our food related and AVS functions.

### Concluding Remarks

It has been an honour and privilege to have served as AVA's Chairman for the past 3 years. For me, it's been a great learning experience, coming at the time when the world is grappling with the huge task of feeding an increasing global population that is also rapidly being urbanised, with a decreasing amount of resources. With more than 90% of our food being imported, we are not immune to these global challenges. On the flip side, the good news is that technology has advanced dramatically in recent years. Promising solutions are now available to solve the world's food problems, including ours. Sharpening AVA's efforts in dealing with these forces and enhancing our food security situation was rightfully one of the Board's early priorities.

I am glad there is now greater focus on the need to produce more of our food locally.

Over the last three years, I have had the good fortune of getting to know a good number of the industry leaders in the food cluster and animal welfare sector. They have been most generous in sharing with me their knowledge and their years of experience. Like other businesses, they have their share of challenges and they slog hard each day to overcome them. Many are most willing to try new approaches and solutions. They have an important role to play in transforming our food sector. I wish them well.

Keeping our food safe, ensuring our food supply and plant health, while inculcating responsible behaviour towards animals, round the clock, required a high level of commitment by AVA staff, past and present. They have constantly kept the systems ticking while seeking improvements from time to time. On behalf of the Board, I would like to recognise the great work put in by the many hundreds of AVA officers, in the field and in the office, who go the extra mile to give their best, day in, day out.

The AVA Board has played an indispensable role in the running of AVA. I would like to thank the Board members for their support, in particular for their selfless service and invaluable role in guiding and supporting the AVA management. The depth and breadth of collective experience of the AVA board members, put together by MND, has complemented the AVA Management and helped to improve the overall performance of AVA and ensure robust corporate governance.

Finally, on behalf of the Board, I would like to thank the CEO and the leadership team for the support given to the Board and the Board Committees. I wish them all the best in their new roles at SFA and at AVS under NParks.

**Lim Neo Chian**  
AVA Chairman

# Board of Directors



## 1 Mr Lim Neo Chian

### Chairman

- Vice President & Director, Home Nursing Foundation
- Director, Zhi\*Lim Pte Ltd
- Director, Innospring Development Pte Ltd
- Director, Supreme Wealth Development Sdn Bhd
- Director, Majulah Holdings Pte Ltd

## 2 Mr Lim Kok Thai

- CEO, Agri-Food & Veterinary Authority of Singapore
- Board Director, AgriFood Technologies Pte Ltd
- Board Member, Tropical Marine Science Institute Management Board

## 3 Mr Eugene Wong

- Founder & Managing Director, Sirius Venture Capital Pte Ltd
- Non-Executive Director, Sirius Angel Fund Pte Ltd
- Non-Executive Director, Sirius SME Growth Partners I Limited / British Virgin Islands
- Non-Executive Director, Jason Marine Limited
- Non-Executive Director, Sirius Investment Inc/ British Virgin Islands
- Non-Executive Chairman and Chairman of HRDC, CrimsonLogic Pte Ltd
- Non-Executive Director, Cargo Community Network Pte Ltd
- Non-Executive Director, Singapore Cruise Centre Pte Ltd
- Vice Chairman of the Exco of CNABG, SBF China and North Asia Business Group (CNABG)
- Non-Executive Chairman, Gets Global Pte Ltd
- Council Member, China-Singapore Business Council (CSBC)
- Member, Food Science and Technology Industry Advisory Panel (FST IAP)
- Non-Executive Vice Chairman, Japan Food Holdings Ltd
- Council Member, Malaysia-Singapore Business Council (MSBC)
- Management Committee - Captain of Power, SAF Yacht Club
- Non-Executive Director, Hargol Foodtech Ltd
- Member, Advisory Board, Han Culture & Education Group
- Member, ASEAN- India Business Council (AIBC)
- Board Member, Enterprise Singapore
- Council Member, Andhra Pradesh Singapore Business Council (APSBC)
- Committee Member, SAFTI-MI Alumni Association
- Council Member, Singapore Business Federation
- Non-Executive Director, Agfunder Asia Pte Ltd
- Non-Executive Director, Dining Collective Pte Ltd

## 4 Mr Dileep Nair

- Director, Keppel Data Centre Reit Management Ltd
- Director, Singapore Reinsurance Corporation Ltd
- Director, Thakral Corporation Ltd
- Board Member, Health Sciences Authority of Singapore

## 5 RADM (Dr) Tang Kong Choong

- Chief of Medical Corps, Singapore Armed Forces

## 6 Ms Chua Mui Hoong

- Board Member, Consumer Protection Resource Panel under the Competition and Consumer Commission of Singapore
- Opinion Editor, The Straits Times, Singapore Press Holdings

## 7 Mr Lau Teck Sien

- Partner & Chief Investment Officer, HOPU Investment
- Independent Director, BHG Retail Trust Management Pte Ltd
- Director, AgriFood Technologies Pte Ltd

## 8 Ms Harasha Bafana

- Board Member, Creative Malay Arts & Culture
- Founder & Director, Adam & Hawa Network
- Director, Nanyang Academy of Fine Arts

## 9 Dr Ho Kim Wai

- Associate Professor, Nanyang Technological University
- Director, Ascendas Hospitality Fund Management Pte Ltd
- Director, Ascendas Hospitality Trust Management Pte Ltd

## 10 Mr Jim Lim

- Director, DoDuco Singapore Holdings Pte Ltd
- Director, Sojitz Automotive Investment Pte Ltd
- Director, JIMLIM IP Pte Ltd
- Director, JL Capital Pte Ltd
- Director, MyHealth Sentinel Pte Ltd
- HOD/Partner, KhattarWong LLP

## 11 Ms Toh Hwee Tin

- Executive Secretary, Attractions, Resorts & Entertainment Union (AREU)
- Director, Woman and Family Unit (WAF)
- Supervising Lead, Hospitality & Consumer Business Cluster
- Executive Secretary, Food, Drinks and Allied Workers' Union (FDAWU)
- Board Member, Board of Advisors of the Institute of Service Excellence at SMU (ISE)

## 12 Mr Low Xin Wei

- Director, Digital Workplace Programme Office and 2nd Director, Human Resources Management Information and Systems, SPR

# Leadership Team



- 1 **Mr Lim Kok Thai**  
Chief Executive Officer (CEO)
- 2 **Dr Yap Him Hoo**  
Director-General for Agri-Food & Veterinary Services  
Deputy CEO, Regulatory Programmes & Operations
- 3 **Dr Tan Lee Kim**  
Deputy CEO, Corporate & Technology
- 4 **Dr Chew Siang Thai**  
Managing Director, Special Project
- 5 **Dr Chang Siow Foong**  
Group Director, Agri Establishment Regulation Group
- 6 **Ms Jessica Kwok Swee Cheng**  
Group Director, Animal Management Group
- 7 **Dr Choo Li Nah**  
Group Director, Communications & Corporate Relations Group
- 8 **Ms Kho Soo Pei**  
Group Director, Corporate Resource Management Group
- 9 **Mr Leslie Phua Teck Heng**  
Group Director, Food Establishment Regulation Group
- 10 **Mr Melvin Chow Wing Chung**  
Group Director, Food Supply Resilience Group
- 11 **Ms Cheong Lai Peng**  
Group Director, Industry Development & Partnership Group
- 12 **Mr Tan York Chor**  
Group Director, International Relations
- 13 **Dr Paul Chiew King Tiong**  
Group Director, Laboratories Group
- 14 **Mr Foo Siang Ming**  
Group Director, Planning and Organisation Excellence Group
- 15 **Dr Chua Tze Hoong**  
Group Director, Quarantine & Inspection Group
- 16 **Ms Melin Lim**  
Group Director, Research Planning & Systems Integration Group
- 17 **Dr Astrid Yeo Poh Kim**  
Group Director, Regulatory Administration Group
- 18 **Dr Leong Hon Keong**  
Group Director, Technology & Industry Development Group
- 19 **Mrs Tan-Low Lai Kim**  
Group Director, Special Duties, Food Supply Resilience Group

# Organisational Chart

**Chief Executive**

**Officer (CEO)**

**Corporate & Technology**

**Regulatory Programmes & Operations**

**Special Project**

**Internal Audit**

**Communications & Corporate Relations Group**

- Media relations
- Corporate publications
- Community outreach
  - Food safety and supply
  - Responsible pet ownership
- Customer relations

**Corporate Resource Management Group**

- Financial management and procurement
- Human resource management
- Information communication technology management
- Corporate administration and facilities management
- Legal services

**Food Supply Resilience Group**

- Food supply resilience
  - Food supply policy and planning
  - Agricultural land planning, development, and sales
  - Source diversification
  - Monitoring and contingency planning
  - Incentives and resource development for food security
- Fisheries and port management

**Industry Development & Partnership**

- Industry engagement
- Industry development
- Standards development and promotion

**Planning & Organisational Excellence Group**

- Horizon scanning
- Strategic planning
- Strategic futures
- Emergency planning
- Organisational excellence
- Board secretariat

**Research Planning & Systems Integration Group**

- R&D programmes
- Agri-technology development
- Corporate-wide digitalisation

**Technology & Industry Development Group**

- Technology development, promotion, and transfer
  - Horticulture
  - Aquaculture
  - Post-harvest
- R&D planning
- Industry development
- Technical assistance and services

**Agri Establishment Regulation Group**

- Regulation of local farms
- Regulation of animal and plant establishments and feed mills
- Regulation of veterinary services and standards

**Animal Management Group**

- Animal welfare and management
- First Responder on animal-related issues
- Licensing of pet animal establishments
- Licensing of dogs
- Investigation and enforcement
- Stakeholder engagement and outreach

**Food Establishment Regulation Group**

- Regulation of local food establishments
  - Food factories
  - Slaughterhouses
- Grading of food factories
- Technical assistance and services
- Export facilitation

**International Relations**

- Oversight and management of AVA's international and external relations

**Laboratories Group**

- Testing, diagnostic services, and scientific expertise
  - Food safety
  - Animal health
  - Plant health
- R&D of new test methodology
- Export certification testing

**Quarantine & Inspection Group**

- Import control
  - Food
  - Animals
  - Plants
- Quarantine services
- Export facilitation

**Regulatory Administration Group**

- Policy, legislation, and programme review
- Risk assessment
  - Food safety
  - Animal health
  - Plant health
- Food source accreditation
- Investigation and prosecution

- Establishment of a dedicated institute to drive capability building
  - Food safety
  - Animal health
  - Plant health
  - Animal welfare
  - Animal management
  - Agriculture

- Independent and objective review of AVA's operations
- Evaluate and improve the effectiveness of risk management, control and governance processes

# Corporate Governance

The AVA Board and Leadership Team have put in place a framework for adherence to good corporate governance practices.

The AVA Act governs the work of AVA and its Board. Board members hail from a broad range of fields from both the public and private sectors, providing a spectrum of expertise and depth of experience to the Board.

## Internal control framework

AVA has in place an organisation-wide system of internal controls, which includes:

- An organisation structure with clear definitions of responsibility and reporting mechanisms at different levels of the organisation;
- Documented policies and procedures, proper segregation of duties, approval procedures and authorisations, and checks and balances built into AVA's processes;
- Systems to safeguard assets, maintenance of proper accounting records, reliability of financial information, compliance with appropriate legislation, regulations and best practice;
- Financial Regulations that set out financial policies, procedures, and financial authority on the various operations in AVA;
- A Code of Conduct that lays out the values and key principles governing the conduct of officers, and provides guidance as they carry out their daily work;
- An internal disclosure policy that allows officers to report wrongful practices; and
- Independent internal audit function and external audit functions.

These internal control systems are designed to manage risks rather than to eliminate the risk of failure, and provide only reasonable, and not absolute, assurance against fraud, material misstatement or loss.

## Internal and external audit functions

The Internal Audit Unit operates independently from other Groups in AVA, and reports to the AVA Board's Audit and Risk Committee. The Unit provides consulting advice and performs assurance reviews of the functions of AVA and its subsidiary independently and objectively in order to assist the organisation in the continuous improvement of its internal control systems and governance processes, and to comply with required government, financial and statutory regulations. It communicates the audit results to AVA's Management, and provides analysis and recommendations on areas for improvement, and monitors the follow-up actions.

AVA's accounts are audited by the Auditor-General's Office of Singapore or such other auditor that may be appointed by the Minister for National Development in consultation with the Auditor-General. The external auditor engaged for the financial year, which ended on 31 March 2019, was BDO LLP. The external auditor reports its audit findings and recommendations to AVA Board's Audit and Risk Committee. AVA's Board approves the accounts and forwards the audited statements to the Ministry of National Development and Auditor-General's Office.

## Board committees

As part of corporate governance, Board Committees comprising Board members are formed to review financial matters such as changes in accounting practices, financial regulations, and procedures. It also reviews and endorses audit plans and reports, control improvements, risk management frameworks, and policies.



# Food Supply Resilience

## GOAL:

We ensure that Singapore will always enjoy a steady supply of safe food, by diversifying the nation's food sources and boosting local production. Our "30 by 30" vision: to produce 30% of Singapore's nutritional needs by 2030.

## WE HAVE...

- Expanded food import network with new approved sources of poultry, pork, egg, beef, and their products, as well as live oysters, from countries such as Poland, Russia, Ukraine, Mexico, and Japan.
- Opened up alternate vacant spaces for hi-tech urban farming and food production, such as on the grounds of the former Henderson Secondary School, on the rooftop of HDB multi-storey carparks, and in the Agri-Food Innovation Park cluster.
- Developed a pool of local agri-technologists through the 'SkillsFuture Earn and Learn Programme', which leads to a part-time Diploma in Applied Science in Urban Agricultural Technology.
- Created a vibrant agri-food ecosystem that supports R&D, with the signing of memoranda of understanding to establish Singapore's first urban agriculture research facility in a junior college, and to formalise the intention to establish a Centre of Innovation in Aquaculture.
- Educated and encouraged the public to choose local produce, through outreach events such as the SG Farmers' Market series.

## NOTES:

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## OUR MOMENTS AT WORK: PAST & PRESENT

### In 2008

AVA rolled out a "Eat Well for Less, Choose Frozen Meat" public education programme to increase consumer awareness of frozen meat as a cheaper alternative to chilled meat.



### This FY

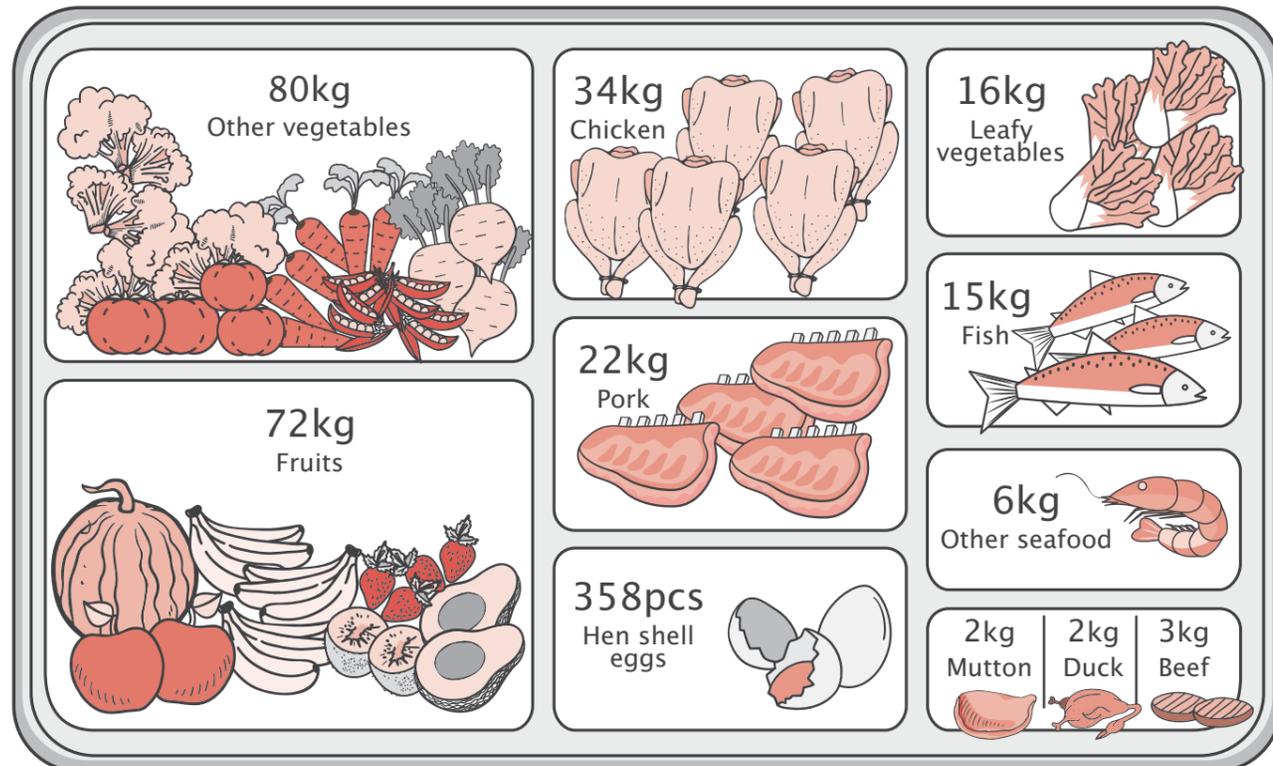
Besides educating the public on alternative food options, AVA also encourages consumers to choose local produce. We continued to collaborate with the Singapore Agro-Food Enterprises Federation to organise farmers' market events around Singapore.

# Food Supply Resilience

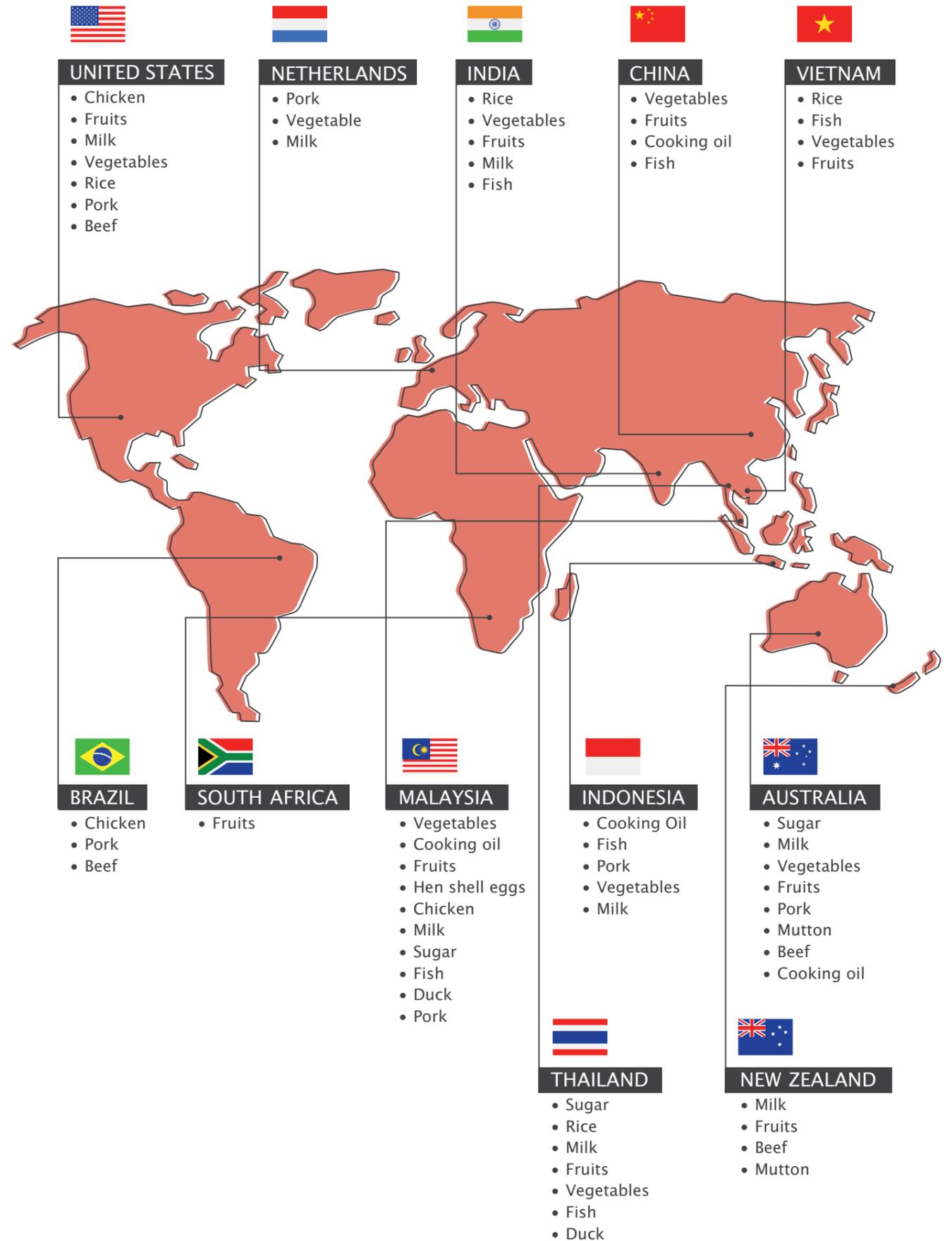
Singapore enjoys a wide variety and steady supply of food. To mitigate potential food shortages, each type of food is sourced from diversified sources and we consistently seek new sources to import from. Concurrently, we support local farming industry in improving productivity and nurturing talent. Our efforts also include working with our partners in building a vibrant agri-food ecosystem, as well as educating the public on the importance of supporting home-grown produce.

## Food Supply in Singapore

### Per capita consumption



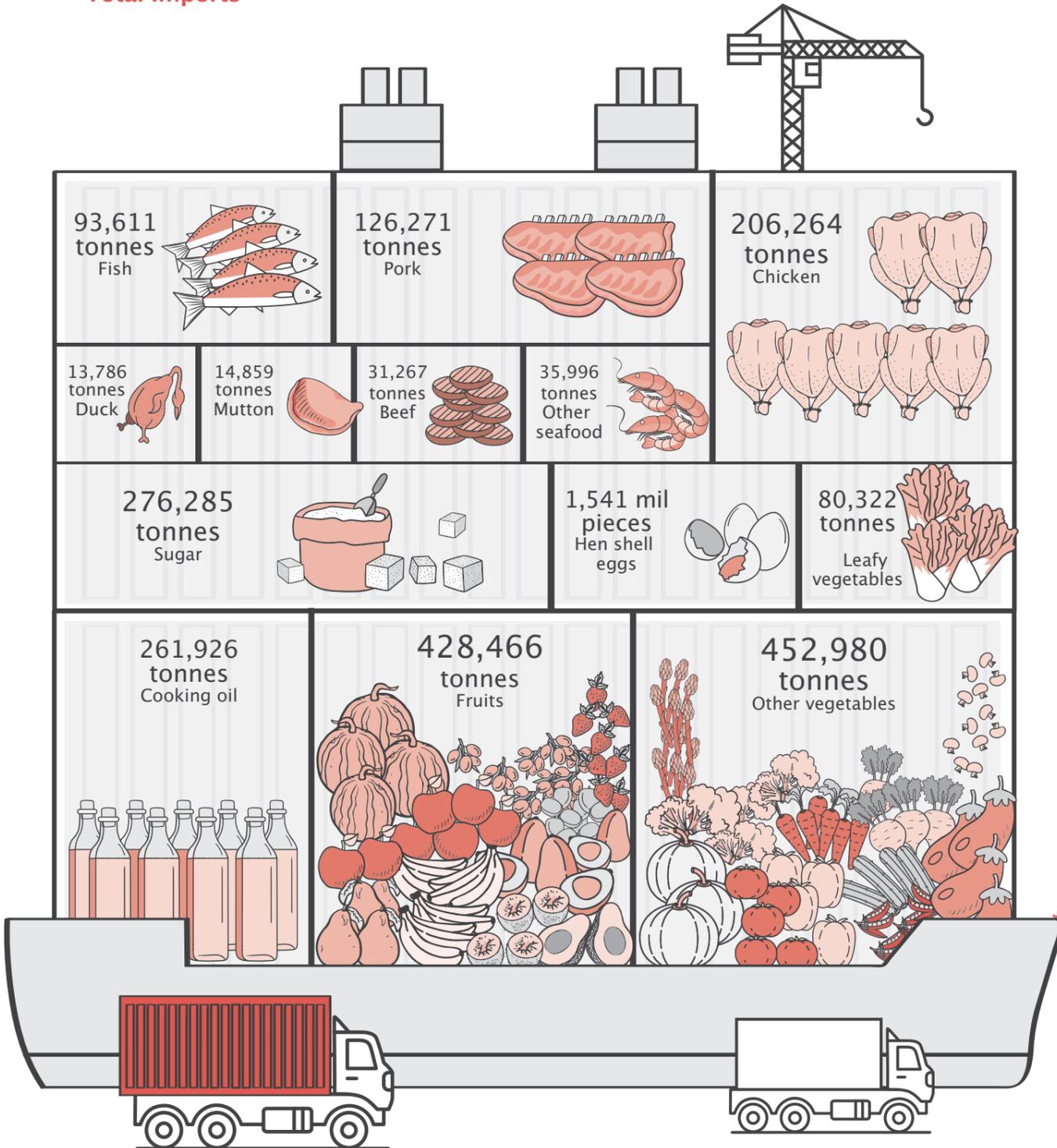
### Major sources of supply of key food items (FY 2018)



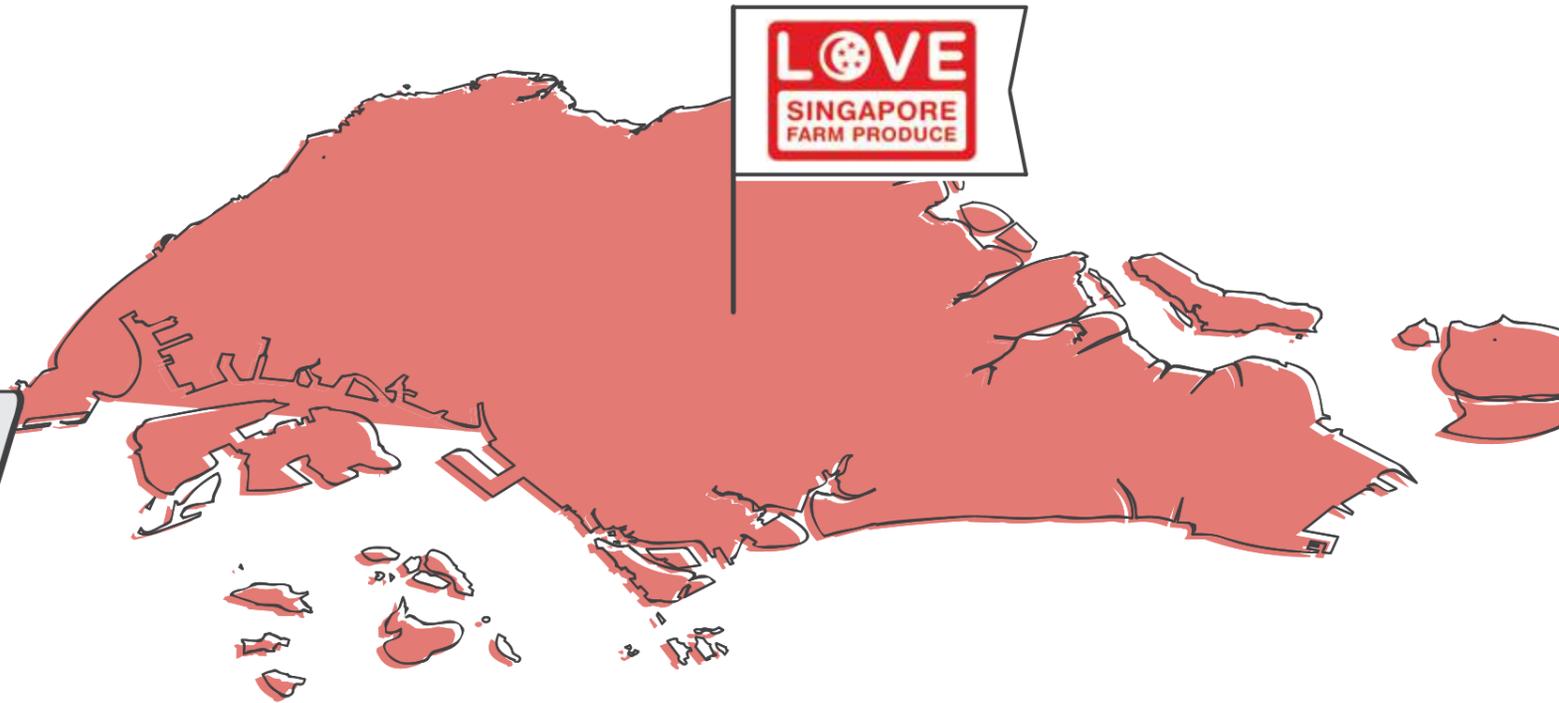
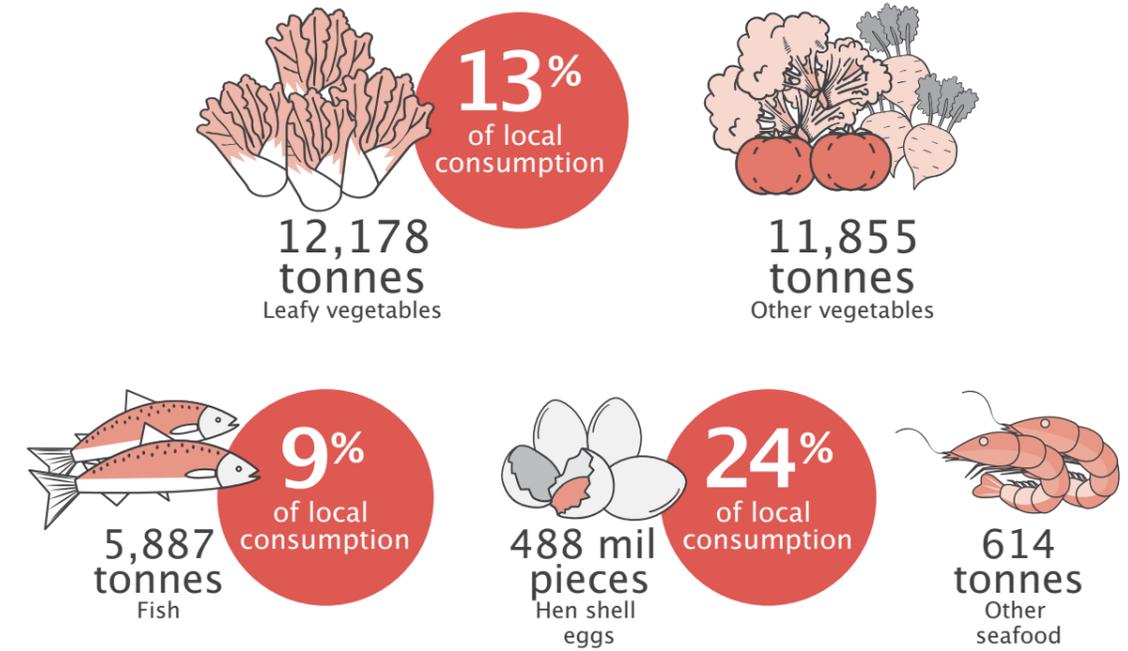
# Singapore imports more than 90% of our food

# The remaining are from local farms and landing

## Total Imports



## Local farm production of key food items



## Diversifying Sources of Import

As Singapore imports more than 90 percent of our food, AVA is constantly exploring new sources to reduce our vulnerability to potential supply disruptions.

In FY 2018, we approved new sources of poultry, pork, egg, beef, and their products, as well as live oysters, from countries such as Poland, Russia, Ukraine, Mexico, and Japan. Trips to countries such as Ukraine, Spain, Japan, Thailand, Brunei, and the Philippines were made to inspect their national regulatory systems and processing establishments, in efforts to assess their suitability as new sources of meat and eggs for Singapore.

In addition, during the FY, AVA took part in organising sourcing trips to India and Vietnam, where Singapore traders networked with potential exporters of seafood, fruits, and vegetables. Business-matching sessions were also organised for our importers to explore trading opportunities with an egg farm from Thailand, a poultry provider from Ukraine, and a fruit and vegetable wholesaler from Vietnam. Government and industry delegations from Indonesia and Mexico were hosted to a visit to the Pasir Panjang Wholesale Centre, where business-matching and networking sessions were conducted.

### Facilitating imports

AVA manages the Jurong Fishery Port (JFP) and Senoko Fishery Port (SFP), the wholesale and distribution centres for both locally produced and imported fish and seafood of all forms (live, chilled, and frozen) in Singapore. During the FY, Singapore's top five fish sources were Indonesia, Vietnam, Malaysia, Norway, and Thailand.

### Vessel calls and fish volumes handled by JFP & SFP (FY 2018)

	Vessel calls	Fish volumes	Sources
JFP	3,022	42,924 tonnes	Local fish farms, imports
SFP	1,129	5,749 tonnes	Local fishing vessels, local fish farms, imports

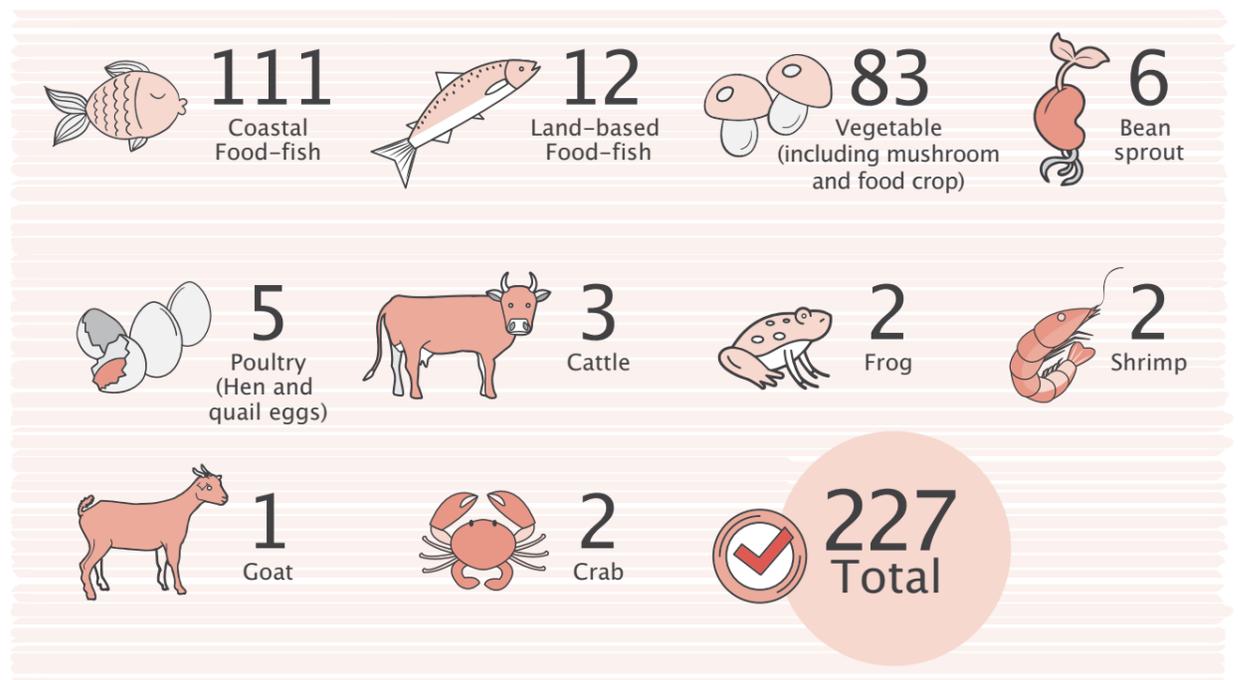
AVA also manages the Pasir Panjang Wholesale Centre, the main wholesale and distribution centre for locally produced and imported fruits and vegetables in Singapore. During the FY, Singapore's top five sources of fruits were Malaysia, China, South Africa, Philippines, and Australia, while our top five sources of vegetables were Malaysia, China, India, Australia, and Singapore.



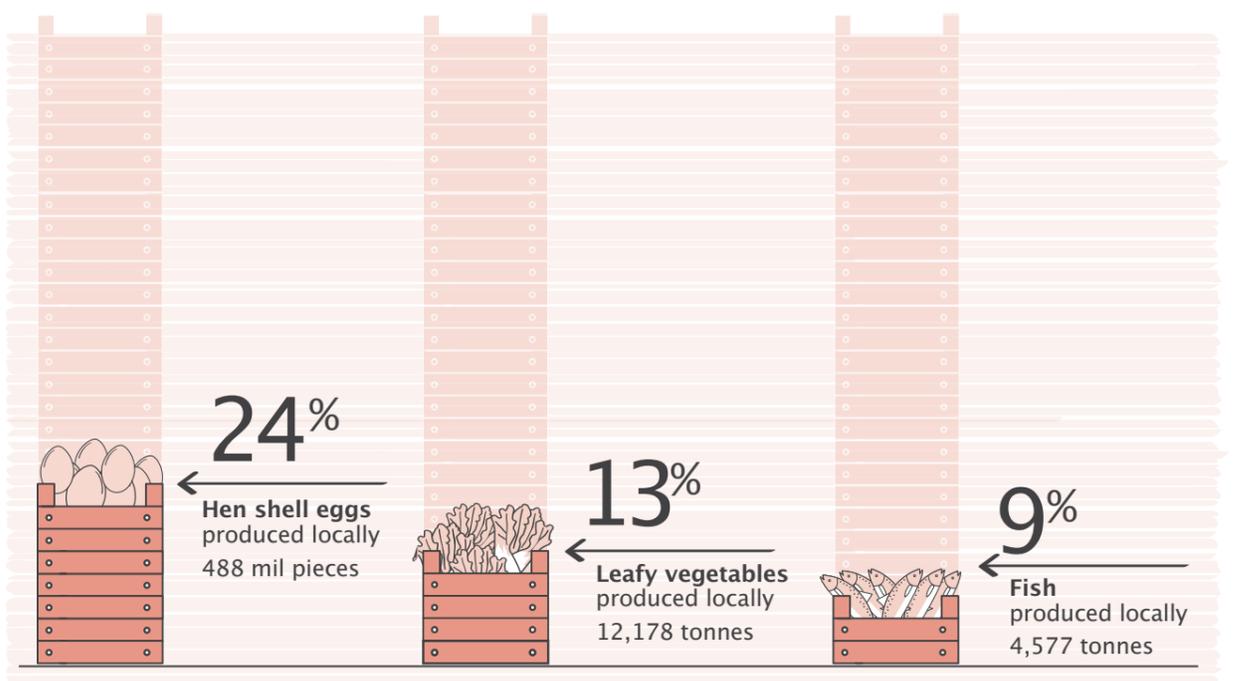
## Boosting Local Production

A measure of self-sufficiency in key food items can help to buffer against possible disruptions of supply overseas. However, land-scarce Singapore produces limited amounts of food for local consumption. Singapore needs to transform our agri-food industry into one that is highly productive and employs climate-resilient and sustainable technologies.

### Licensed food farms in Singapore (FY 2018)



### Local production of hen shell eggs, leafy vegetables, and food-fish (CY 2018)



## Achieving “30 by 30”

In February 2019, the government announced plans to boost local production and achieve the “30 by 30” vision to produce 30% of Singapore’s nutritional needs by 2030. This translates into 30% of local food production comprising 20% vegetables and fruits and 10% proteins. To achieve this vision, in FY 2018, AVA continued to:

- Release new farmland to tenderers who propose the best concepts to raise production in a sustainable and intensive manner.
- Unlock more farm spaces to grow food locally and explore alternative spaces for food production.
- Leverage technology to grow more with less and farm sustainably.
- Develop a pipeline of local agricultural talents.
- Encourage consumers to choose local produce.

In line with this target, \$144 million from the Research, Innovation and Enterprise 2020 plan was allocated to support R&D in sustainable urban food production, future foods, and food safety science and innovation.

## Releasing new land plots for sustainable and intensive farming

In FY 2018, AVA continued to tender out new agriculture land on 20-year leases. To familiarise bidders with the tender process, an advisory session was conducted in July 2018. Successful bidders submitted proposals that incorporated productive and innovative farming systems, such as a recirculating aquaculture system for shrimp farming with automatic loaders and feeders, as well as sensors to monitor water quality, and a climate controlled greenhouse with automatic conveyer belts for growing ornamental aquatic plants.

### Farmlands tendered out in FY 2018

Type of farming activity	Agriculture food and non-food	Vegetables and quail egg
<b>Tender launch and closing dates</b>	14 June 2018 23 August 2018	26 June 2018 4 September 2018
<b>Tender Method</b>	<b>Concept &amp; Price</b> <b>Stage 1:</b> Concept assessment based on production capability, production track record, relevant experience, and qualification, as well as innovation and sustainability. <b>Stage 2:</b> Price evaluation	<b>Fixed Price</b> Price set upfront and bidders compete solely on concept.
<b>No. of plots tendered</b>	5 in Sungei Tengah	7 in Lim Chu Kang
<b>No. of plots awarded</b>	3, comprising: <ul style="list-style-type: none"> <li>• 1 plot of agriculture (food) farmland to 1 company</li> <li>• 2 plots of agriculture (non-food) farmland to 2 companies</li> </ul>	7, comprising: <ul style="list-style-type: none"> <li>• 5 plots of vegetable farmland to 3 companies</li> <li>• 2 plots of quail egg farmland to 2 companies</li> </ul>

## Unlocking more farm spaces and alternative spaces for food production

In FY 2018, AVA conducted a study to determine the amount of fish that can be farmed in Singapore’s northern aquaculture zones at a sustainable level, and to better understand the ecological and environmental characteristics of the Straits of Johor. The study highlighted key issues affecting farming conditions and recommended various governance and management measures to improve the farming environment. Based on the study, there is potential to transform the coastal fish farming industry into one that is more sustainable in the longer term. At the same time, AVA continued to work with various agencies to identify suitable deep-sea spaces to increase local production of food-fish.

To promote the use of alternate vacant spaces for urban farming, the former Henderson Secondary School would be repurposed to pilot Singapore’s first integrated development comprising an urban farm; a childcare centre; and a nursing home cum dialysis centre. This is a collaborative effort of the Early Childhood Development Agency, the Ministry of Health (MOH), and AVA to integrate three facilities within a single site to cater to the needs of the community living there. The tender for this site closed on 8 January 2019.

In addition, AVA worked with the Housing Development Board (HDB) to pilot a commercial urban farm on a HDB multi-storey carpark rooftop in Ang Mo Kio. This pilot will test the feasibility of commercial-scale urban food production in the heartlands. The farm is run by Citiponics and hires local residents. The first batch of leafy greens, grown using vertical systems, will be ready for harvest by April 2019.



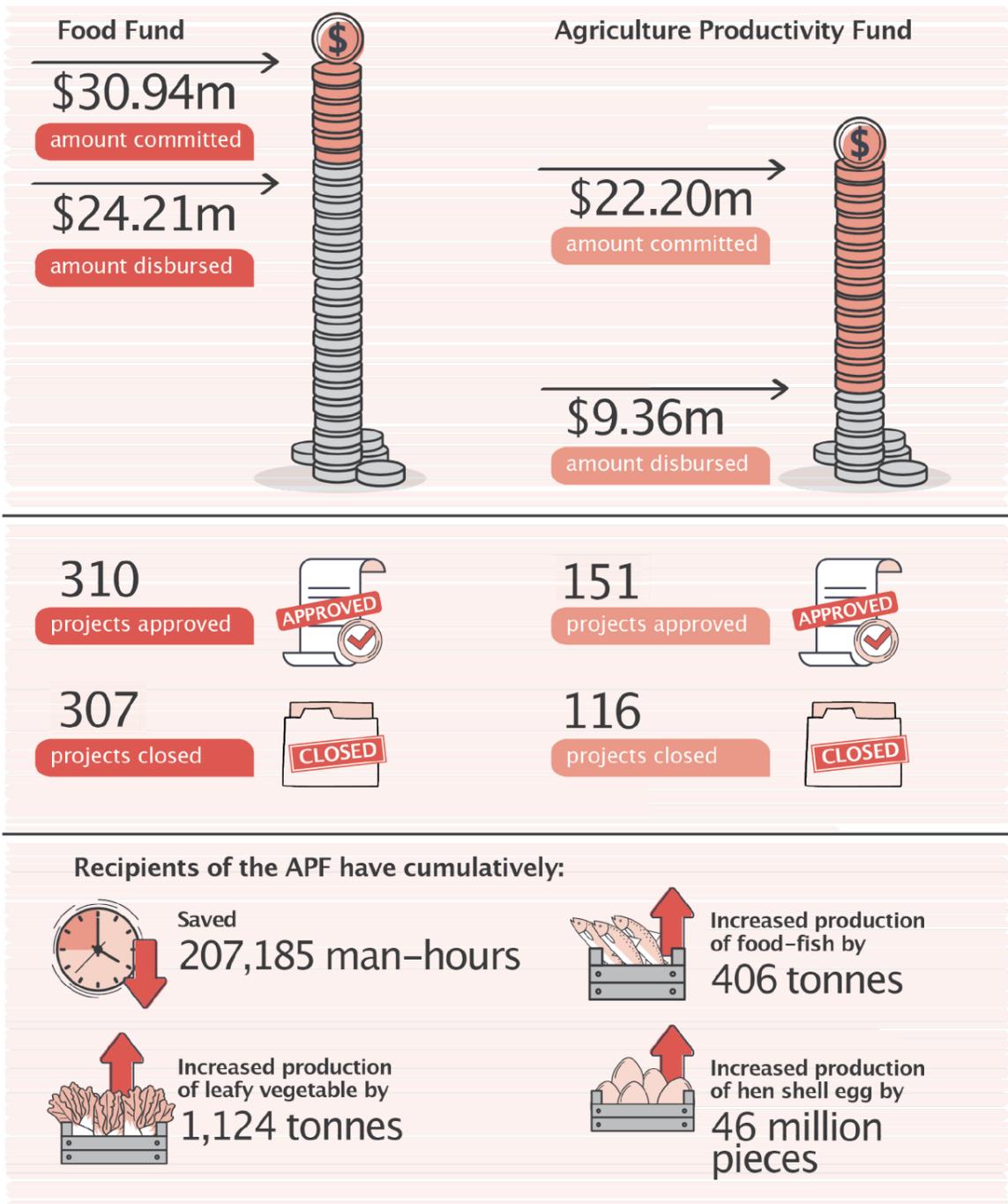
To catalyse innovation in the whole ecosystem of farming and agricultural technology, a pilot 18-hectare Agri-Food Innovation Park (AFIP) cluster will be set up within the Greater Sungei Kadut area, forming part of a larger Northern Agri-tech and Food Corridor with food-related industries. This initiative will bring together hi-tech urban indoor agriculture and aquaculture, as well as associated R&D activities. The first phase of the AFIP will be ready from the second quarter of 2021, with potential for future expansion.

### Leveraging technology to grow more with less and farm sustainably

AVA helps local farms and food companies adopt technology through funding assistance and technology transfer. We undertake R&D on new and hi-tech agricultural methods and share the findings with the industry. In doing so, we continue to build Singapore's reputation as a living technological laboratory for urban food production.

#### Food Fund & Agriculture Productivity Fund in review (FY 2018)

The Agriculture Productivity Fund (APF), which replaced the Food Fund in October 2014, supports local farms in their capability development and drive towards higher productivity.



#### Developing intensive indoor hatchery technology

AVA transferred its expertise in fish breeding and hatchery technology to local farms, and successfully helped them to breed the Silver Perch (*Bidyanus bidyanus*) and Empurau (*Tor tambroides*) in FY 2018. Silver Perch, a freshwater food-fish native to Australia, is hardy, has a high survival rate and grows rapidly. Empurau is a high-value freshwater fish indigenous to Sarawak, Malaysia. We also developed the respective culture protocol for fry production. Now, these farmers can now produce the fry locally and reduce their reliance on imported fry.

In FY 2018, AVA expanded its research in fish breeding and development of intensive indoor hatchery technology to cover other popular food-fish species such as the Red Snapper. Currently, these fishes are being conditioned at AVA's MAC through quality broodstock diets and are cultured under a controlled environment as future breeding stock. Fry production protocols and broodstock are concurrently being developed for transfer to the industry.

AVA is also working with James Cook University Singapore to develop an intensive indoor hatchery protocol for the consistent production of high-quality Red Snapper fingerlings under optimised culture parameters. Red Snapper, a commonly farmed species in Singapore and the region, is mostly produced using extensive outdoor ponds. The larvae are highly sensitive to environmental changes and have higher nutritional needs. The fry production protocols were being developed for transfer to the industry.

#### Growing vegetables with biochar

AVA and the National University of Singapore (NUS) embarked on trials to use biochar for vegetable farming. A by-product of the food or agricultural waste recycling process, biochar is a charcoal-like substance that locks carbon into the soil, thereby reducing carbon dioxide emissions into the atmosphere. As it also has properties to retain water and nutrients, biochar can be added to soil to improve its quality for farming. Preliminary studies have shown that biochar can improve vegetable yields.



#### Studying effects of climate change on local farms

Climate change and its effects have a major impact on global agriculture and food production. To help local food farmers better manage climate risks, AVA commissioned a study in FY 2018 to examine the effects of climate change on local farms. When completed in 2020, the study will provide insights to help guide us in our short- and long-term climate adaptation measures for local food production, such as R&D on climate-resilient farming systems and methods.

## Building A Vibrant Agri-Food Ecosystem

AVA regularly engages with key industry stakeholders to keep them updated of our policies and initiatives, enhance their capabilities, and exchange ideas. Our knowledge and technical expertise are also shared with the local and international food community in the spirit of learning, collaboration, and building a vibrant agri-food ecosystem.

### Engaging with the industry



In August 2018, AVA and Singapore Agro-Food Enterprises Federation (SAFEF) co-organised a session for Senior Minister of State for Trade & Industry Dr Koh Poh Koon and Senior Parliamentary Secretary for Home Affairs & National Development Ms Sun Xueling to engage with local farmers. In October and November 2018, a series of dialogue sessions were conducted, where AVA CEO Mr Lim Kok Thai spoke to key food industry associations on the formation of SFA.

In an engagement session with members from 37 coastal fish farms in December 2018, AVA shared with them updates on our latest water monitoring efforts, the upcoming high-risk period for Harmful Algae Bloom, and the improvements required for farm safety and security. Members from SAFEF also attended the session and engaged with these farmers.

### Imparting technical knowledge to the industry

AVA's Post-Harvest Technology Centre (PHTC) provides applied research and extension services to help the agri-food industry optimise post-harvest processes and improve the efficiency of their food supply chains. We collaborate with stakeholders to reduce fresh produce waste from farm to fork and develop value-added products.

In FY 2018, following in-house trials and stakeholder consultation, guidelines on handling live and chilled seafood were developed to address gaps in the local seafood supply chain and to ensure the quality of fresh seafood in Singapore.

AVA, the Norwegian Seafood Council, and Hai Sia Pte Ltd co-organised a seminar cum workshop, covering topics such as creating value in seafood through quality assurance and technology, methods to maximise the yield of commonly sold fish, and seafood market trends. Demonstrations on the handling and preparation of fishes were also conducted.



AVA collaborated with Nanyang Polytechnic (NYP) to testbed the efficacy of an advanced non-chemical sanitising technology for Ready-to-Eat and Ready-to-Cook vegetables. This technology generates fine bubbles that penetrate the crevices of lettuce to reduce microbial load. A local urban farm participated in the trials, with the aim to eliminate chemical sanitisers such as chlorine in the processing of fresh vegetables. Trials revealed that further alterations of treatment time and effective gas are needed.

In May 2018, PHTC conducted a training session for staff from an online grocery retailer to learn about good agricultural practices, post-harvest handling practices, as well as the optimal quality indices and technologies that improve the quality of fresh produce. Tips on how to conduct quality analysis on fruits and vegetables were also provided.

### Showcasing and learning about agri-food technology

AVA participated in the World Cities Summit in July 2018, and showcased a booth themed 'Ensuring Resilient Supply of Food and Energy', where technology and innovation, such as the use of robotics and energy-efficient solutions, were highlighted. Local farms Netatech and Agriculture Total Solution were also invited to demonstrate the automated process of weighing and packing leafy vegetables and the use of energy-efficient LED grow lights for sustainable indoor farming. In addition, AVA hosted a forum where experts in agri-tech innovation and cluster development provided insights into building and growing a thriving urban food ecosystem.

AVA, together with the Enterprise Singapore (ESG) and Intellectual Property Intermediary, jointly curated the 'Urban AgriTech' pavilion at the TechInnovation 2018 exhibition in September to showcase urban agriculture technologies and collaboration partners. Alongside this pavilion, AVA and ESG co-hosted a conference featuring the latest trends, developments, and opportunities in the urban agri-tech sector.

In November 2018, AVA delivered a presentation on 'Opportunities for Robotics & Automation in Agriculture' at the Singapore International Robo Expo, to raise awareness of the challenges and needs of our agriculture sector, as well as to foster partnerships with the private sector and academia.

## Developing a pipeline of local agricultural talents

In FY 2018, AVA collaborated with Republic Polytechnic (RP) and SAFEF to develop a 'SkillsFuture Earn and Learn Programme' (ELP) that leads to a part-time Diploma in Applied Science in Urban Agricultural Technology. This was the second ELP programme that AVA has jointly developed with Institutes of Higher Learning (IHL) to equip Institute of Technical Education (ITE) graduates with relevant knowledge and skill sets to start their careers in the farming industry. Additionally, AVA provided training for two interns from RP and Temasek Polytechnic (TP) to groom talents for the aquaculture industry.

AVA's Marine Aquaculture Centre (MAC), in collaboration with James Cook University Singapore, hosted undergraduates of the Bachelor of Business and Environmental Science (Aquaculture) programme to two practical training sessions on live feeds preparation as well as broodstock stripping and spawning procedures at its premises.

To further expose students to agri-tech at an early stage and inspire them to become a new generation of agri-specialists, AVA signed a memorandum of understanding (MOU) with a local food technology start-up company, Life3 Biotech, and National Junior College to jointly establish Project Cube/Roots. As a five-year project, Project Cube/Roots will be Singapore's first urban agriculture research facility in a junior college. It will conduct R&D on agri-tech solutions for the production of healthy food products.

In addition, in partnership with a children's amusement centre – 'Kidzania', an educational indoor vegetable farm was set up within its theme park to expose the young to farming technologies and help them develop an interest in urban farming as a possible career.

## Working with Institutes of Higher Learning (IHL)

AVA, James Cook University Singapore, Nanyang Technological University (NTU), NUS, RP, TP, Ngee Ann Polytechnic, and A\*STAR signed an MOU to formalise the intention to establish a Centre of Innovation in Aquaculture. The Centre will provide a platform for IHLs, government agencies, and research institutes to share expertise and facilities with each other, as well as solve industry challenges together. The signing of the MOU was witnessed by the Minister of State for National Development & Manpower Mr Zaqa Mohamad on 3 October 2018 at the AquaSG 2018 Conference.



At the World Cities Summit, AVA CEO Mr Lim Kok Thai also witnessed the signing of an MOU between VertiVegies and the NUS Environment Research Institute (NERI) to collaborate on indoor farming research. This initiative would pave the way for VertiVegies to tap into the technical expertise of NERI to improve farm productivity and sustainability.

In July 2018, AVA's PHTC hosted students and professors from the Hokkaido University, as part of the annual student exchange programme between NUS and Hokkaido University. Participants learned about the supply chain of seafood in Singapore and shared their knowledge of the seafood supply chain in Japan, Nigeria, and Cape Verde. In August and October 2018, lecturers from Indonesia's Ministry of Research, Technology and Higher Education visited AVA's PHTC as part of NYP's 'Train-the-Trainer' programme. They learned about the mechanisms of agricultural and food technology transfer, as well as AVA's research capabilities in the cold chain management of vegetables, particularly during the pre-cooling stage.

## Promoting international and regional collaboration

On 15–17 October 2018, AVA and International Rice Research Institute co-organised the 5th International Rice Congress to spur innovation in rice farming and forge new partnerships. A conference session on 'Rice for the Future: A Singapore Perspective' was jointly organised by AVA, A\*STAR, and ESG, where experts from NTU, NUS, TLL, Science Centre Singapore, and private companies presented their insights into research and innovation in rice. In addition, delegates visited AVA's Veterinary Public Health Centre and the NERI to learn about the research laboratories and capabilities available, and to explore opportunities for collaboration.

AVA, as a collaborating centre of the Southeast Asian Fisheries Development Centre (SEAFDEC), promotes the post-harvest technology development of fisheries in the region, by implementing activities under SEAFDEC's Marine Fisheries Research Department (MFRD) programmes. In collaboration with University of Malaya's Institute of Ocean & Earth Science, MFRD organised the 'Regional Training Course on Culturing for Harmful Algae Blooms (HAB) Species and Toxin Characterisation' in July 2018, with a focus on culturing HAB species cells for identification and enumeration using microscopy and molecular methods. On 18–19 April 2019, Singapore hosted the final meeting for the 'Cold Chain Management for Seafood' project under MFRD. The meeting saw the finalisation of the ASEAN Regional Guidelines on the Cold Chain Management of Fish and Fishery Products.



## Educating the Public on Local Produce and Frozen Meat

In FY 2018, AVA remained steadfast in reaching out to consumers, encouraging them to choose local produce and support our farmers. We also continued to raise public awareness of frozen meat as an alternative to chilled meat. Our outreach efforts included public events, joint promotions, industry collaborations, and media advertisements.

### Reaching out to consumers

Through the SG Farmers' Market series, AVA and SAFEF continued to create a lively setting for consumers to meet local farmers and buy local produce. During the FY, such events were held at Hillion Mall, myVillage mall, and Cairnhill Community Club, reaching out to about 24,000 consumers. Media publicity via television, radio, online, and social media was rolled out to promote the series and local produce.

Three other market events at the Goodman Green Green Market, Yio Chu Kang Community Day, and inaugural Car-free Weekend were also organised in collaboration with SAFEF and various public agencies. In addition, we participated in two market events organised by the Kranji Countryside Association to educate the public on local produce.



Local farmers and their produce were also showcased at food exhibitions. Eight farmers were represented for the first time at the Food & Hotel Asia 2018, in a space secured by AVA and SAFEF. At the Singapore Food Expo and Asia Pacific Food Expo, AVA continued to raise awareness of locally farmed produce and frozen meat, through cooking demonstrations, food tastings, educational materials, and quizzes.

To encourage consumers to choose local produce when shopping for groceries, AVA collaborated with NTUC FairPrice to organise quarterly promotions, put up in-store branding, and take up newspaper advertisements that highlighted the freshness and quality of local produce. We also worked with Dairy Farm Group to debut a local produce fair at four Giant hypermarket outlets.

In addition, AVA reached out to the public through our participation in events such as the Singapore Heart Foundation's Healthy Mummy, Healthy Family Symposium 2018; Suntec Singapore's Sprout 2018; and Choa Chu Kang Community Centre's Big Farm Walk 2018.

### Learning journeys

In FY 2018, AVA brought educators from the Ministry of Education (MOE) and TP's School of Culinary and Catering Management on learning journeys to farms, where we introduced local produce and farming technologies to them. We also collaborated with MOE to incorporate information on local produce, as well as the past and present of agriculture in Singapore, into the curriculum of primary and secondary schools.

Learning journeys are conducted at AVA's MAC to showcase its efforts in providing a measure of self-sufficiency in fish supply for Singapore. During the FY, AVA hosted nine learning journeys to MAC where over 200 students, teachers, and members of the public learned about the R&D efforts and techniques that enable large-scale production of food-fish. We hosted over 100 international participants to three technical visits to MAC.





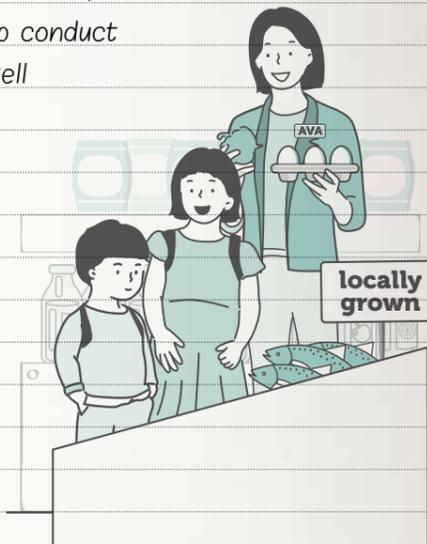
# Food Safety

## GOAL:

We ensure that food in Singapore is safe, through an integrated farm-to-fork food safety system. We also support the local industry in their efforts to be compliant and competitive.

## WE HAVE...

- Updated AVA Food Regulations and import conditions to align with international standards and facilitate agri-food trade.
- Enhanced food safety regime, by reviewing the regulatory oversight of food storage warehouses.
- Collaborated with global leaders – such as European Committee; Food and Agriculture Organisation of the United Nations; and World Bank's Global Food Safety Partnership – to conduct research on food safety laboratory testing, as well as to enhance laboratory testing capabilities in the region.
- Piloted the outreach programme for pre-schoolers, who will learn about food safety during their learning journeys at supermarkets.



## NOTES:

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## OUR MOMENTS AT WORK: PAST & PRESENT

### In 2002

A Food Safety Public Awareness programme was launched to educate consumers on how to better protect themselves against food-borne diseases. As part of the programme, a food safety mascot – Oscar the Food Safety Otter – was introduced.



### This FY

We continued to reach out to the public through the programme. AVA also piloted an outreach initiative for pre-schoolers to learn about food safety during learning journeys within supermarkets.

# Food Safety

AVA adopts a risk-based approach to food safety, and has put in place a comprehensive and integrated food safety system to ensure food safety from farm to fork. This system comprises source accreditation, inspection, surveillance, laboratory analysis, regulations, and horizon scanning. As food safety is a joint responsibility, we also engage with the industry and public to encourage them to do their part in keeping food safe.



## Aligning Regulations with International Developments

AVA constantly monitors international development in food safety and updates our regulatory requirements so that we are aligned with global shifts and standards.

Amendments to AVA's Food Regulations came into effect on 1 February 2019, following a public consultation exercise in September 2018. The majority of the amendments served to facilitate trade and are in line with the latest scientific and regulatory developments in international standard-setting bodies. The amendments have:

- Allowed the use of new additives, such as 1,3-propanediol and monk fruit extract (containing 20 to 90% w/w mogroside V).
- Extended the use of existing food additives to additional food categories, such as steviol glycosides in 19 food categories, and nisin in liquid egg analogues.
- Extended a permitted health claim on blood cholesterol-lowering effect to oat beta-glucan.
- Removed the requirement for shell eggs treated with mineral hydrocarbons to be marked with the word "sealed".
- Established a maximum limit for inorganic arsenic in husked rice.
- Removed the maximum limit of five parts per million for formaldehyde in smoked meat, smoked sausage, and smoked fish.
- Removed the maximum limits for copper under the Tenth Schedule.

AVA participates in Codex Alimentarius meetings, where food safety and quality standards are discussed. In FY 2018, the 41st Codex Alimentarius Commission adopted 20 new and revised Codex standards, which AVA will take into consideration when reviewing our Food Regulations.

## Regulating Imports

### Accrediting food sources

Accreditation is an upstream measure in our food safety system. It involves assessing the robustness of the country's national animal health and food safety systems, and evaluating each export establishment to ensure compliance with our food safety requirements. In the event of a breach in food safety or animal health standards in the approved establishment or country, AVA will take enforcement actions, such as suspension of import.

## Accreditation of sources (FY 2018)



AVA constantly reviews import regulations to ensure food safety and alignment with international standards. Previously, AVA prohibited the import of beef from countries classified under the “undetermined risk” statuses for Bovine Spongiform Encephalopathy (BSE) – the lowest status under the World Organisation for Animal Health (OIE)’s official classification system for BSE. Nevertheless, OIE recognises deboned beef, in particular, as a safe product regardless of the origin country’s BSE-risk status.

Given OIE’s position, and with the steep decline of BSE incidence worldwide, as well as studies showing no evidence of prions causing BSE infection in deboned beef, AVA revised its import conditions in FY 2018. Deboned beef from cattle of all ages is now allowed to be imported from countries with “undetermined BSE risk” status, subject to meeting the following conditions:

- The meat was derived from cattle that have not been fed meat-and-bone meal or greaves derived from ruminants.
- The meat was not contaminated with nervous or lymphatic tissue exposed during the deboning process.
- The meat was not contaminated with mechanically separated meat.

## Licensing importers and issuing permits

All food imports that enter Singapore must be imported by licensed or registered importers, and every consignment must be accompanied with a valid import permit. In FY 2018, AVA issued close to 990,000 import permits to about 14,000 licensed or registered traders.

## Food import permits issued (FY 2018)

Meat and meat products	Meat and meat products	Fish and fish products	Fruits and vegetables	Processed food	Egg and egg products	Total
Licences / registrations	2,483	1,230	10,671	14,384		
Import permits issued	25,637	196,067	275,693	486,543	766	984,706

## Inspecting and sampling food imports

Imported consignments are subject to inspection and sampling for laboratory testing. The samples are tested for pathogens, chemical contaminants, and chemical residues.



## Inspection and sampling of food imports (FY 2018)

Type of food	Volume inspected (tonnes)	Value inspected (million)	Consignments inspected	Samples tested
Meat & meat products	312,501	1,269	83,835	8,550
Fish & fish products	3,807	58	2,946	2,548
Egg & egg products	6,050	28	1,227	1,130
Fruits & vegetables	2,470	4	7,593	7,240
Processed food	10,548	27	3,419	3,419
<b>Total</b>	<b>335,376</b>	<b>1,386</b>	<b>99,020</b>	<b>22,887</b>

## Keeping out illegal imports

Food that are illegally imported pose a food safety risk. Offenders who illegally import food are liable on conviction to a maximum fine of \$50,000 and/or imprisonment for a term not exceeding two years.

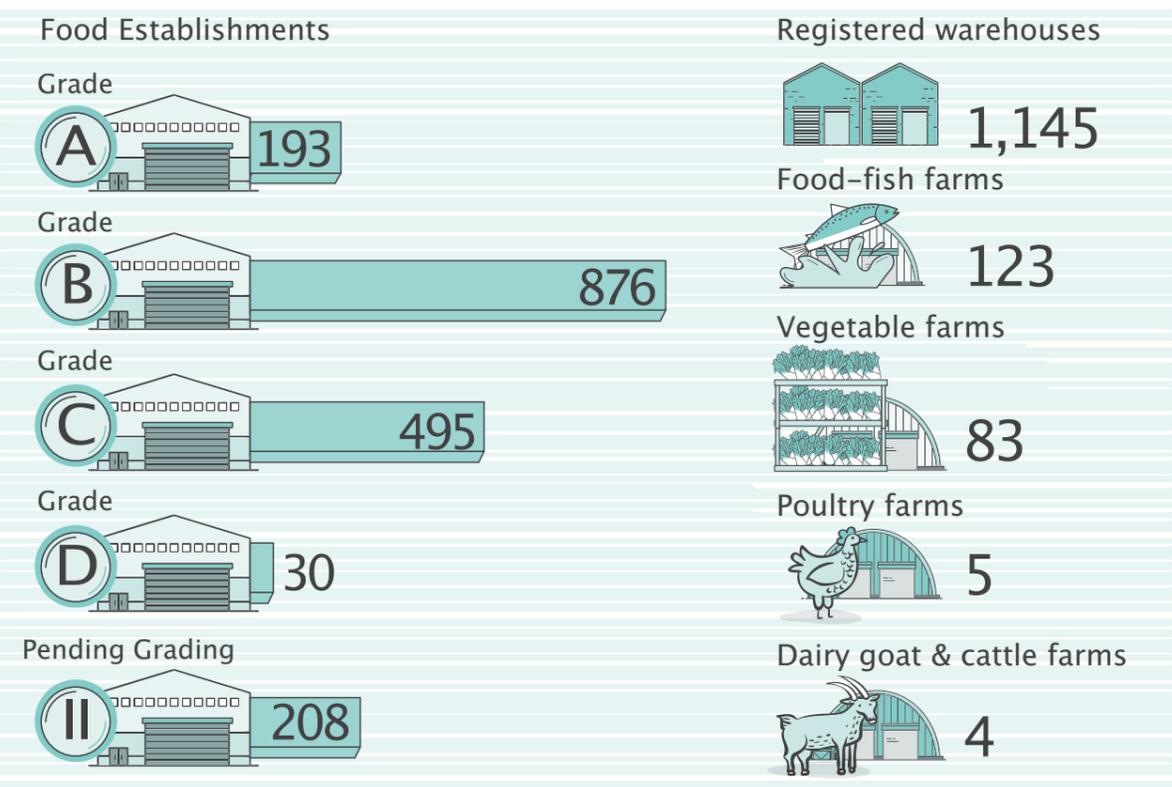
## Enforcement actions on illegal food imports (FY 2018)

Enforcement action	Meat & seafood products	Fruits & vegetables	Processed food
Prosecution	0	3	1
Compound fines	14	11	15
Warnings	31	8	385

# Regulating Local Food Production

AVA licenses all farms and food establishments in Singapore, including processing establishments, slaughterhouses, and cold stores. We also carry out site inspections to ensure that these establishments comply with our licensing conditions and observe proper bio-security, food safety, and hygiene practices. Samples are taken for a range of tests for food safety hazards such as pesticide residues, heavy metals, microbiological contaminants, and chemical contaminants.

## Inspection and sampling in local food establishments and farms (FY 2018)



 **19,070**  
Inspections conducted

 **58,447**  
Samples tested



### Among our local farms...

In FY 2018, there were 4 Good Aquaculture Practice for Fish Farming (GAP-FF) certified farms, 8 Good Agricultural Practice for Vegetable Farming (GAP-VF) certified farms, and 3 Singapore Quality Egg Scheme (SQES) certified farms. These schemes provide assurance to retailers and consumers by setting benchmarks for the production of safe and good quality local produce.

## Reviewing regulatory oversight of food storage warehouses

Currently, food storage warehouses are registered with AVA on a voluntary basis. With the amended Sale of Food Act, which was passed in Parliament in November 2017, AVA will be licensing all non-retail food businesses, such as food storage facilities. This will enable AVA to have greater regulatory oversight along the food supply chain, and ensure best practices are applied in these premises. As part of the licensing process, operators will need to submit a food recall/traceability plan and details on training for the operator's food safety officer, amongst other requirements. An online consultation was conducted between July and August 2018 to gather industry feedback on the proposed licensing regime. Subsequently, a series of industry engagement sessions will be held to identify capability gaps and address concerns, before AVA implements the new regime.



## Managing antimicrobial and drug residue levels in farms

In FY 2018, enforcement actions were taken against farms that failed our drug residue tests and flouted food safety regulations.

In July 2018, meat samples from spent quails in a quail farm were detected with coccidiostat residues above the Maximum Residue Limit (MRL). Despite being served a Direction to Impose Movement Controls (DIMC) under the Sale of Food Act, which prohibits the movement (including sale) of all quails from the farm, it was found to have engaged in two transactions of live quails. This resulted in a court fine of \$5,000 being imposed. The DIMC was lifted following the farm's compliance with AVA's requirements.

In two other cases, penicillin and enrofloxacin residues above the MRLs were detected in samples from a dairy farm and a fish farm, respectively. A direction was issued to the dairy farm to separate treated cows from milking cows. AVA also imposed a DIMC on the fish farm. These directions were lifted following corrective measures and compliance with our requirements.

## Facilitating religious slaughtering: Korban 2018

In FY 2018, AVA issued 52 special permits for religious slaughtering. These included 3,924 sheep from Australia, which were slaughtered at 28 approved premises for Korban in August 2018.

AVA worked closely with the Singapore Mosque Korban Committee and Islamic Religious Council of Singapore to ensure animal welfare and food hygiene standards were adhered to, and that the same standard operating procedures, training, and regulatory oversight were implemented at all the premises. Emphasis was placed on ensuring sufficient ventilation in the lairages and improving the overall housing conditions of the animals. Following inspections at all 28 premises, we found the animal welfare standards for Korban 2018 to be satisfactory and in line with international standards and AVA's Code of Practice for Animal Welfare. All premises were equipped with adequate facilities to accommodate the animals, as well as trained handlers and slaughtermen.

## Facilitating exports of food and food products

AVA facilitates the export of food and food products by issuing internationally recognised certificates and permits. In FY 2018, we issued 10,380 free sale certificates, 9,425 food export certificates, and 2,666 veterinary health certificates.

## Assessing risks of dietary exposure to food chemicals

AVA conducts risk assessments on the dietary exposures of food chemicals in our daily food intake. Our assessment on sorbic acid, a chemical preservative, showed that the current regulatory maximum limits for sorbic acid in various foods are sufficient to protect the health of the population.

We also conduct safety assessments on food-contact materials and articles to ensure that they are safe for food-contact applications. During the FY, we assessed the safety of food-contact articles made using paper, and found them to be safe for use.

## Enhancing Laboratory Capabilities

AVA's Veterinary Public Health Laboratory (VPHL) is the national diagnostic laboratory for food-borne hazards. It plays a crucial role in the enforcement of Singapore's food safety standards by testing samples of local and imported food products, as well as providing testing services to investigate food-borne disease outbreaks.



## Volume of tests conducted at VPHL (FY 2018)

Functions	Export certification	Import control	Surveillance	Commercial	Total
Samples tested	2,278	31,069	11,621	3,461	48,429
Lab tests performed	10,209	159,112	82,264	10,296	261,881
Results obtained	14,105	1,882,769	530,098	222,932	2,649,904

VPHL's work is underpinned by a commitment to maintain high laboratory testing standards. During the FY, it continued to attain accreditation under the International Organisation for Standardisation/International Electrotechnical Commission (ISO/IEC) 17025:2005 scheme, which is administered by the Singapore Accreditation Council – Singapore Laboratory Accreditation Scheme (SAC-SINGLAS). As at 31 March 2018, VPHL attained accreditations for a total of 240 tests, which included nine new tests accredited in FY 2018 (Table 1).

VPHL benchmarks its testing capabilities through inter-laboratory proficiency (ILP) testing programmes. These programmes assess the laboratory's effectiveness in discerning parasites, pathogens, chemical contaminants, additives, preservatives, allergens, nutritional components, and pesticides, amongst others, in food. In FY 2018, VPHL participated and performed well in 125 proficiency test rounds under 13 proficiency testing schemes administered by reputable international ILP scheme providers including:

- Food and Agriculture Organisation of the United Nations
- Public Health England (UK)
- Centre for Environment, Fisheries & Aquaculture Science (UK)
- EU Community Reference Laboratory
- RIKILT – Institute of Food Safety of Wageningen University & Research (Netherlands)
- US Department of Agriculture
- Global Proficiency Limited (New Zealand)
- Asia-Pacific Laboratory Accreditation Cooperation
- Asia-Pacific Economic Cooperation
- ASEAN Reference Laboratories

During the FY, seven additional methods were developed to establish new testing capabilities (Table 2), and two key enhancements were made to improve accuracy and turnaround time (Table 3).

**Table 1: Tests accredited by SAC-SINGLAS (FY 2018)**

#### Food-borne toxins

- Determination of Saxitoxin in shellfish using the EuroProxima Saxitoxin ELISA test kit
- Multicomponent method for determination of Paralytic Shellfish Poisons (PSP) in seafood using Carbon SPE Clean-up by LC-MS/MS
- Multicomponent method for determination of Lipophilic Biotoxins – Okadaic acid (OA), Dinophysistoxins (DTX1, DTX2), Pectenotoxin-2 (PTX2), Yessotoxins (YTX, homoYTX) and Azaspiracids (AZA1, AZA2, AZA3) in seafood by LC-MS/MS

#### Drug residues

- Multi-residue screening method for the detection of Ampheniols, Beta-agonists, Coccidiostats, Fluoroquinolones, Macrolides, Nitroimidazoles, Penicillins, Quinolones, Sulfa drugs in meat by HPLC-MS/MS

#### Chemical contaminants

- Analysis of inorganic arsenic on SPE-ICP/MS

#### Food microbiology

- Enumeration of *Vibrio parahaemolyticus* in seafood

#### Genetically modified organisms

- Qualitative & quantitative detection of DAS-40278-9 maize DNA by real-time PCR
- Detection of plant endogenous gene actin by real-time PCR

#### Pesticide residues

- Multiple pesticide residues analysis on various types of vegetable samples via Triple Quad LC-MS/MS Technique

**Table 2: New capabilities developed and validated by VPHL (FY 2018)**

#### Food-borne toxins

- Determination of Emetic toxin Cereulide from *Bacillus Cereus* in food by LC-MS/MS
- Determination of Phytotoxins Steroidal alkaloids in food by LC-MS/MS
- Determination of Phytotoxins Tropane alkaloids in food by LC-MS/MS

#### Chemical contaminants

- Tritium in bottled drinking water by LSC
- Bromate in flour by LC-MS/MS
- Elemental profiles for pork by ICP-MS and ICP-OES
- Chromium(III) and (VI) in water by LC-ICP-MS

**Table 3: Key enhancements made by VPHL (FY 2018)**

#### Food preservatives and additives

- Colours (Orange II & Patent Blue)

#### Chemical contaminants

- Analysis of heavy and trace metals (aluminium, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, selenium, zinc) in water by ICP-MS

## Collaborating with International Food Safety Organisations

During the FY, AVA partnered international food safety organisations, such as the European Committee for Standardisation, Food and Agriculture Organisation of the United Nations (FAO) / International Atomic Energy Agency (IAEA), Institute of Molecular and Cell Biology, and Bioprocessing Technology Institute, to enhance food safety laboratory testing. Research projects we worked on in FY 2018 included:

- Inter-laboratory validation study on the analysis of gossypol in feed (2018)
- Accessible technologies for the verification of the origin of dairy products as an example control system to enhance global trade and food safety (2013–2018)
- Field-deployable analytical methods to assess the authenticity, safety, and quality of food (2017–2022)
- Development of emerging technology for pathogen screening (2018–2019)

## Supporting Laboratory Capability Development in the Region

As an OIE Collaborating Centre for Food Safety and the ASEAN Food Reference Laboratory for Pesticides and Environmental Contaminants, VPHL continues to collaborate with international and local experts in enhancing laboratory testing capabilities in the region.



During the FY, AVA conducted trainings in collaboration with the World Bank's Global Food Safety Partnership, ASEAN-European Commission Joint Research Centre, Ministry of Foreign Affairs, National Metrology Centre, A\*STAR, and Health Sciences Authority of Singapore. The topics covered included:

- Analyses of trans-fat; Polychlorinated Biphenyls (PCB) in cooking oil; indicator PCB in food; and pesticide residues.
- Detections of Aflatoxins B & G in nuts and cereals; total mercury for fish products by cold vapour atomic absorption spectrometry; and genetically modified organisms by quantitative methods.
- Veterinary drug residue monitoring in Singapore and techniques for detection of veterinary drug residues in food.
- Feeding the future: Food safety and technology in times of global change.
- In the spirit of collaboration and learning, AVA also hosted the Indian Commissioner of Food and Drug Authority (Punjab), the Commissioner of Food Safety (Goa), as well as senior officials from Food Safety and Standards Authority of India to a week-long programme to enhance their understanding of Singapore's regulatory environment for food safety and trade.

## Engaging with the Industry and Public

Food safety is a joint responsibility between the government, industry, and public. AVA actively reaches out to the industry to foster mutual understanding, enhance its competency in food safety, and spur the sector towards excellence. To ensure food safety from farm to fork, we also educate the public on how they can play their part.

### Fostering mutual understanding

In FY 2018, two dialogue sessions between AVA and food industry association/business cluster representatives were held. Topics such as food safety regulations, export related matters, industry training, and issues related to the inspection, labelling, and clearance of imported food were discussed.



### Enhancing industry competency

Two food safety seminars and exhibitions were organised to heighten awareness of the Hazard Analysis & Critical Control Point (HACCP) food safety management system, good manufacturing and food hygiene practices, food defence, proper sanitation, pest management, and the proper use of personal protective equipment. AVA also collaborated with Enterprise Singapore and the Ministry of Manpower to provide useful insights into the average quantity system, as well as safety measures and requirements relating to the use of pressure vessels, boilers, and refrigerants for cold rooms.

## Recognising excellence in the industry

On 20 July 2018, AVA held the 15th AVA Food Safety Awards Night to recognise exemplary food companies for their commitment to upholding stringent food safety standards and commend those who played an active role in educating the public about food safety. Four Platinum, seven Gold, nine Silver, nine Bronze awards, as well as 145 Certificates of Commendation were presented to deserving local food companies with continuous 'A'-grading. In addition, we acknowledged the public education efforts of three food safety partners and renewed their partnership status.



## Educating the Public

In FY 2018, AVA continued to educate the public to equip them with the knowledge of food safety risks and safe food practices. Our outreach efforts included learning journeys, collaborations with supermarkets, and media publicity.



## Food safety public education activities (FY 2018)

30  
Food safety talks



7  
Community events



12  
Learning journeys



58  
Roadshows at Sheng Siong, NTUC FairPrice, and Cold Storage supermarket outlets



Piloted learning journeys for pre-schoolers to visit supermarkets to learn about food safety.

An interactive e-learning game was produced for the roadshows. Together with a 'Spin & Win' game, we spread food safety tips in an edu-taining way. Relevant brochures, collaterals, and activities such as the appearance of AVA's food safety mascot 'Oscar', were also included as part of the roadshow experience.



Reached out to about  
**34,000**  
people

## Media outreach

In conjunction with the Food Safety Month, the annual Food Safety Excellence Awards Supplement was published in The Straits Times and Lianhe Zaobao to educate the public on food safety. Food safety tips and posts by our food safety partners were also regularly featured on AVA's Facebook page.





# Animal Health, Welfare & Management

## GOAL:

We **safeguard the health of animals** via an **integrated animal health system**, and **ensure animal welfare** through **enforcement, engagement, and education**.

## WE HAVE...

- Partnered local agencies and global leaders** – such as the World Organisation for Animal Health (OIE), UK's Animal Health Trust, and Food and Agriculture Organisation (FAO) of the United Nations – in **enhancing animal disease laboratory testing and combatting antimicrobial resistance**.
- Embarked on collaboration with the Early Childhood Development Agency** to impart knowledge on animal welfare, management, and pet care to **pre-school teachers**.
- Commenced the Trap-Neuter-Release-Manage programme** to jointly manage Singapore's stray dog population with **animal welfare groups**, as well as engaged FAO experts to conduct trainings on the **humane trapping and safe handling of stray dogs**.
- Appointed Cat Welfare Society (CWS) as our third-party mediator for cat-related issues**, in a pilot to tap into CWS' rich experience and relationship with owners of pet cats and feeders of stray cats.

## NOTES:

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S	M	T	W	T	F	S
31					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

## OUR MOMENTS AT WORK: PAST & PRESENT

### In 2004

AVA debuted the **Responsible Pet Ownership (RPO) public education programme** to spread the message of **"A Pet Is for Life"**.



### This FY

AVA remained steadfast in encouraging existing pet owners to be responsible. Through public events such as **"Happy Pets, Happy Hood"**, we also partnered animal welfare groups in urging potential pet owners to consider adoption as their first option.

# Animal Health

AVA has put in place a comprehensive and integrated animal health system that comprises risk assessment, regulation, inspection, laboratory testing, and surveillance to safeguard animal health. This system continues to keep out major animal diseases of public health and economic significance, such as Foot-and-Mouth disease, rabies, Highly Pathogenic Avian Influenza, and Bovine Spongiform Encephalopathy.

## Keeping Out Animal Diseases



### Aligning with international standards

AVA keeps abreast of the standards, guidelines, and recommendations of the World Organisation for Animal Health (OIE), an inter-governmental body that develops international standards to combat animal diseases. In May 2018, AVA represented Singapore at the 86th General Session of the World Assembly of Delegates of the OIE, where 34 new international standards and guidelines on animal health and welfare were adopted. AVA will take reference from these, and work with our stakeholders on the implementation, where relevant.

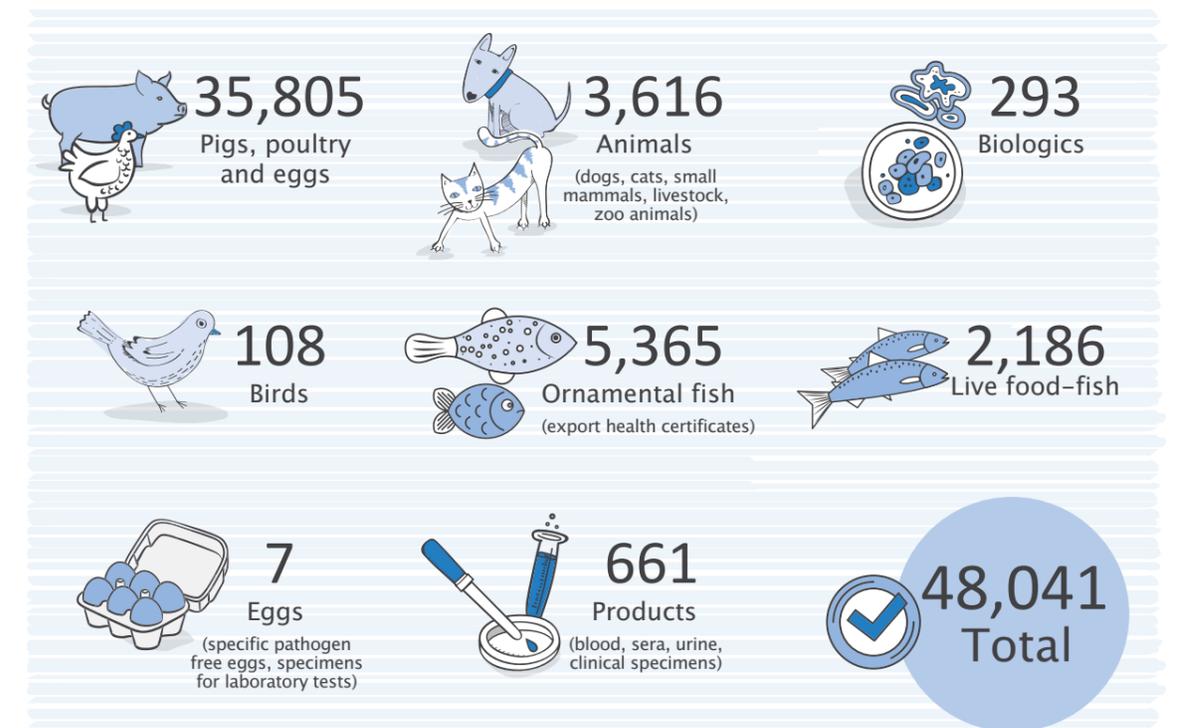
During the General Session, elections were held for the OIE Council and Specialist Commissions. AVA Director-General for Agri-Food & Veterinary Services and Deputy CEO for Regulatory Programmes & Operations, as well as OIE Delegate for Singapore, Dr Yap Him Hoo, was elected as member of the OIE Council for a term of three years. This membership is a form of global recognition for Singapore's role in developing animal health and welfare standards, and gives us an opportunity to participate in the Council's task of developing the new 7th Strategic Plan for OIE (2021-2025).

## Controlling the import of animals and products

AVA prevents the incursion of exotic and zoonotic diseases by regulating the import of animals and related products. Besides being subject to import conditions, which include vaccinations and health certification requirements, imported animals may also need to undergo post-arrival quarantine. In FY 2018, we issued a total of 48,041 licences, permits, and certificates for the import of animals and related products.



### Licences, permits, and health certificates issued for animal imports (FY 2018)



## Combatting illegal import of animals



Smuggled animals are of unknown health statuses and can pose the risk of introducing exotic diseases to Singapore. To keep our animal and human populations safe from such threats, AVA works closely with local enforcement agencies to combat the illegal import of animals and animal products.

In FY 2018, a woman was fined \$4,000 for the illegal import of a sugar glider, and two women were fined \$6,000 and \$7,000 respectively for smuggling embryonated eggs into Singapore.

Sentences ranging from a \$5,000 fine to six weeks' jail were also meted out to four offenders for importing birds without import licences, as well as subjecting the birds to unnecessary suffering during transportation under poor conditions.

In addition, a man was sentenced to six weeks' imprisonment for illegally importing two cats.

## Safeguarding against rabies

Rabies is a fatal viral disease that can spread to humans through the saliva or bite of an infected animal. To keep Singapore free from rabies, AVA imposes quarantine and vaccination requirements on imported dogs and cats based on each exporting country's rabies status.

Dogs living on coastal fish farms are identified as high-risk for rabies, as they are often unsupervised and may come into contact with animals of unknown origin. In FY 2018, AVA continued to conduct the annual rabies vaccination and serosurveillance for dogs on coastal fish farms, with assistance of veterinarians from the private practice and volunteers from polytechnics.



A separate exercise to license, microchip, vaccinate, and neuter dogs in Pulau Ubin was carried out in collaboration with the National Parks Board (NParks) and SOSD Singapore in December 2018.

Our efforts in rabies control extends beyond our borders. In August 2018, AVA donated 29,000 doses of rabies vaccines to Thailand's Department of Livestock Development. Subsequently, AVA was invited to Thailand to observe the country's rabies operations.

## Staying vigilant against bird flu

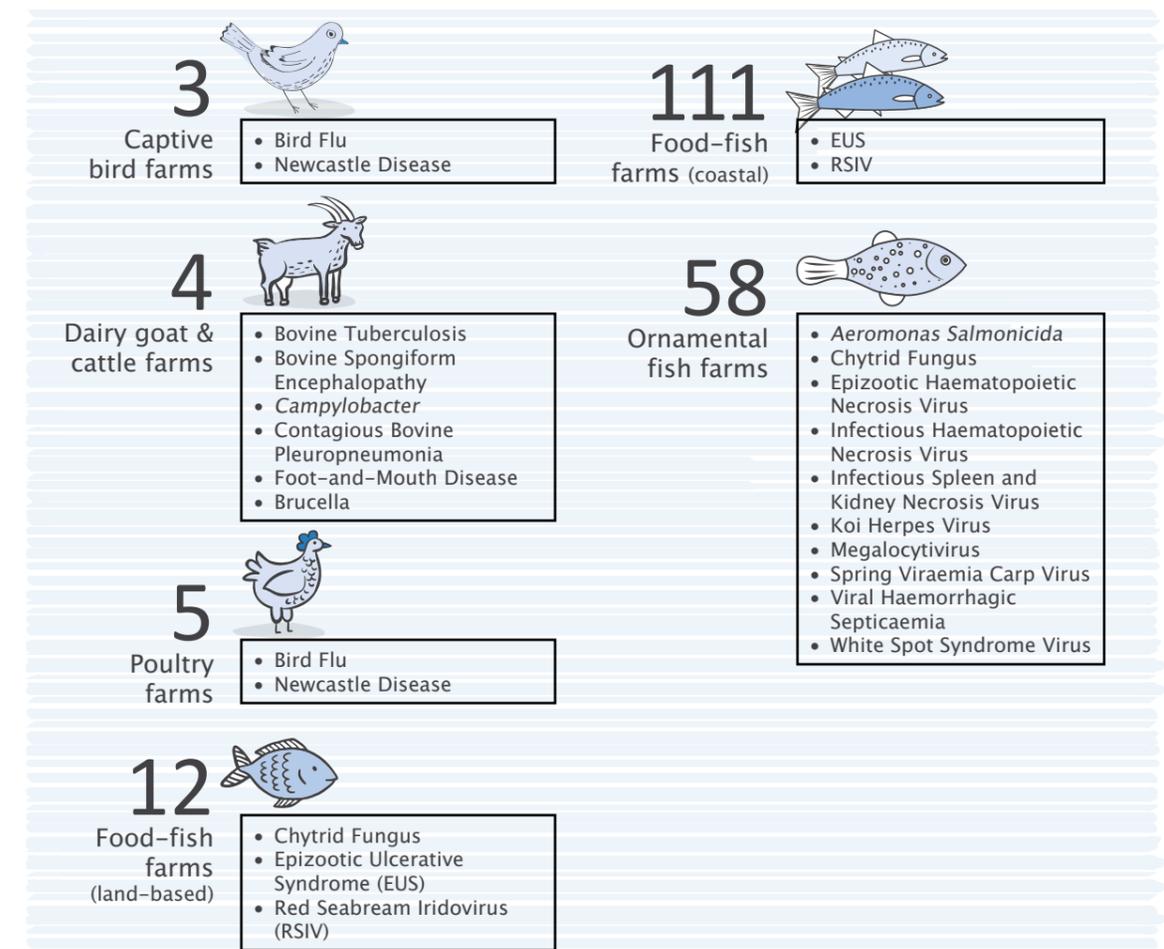
Highly Pathogenic Avian Influenza (HPAI), or bird flu, infects both birds and people. In humans, it can cause illnesses ranging from common flu-like symptoms to serious respiratory diseases that can lead to death. Although Singapore is free of bird flu, it is endemic to the region. Thus, we need to remain vigilant. In FY 2018, we continued to regularly train staff on the proper use of personnel protective equipment, and on their roles and responsibilities in the HPAI contingency plan.

In addition, AVA continued to work closely with Indonesia to control bird flu in Kepulauan Riau (Kepri, or the Riau Islands). There were no reports of bird flu outbreaks in Kepri in FY 2018.

## Watching Over Local Animal Farms

AVA continued its surveillance and inspection of local farms to ensure timely detection, treatment, and containment of animal diseases. We also facilitate the export of animals and animal products by issuing internationally recognised certificates and permits. In FY 2018, AVA issued 6,559 veterinary health certificates and 1,932 certificates for freedom from diseases for exported animals and animal products.

### Types of animal disease surveyed in local farms (FY 2018)



## Facilitating swift recovery of farms hit by storm



Following an unusually severe storm on 30 March 2018, four farms in the Murai area suffered extensive damage. Among them, a poultry farm was the worst hit. Several chicken sheds had completely or partially collapsed, resulting in the escape of a large number of chickens.

Subsequently, AVA engaged with the affected farmers, and helped the poultry farm in rounding up the escaped chickens. We also worked with the Building and Construction Authority; National Environment Agency (NEA); NParks; PUB, Singapore's National Water Agency, and Singapore Land Authority, as well as the farming community and the Singapore Agro-Food Enterprises

Federation, to facilitate the swift recovery of the worst-affected farms, and to ensure that there were no animal, human health, or food safety issues.

For these timely and concerted efforts, AVA received the Ministry of National Development Minister's Award (Team) 2018.

## Combatting Antimicrobial Resistance

Antimicrobial resistance (AMR) is a pressing threat to health globally. As microbes become increasingly resistant to antimicrobial agents such as antibiotics, our ability to treat infections becomes compromised. AVA licenses veterinarians, feed mills, and food farms in Singapore, and specifies the types of antimicrobials that cannot be used in animal feed and food-producing animals. In addition, we work as part of the One Health AMR Workgroup, as well as with OIE and the Food and Agriculture Organisation (FAO) of the United Nations, to reduce the emergence and prevent the spread of drug-resistant organisms in the agriculture and aquaculture sectors.

During the FY, AVA continued to spread AMR-related messages through its Responsible Pet Ownership events and school programme, highlighting the importance of regular veterinary check-ups and advising owners against self-medicating their pets.



## Regulating the Veterinary Profession

AVA regulates the veterinary profession in Singapore to ensure compliance with the Code of Ethics for veterinarians. As at 31 March 2018, there were 86 licensed veterinary centres and 407 licensed veterinarians.

The Veterinary Profession Committee (VPC), comprising members from AVA, the Singapore Veterinary Association, academia, private practice, and industry, charts the direction of the veterinary profession in Singapore, develops strategies to support the veterinary industry, and contributes to society. In FY 2018, VPC continued to play a part in the annual rabies vaccination of dogs on coastal fish farms, and offer their services at Free Pet Health Checks organised by AVA.

## Enhancing Laboratory Capabilities

AVA's Animal Health Laboratories (AHL) is the national reference laboratory for the diagnosis of animal diseases, and carries out testing of animal vaccines. In FY 2018, AHL performed about 83,300 laboratory tests to detect and identify diseases in 271,219 samples of animals.



### Volume of tests conducted at AHL (FY 2018)

Functions	Export certification	Import control	Surveillance	Disease investigation	Commercial	Inter-lab proficiency testing	Total
Samples tested	13,907	1,666	166,536	3,859	1,713	229	187,910
Lab tests performed	6,029	1,366	70,209	4,625	737	343	83,309

To maintain high laboratory testing standards, AHL continued to attain accreditation under the International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) 17024:2005 scheme which is administered by the Singapore Accreditation Council – Singapore Laboratory Accreditation Scheme (SAC-SINGLAS) in FY 2018. As at 31 March 2019, AHL attained accreditations for a total of 118 tests, which included two newly accredited tests.

Since 2004, AHL has been benchmarking its testing capabilities by participating in several inter-laboratory proficiency testing (PT) programmes administered by internationally recognised PT organisers. In FY 2018, AVA participated in 20 programmes organised by the Animal & Plant Health Agency (UK), Pirbright Institute (UK), University of Arizona (US), Australian Animal Health Laboratory, Laboratorio Comunitario de Peste Equina Africana (Spain), as well as OIE Reference Laboratories in Italy, China, and Japan. We achieved results of 99.4% accuracy in these programmes.

As part of efforts to expand AHL's testing capabilities, 12 new diagnostic methods in the areas of veterinary bacteriology, veterinary pathology, and veterinary virology were successfully developed in FY 2018. We also enhanced 10 laboratory testing methods in veterinary bacteriology and virology.

## Collaborating in Research and Sharing Expertise

In FY 2018, AHL continued to collaborate with local and international laboratories and research agencies on various projects that enhance laboratory testing for animal diseases:

- Validation of Equine Influenza testing (2015–2019)
- Surveillance of zoo animals (2016–2021)
- Establishment and validation of an Indirect *Haemagglutination* Assay (IHA) for the detection of *Burkholderia pseudomallei* antibodies in horses (2018–2019)
- Detection of pathogens through air sampling (2018–2019)
- Phylogenetic analysis of *Streptococcus equi* subspecies *equi* strains (2018–2019)
- Detection of Avian Influenza Virus (AIV) (2018–2020)

In addition, AVA shares its expertise and research findings with the scientific community. In July 2018, in partnership with the Ministry of Defence, Ministry of Health, and NEA, AVA co-organised the One Health and Outbreak Surveillance Symposium with the Centre for Infectious Disease Epidemiology and Research. The symposium emphasised the importance of an integrative approach to detecting and managing disease outbreaks.

# Animal Welfare

AVA safeguards the well-being of animals and prevents animal cruelty through enforcement, engagement, and education. We work closely with animal welfare groups in the area of public education and re-homing of animals. AVA also regulates research facilities that use animals for scientific purposes in Singapore, to ensure they comply with guidelines on the care and use of these animals.

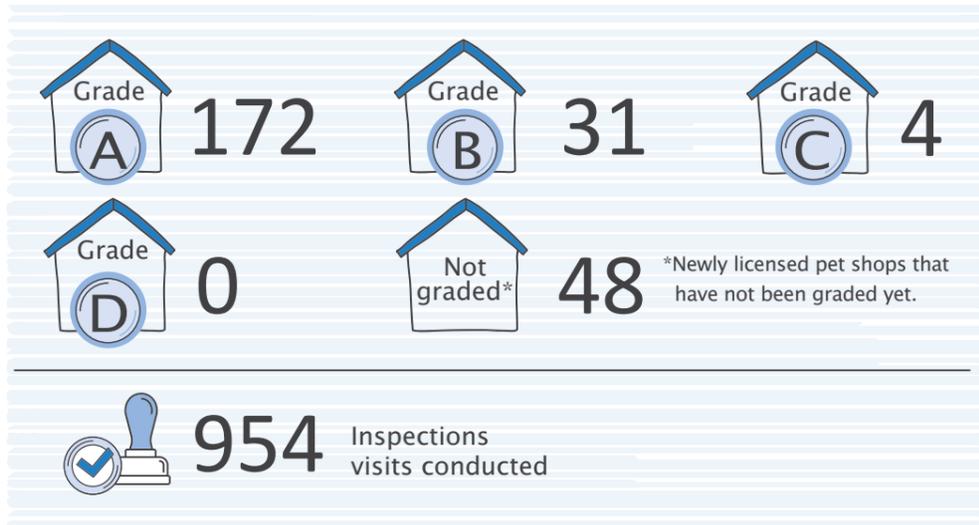


## Licensing and Grading Pet Shops/Farms

AVA licenses and inspects pet shops/farms to ensure they comply with licensing conditions, which specify the standard of care for animals. Pet shops are also graded so that consumers are informed of the standard of care for animals provided by the pet shops.



### Grading of pet shops (FY 2018)

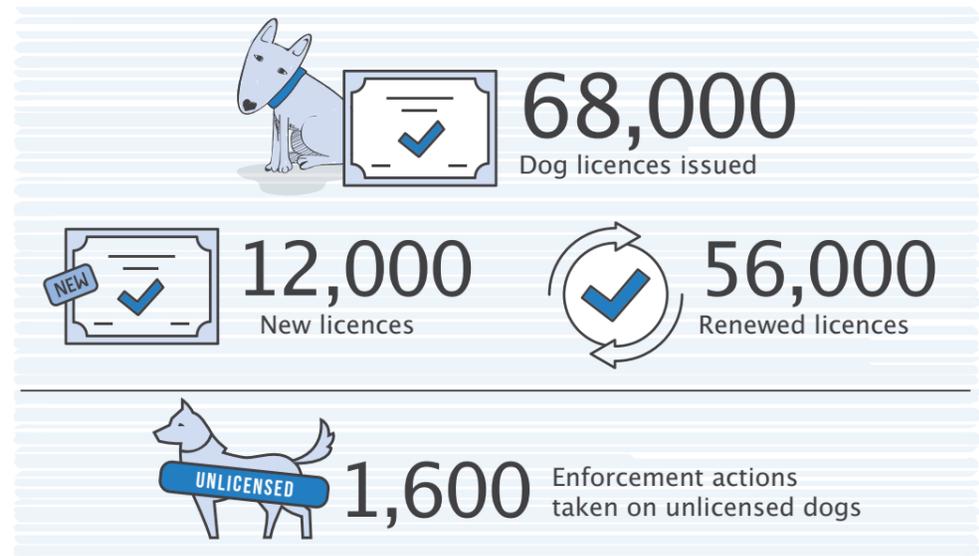


AVA takes enforcement action on individuals and pet shops/farms that flout AVA’s licensing conditions. In FY 2018, a man was fined \$2,500 for selling two cats without a pet shop licence, out of his flat. A woman was fined \$5,000 for using her residence to breed cats for sale, without a pet farm licence. Another man was fined \$6,600 for operating a pet shop without licence, keeping unlicensed dogs, and exceeding the maximum number of dogs allowed in non-pet shop/farm premises.



As dogs are the main host and transmitter of rabies, AVA also licenses pet dogs to facilitate contact tracing in the event of an outbreak. In addition, dog licensing establishes accountability for the care and management of dogs by pet owners.

### Dog licensing and enforcement (FY 2018)



## Enforcing Against Animal Cruelty

AVA investigates all alleged animal welfare, cruelty, and abandonment cases, working with relevant agencies and animal welfare groups whenever necessary. Anyone found guilty of animal cruelty, or failure in duty of care for an animal, is liable to a fine and/or jail term.

In FY 2018, three persons were each fined \$2,000 for pet abandonment. Among them, two were also issued a six-month Disqualification Order (DO) barring them from owning any animals.

In addition, a pet shop operator was fined \$48,000 for failure in duty of care for four dogs in his premises. Two women were fined \$2,500 each for failure in duty of care for their pets. One of these women was also found guilty of pet abandonment and received another fine of \$2,000.

For causing unnecessary pain and suffering to animals, one man was fined \$16,000 or eight weeks’ imprisonment in default, and issued a 12-month DO. Found guilty of animal cruelty that resulted in the deaths of their pets, one man received a jail sentence of four weeks, while another was fined \$3,500.

## Educating and Engaging with the Public

AVA works closely with various stakeholders to conduct outreach activities to raise awareness of animal welfare, and promote the peaceful co-existence of humans and animals. The Responsible Pet Ownership programme (RPO) continues to encourage existing pet owners to be responsible and urges potential pet owners to consider adoption as their first option.

### Encouraging pet owners to be responsible

The annual “Happy Pets, Happy ‘Hood” event, held at Hillion Mall in November 2018, was attended by approximately 8,000 visitors. The event consisted of stage performances, a movie screening, and free pet health checks. Animals from 11 animal welfare groups were put up for adoption at the event. NParks, the Municipal Services Office, as well as Pet Lovers Centre and its educational partner, PCF Sparkletot @ Whampoa Block 85, set up RPO-themed game booths.



Pet preparatory classes were organised for the first time at libraries under the National Library Board. Eight such classes were conducted in collaboration with three of our re-homing partners – Causes for Animals Singapore, Cat Welfare Society, and House Rabbit Society Singapore. The well-received talks focused on popular pets such as dogs, cats, and rabbits.

In FY 2018, AVA also supported more than 25 pet-related community events islandwide.

### Educating the young to be responsible pet owners



AVA believes that education can bring about long-term, positive change. Through our RPO school programme, we reached out to more than 60,000 students and educators in FY 2018 through school talks, learning journeys, and activities such as show-and-tell. Primary 4 students continued to learn about RPO through the character and citizenship curriculum.

Dovetailing with Early Childhood Development Agency's Innovation Guidance Project, AVA imparted knowledge on animal welfare, management, and pet care to 60 pre-school teachers. The teachers subsequently developed lesson plans to share AVA's RPO messages and values with their pupils.

### Supporting animal adoption drives

AVA's matchmaking activity for potential pet owners and rescued animals, 'The Pawfect Match', returned to Pet Expo in April 2018. Twelve re-homing partners participated in the activity with their animals for adoption. Crossbreed dogs continued to enjoy warm reception among the 29,000 visitors at Pet Expo.

Also, in support of its re-homing partners, AVA part-sponsored seven adoption drives organised by Exclusively Mongrels. Other animal welfare groups such as Causes for Animals Singapore also joined these adoption drives.



# Animal Management

In managing animal-related issues, AVA has to balance the diverse interests of different stakeholder groups. Our animal management measures are multi-pronged and include efforts such as research, education, partnership with animal welfare groups, animal population management, and re-homing of animals.

## Playing Our Role as First Responder

Animal-related issues are often complex and multi-faceted, and require the efforts of various stakeholders to achieve an effective resolution. As the First Responder for animal-related feedback, AVA leads and coordinates among relevant government agencies and stakeholders to address public feedback on animal-related issues.

## Enhancing Stray Dog Population Control Measures

On 10 November 2018, AVA's Trap-Neuter-Release-Manage (TNRM) programme was officially launched. Developed in close collaboration with 11 animal welfare groups, TNRM is a scientific and humane approach to catch and sterilise dogs, then re-home as many sterilised animals as possible. Since then, AVA has been working closely with animal welfare groups on TNRM operations across Singapore, with the Society for the Prevention of Cruelty to Animals (SPCA) as the lead animal welfare group. Under this programme, the costs for pre- and post-surgical boarding, vaccination, and sterilisation of TNRM dogs were borne by AVA.

In addition, we worked to build up our operational capabilities and increase public engagement. In September 2018, AVA invited experts from FAO to train TNRM participants on the humane trapping and safe handling of stray dogs. During our walkabout sessions in housing estates, we also stepped up efforts to inform residents of the appropriate responses or actions to take when they encounter stray dogs.

During the FY, a total of 182 dogs were re-homed.



## Managing Stray Cats

### Supporting the sterilisation of stray cats

Through the Stray Cat Sterilisation Programme (SCSP), AVA works with the Cat Welfare Society (CWS), SPCA, and four town councils to sterilise community cats, mitigate issues caused by strays, and ensure that they are properly managed by appointed caregivers. SCSP now covers Housing & Development Board (HDB) residential estates, private estates, as well as industrial and commercial areas.

In FY 2018, AVA continued to provide 50% funding (up to \$30 for male cats and \$60 for female cats) for the sterilisation of stray cats, and \$20 subsidies for microchipping costs. As at 31 March 2019, more than 500 volunteers had registered themselves as stray cat caregivers and over 11,400 stray cats have been sterilised under the programme.



### Piloting cat ownership in HDB flats

Project Love Cats, a community-owned pilot project led by CWS, is currently ongoing in the Chong Pang estate to test out a framework for responsible cat ownership in HDB flats.

### Mediating cat-related issues in neighbourhoods



Since 2015, AVA has worked closely with CWS to manage cat-related feedback. This includes CWS helping to mediate cat-related disputes, as well as advising community cat feeders and owners to practise responsible cat feeding and pet ownership. To formalise this existing collaboration, AVA appointed CWS as its third-party mediator for cat-related issues in FY 2018, on a pilot basis for one year.

## Reducing Nuisance Caused by Birds

AVA commissioned NUS to conduct a two-year study to understand the biological, ecological, and social aspects involved with urban birds and the issues they cause residents in the area. Completed in January 2018, the study revealed that pigeons tend to congregate and are localised within certain housing estates where food from humans is easily found. Using data established from this study, AVA is currently working with NUS to develop a population model and establish targeted measures for individual estates.





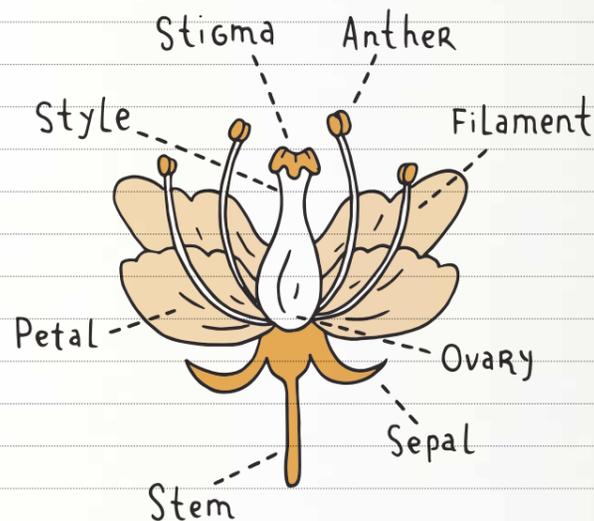
# Plant Health

## GOAL:

We **safeguard the health of crops and greenery** in Singapore with our **comprehensive plant health programmes** and **laboratory testing capabilities**.

## WE HAVE...

- Ensured AVA's standard protocol for the molecular identification of the South American Leaf Blight were **endorsed and adopted by ASEAN**.
- Developed laboratory capabilities** in the **molecular identification of plant pests** *Chysomphalus aonidum*, *Sitophilus oryzae*, and *Liriomyza trifolii*.
- Further helped farmers safeguard their crops** from Diamondback Moth (DBM) and thrips, by developing an **economic threshold for DBM** and studying the efficacy of **blue/yellow sticky traps for thrips**.



## NOTES:

## OUR MOMENTS AT WORK: PAST & PRESENT

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
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28	29	30				

### In 2005

AVA consolidated its animal and plant health laboratories into the Animal and Plant Health Centre. Here, the Plant Health Laboratories (PHL) provide world-class plant disease investigation and pest diagnostic services.



### This FY

New laboratory capabilities are constantly developed at the PHL. The latest included methods for the molecular, electronic, and morphological diagnosis/identification of plant pests.

# Plant Health

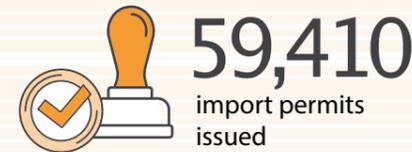
AVA protects Singapore's farms, nurseries, and greenery from exotic and emerging plant pests that may cause significant economic losses. Our comprehensive range of plant health programmes, comprising import regulation and inspection, risk analysis, as well as laboratory testing and surveillance, have successfully kept Singapore free from important quarantine pests.



## Preventing Entry of Plant Pests

Plants and plant products entering Singapore must meet AVA's plant health import requirements. A permit is required and AVA conducts post-entry inspections to ensure compliance. In addition, as part of our monitoring efforts on quarantine pests, we conduct surveillance visits and collect samples for laboratory analysis.

### Import permits and inspections (FY 2018)



### Keeping imported plants free from quarantine pests

In FY 2018, we continued to collect samples of fruits and cut flowers imported from the South American tropics, where the South American Leaf Blight (SALB), a fungal disease of rubber, is endemic. The SALB is defined as a "quarantine pest" under the International Plant Protection Convention. Singapore continued to maintain its SALB disease-free status, as this pest was not detected in Singapore during the FY.

As part of efforts to prevent an incursion of SALB locally and in the region, AVA developed an ASEAN standard protocol for the molecular identification of the SALB in FY 2017. This protocol was endorsed and adopted by ASEAN in FY 2018.

Over the FY, we also closely monitored imported plants for the presence of quarantine pests – Queensland fruit flies and Mediterranean fruit flies. In addition, over 300 samples of spices and stored products were checked for Khapra beetles. Results showed that Singapore remained free from these pests.



## Detecting and Monitoring New Plant Pests

AVA detects new plant pests during its surveillance, and monitors such pests to ensure minimal damage to the local horticulture sector. During the FY, AVA detected the following new plant pests for the first time in Singapore:

- *Selenothrips rubrocinctus* Giard (1901) (Thysanoptera: Thripidae)
- *Silvanus Latrielle* (1807) (Coleoptera: Silvanidae)
- *Tetranychus cinnabarinus* Boiusduval (Acarina: Tetranychidae)
- *Xylosandrus Reitter* (1913) (Coleoptera: Scolytidae)
- Julid millipedes from Family Julidae Leach (1814) (Diplopoda: Julida)
- Neophyllaphidinae Takahashi (Aphididae: Hemiptera)
- *Sciara* species Meigen (1803) (Diptera: Sciaridae)
- *Spinibdella* Thor (1930) (Acariformes: Bdellidae)



Of these, the first three are pests of significance to Singapore, as they may spread easily and cause significant damage to a wide range of plants. Recommendations for the control of these pests were given to affected stakeholders. AVA will also stay vigilant in monitoring these pests, as well as determine the potential impact and mitigation measures required.

## Supporting Local Plant Industry

AVA closely monitors establishments involved in the cultivation of plants, flowers, and vegetables to keep them free from targeted quarantine pests and new pest incursions. We also facilitate the import and export of these commodities, and work together with the industry to ensure that biosecurity and phytosanitary standards are met.

### Controlling pests in local farms

During the FY, AVA deployed 2,195 traps for the monitoring of Diamondback Moth and thrips, conducted 328 pest surveillance visits, inspected 43,691 samples on-site, and collected 2,022 samples for laboratory testing and diagnosis. Such surveillance continued to enable us to detect and control pests in a timely manner.



To ensure food, environmental, and workers' safety, AVA registers, approves, and manages the use of all agricultural pesticides in vegetable and ornamental plant farms. As of FY 2018, there were 328 pesticide products registered by AVA for use in agricultural farms.

AVA continued to produce 'Plant Health Brief', a monthly newsletter disseminated to the horticulture industry and members of the surveillance network to keep them updated on the latest pest detections.

### Facilitating plant trade

AVA regulates and facilitates the international trade of plants through the Bio-security Assurance Arrangement (BSAA) for the import of plants, seeds, genetically modified plant materials, insects and microorganisms; and the Assurance Certification Scheme (ACS) for the export of plants and plant produce.

Establishments accredited under BSAA and ACS play a greater role in self-regulation. They implement AVA-approved assurance systems to minimise risks involved in the use of imported plants and ensure exports are free from pest infestations, respectively. In addition, AVA's Treatment Provider Scheme (TPS) accredits providers who conduct phytosanitary treatments to meet export certification requirements and biosecurity conditions of entry.

In FY 2018, AVA continued to audit establishments under BSAA, ACS, and TPS to ascertain their compliance with our standards and requirements.

We also facilitate the export of plants and plant products by issuing internationally recognised certificates and permits. During the FY, 10,657 phytosanitary certificates for exported plants and plant products were issued.

## Enhancing Laboratory Capabilities

AVA's Plant Health Laboratory (PHL) provides diagnostic and analytic services on a wide range of plant pests and soil nutrients.

### Volume of tests conducted at PHL (FY 2018)

Functions	Export certification	Import control	Surveillance	Commercial	Total
Samples tested	392	717	4,382	836	6,327
Lab tests performed	659	1,298	5,304	4,993	12,254

PHL'S work is underpinned by a commitment to maintain high laboratory testing standards. During the FY, it continued to attain accreditation under the International Organisation for Standardisation/International Electrotechnical Commission (ISO/IEC) 17025:2005 scheme, which is administered by the Singapore Accreditation Council – Singapore Laboratory Accreditation Scheme (SAC-SINGLAS). As at 31 March 2018, PHL attained accreditations for a total of 31 tests.

In FY 2018, PHL continued to benchmark its testing capabilities through inter-laboratory proficiency (ILP) testing programmes administered by the Wageningen Evaluating Programmes for Analytical Laboratories (WEPAL), the Netherlands. In addition, our taxonomic identification expertise in insects and nematodes was also confirmed by specialists through proficiency testing programmes conducted at organisations in Australia, New Zealand, South Africa, and the US. Satisfactory performance was achieved in these programmes.

During the FY, five new diagnostic and identification capabilities were developed:

- Molecular diagnosis of *Chysomphalus aonidum* (Linnaeus)
- Molecular identification of *Sitophilus oryzae* (Linnaeus)
- Molecular identification of *Liriomyza trifolii* via DNA barcoding of mitochondrial cytochrome oxidase I (mtCOI) gene
- Electronic identification keys for mites
- Dichotomous key for the morphological identification of common weevils distributed in Singapore and the region

In addition, to enhance pest control, we studied the efficacy of using blue and yellow sticky traps in monitoring thrips in orchid nurseries, as well as developed an economic threshold for the management of Diamondback Moth population.

### Cultivating good soil for healthy plants

PHL conducts testing on soil mixes to help landscapers determine if the soil mix conforms to the National Parks Board's specifications. Of the soil mix samples tested in FY 2018, the pH level in 73% of samples was found to be within acceptable range but the Organic Matter level was adequate only in 47% of the samples. The Cation Exchange Capacity, which helps soil to hold certain nutrients, was found to be within the specified limit in nearly 66% of samples. We provided remedial recommendations to landscapers whose samples failed meet NParks' specifications.



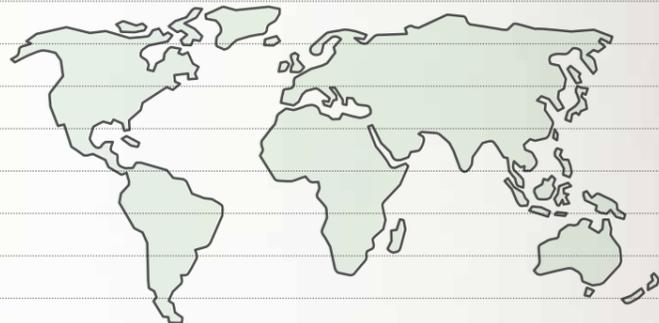
# International Relations

## GOAL:

We forge strong international relations in the areas of agriculture, food safety, animal health, plant health, and conservation of endangered species.

## WE HAVE...

- Negotiated the Sanitary and Phytosanitary Chapters in Singapore's Free Trade Agreement** to facilitate agri-trade, safeguard animal and plant health, as well as to ensure the safety of imported food in Singapore.
- Extended Singapore-Food and Agriculture Organisation (FAO) of the United Nations Memoranda of Understanding (MOU)** on knowledge exchange and technical consultation pertaining to areas of food security, food safety, and animal/plant health.
- Facilitated the signings of and protected Singapore's interests** in the ASEAN-China MOU on Food and Agriculture Cooperation, ASEAN-FAO MOU on Strengthening Cooperation in Agriculture and Forestry; and Amendment Protocol to the ASEAN Plus Three Emergency Rice Reserve (APTERR) Agreement.
- Worked with a world leading conservation biologist** and the US Homeland Security Investigations to tackle illegal ivory trade upstream.



## NOTES:

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## OUR MOMENTS AT WORK: PAST & PRESENT

### In 2006

For the first time, AVA organised the 28th ASEAN Ministers on Agriculture and Forestry (AMAF) and 6th AMAF+3 (China, Japan, and Republic of Korea) meetings. The meetings successfully advanced ASEAN initiatives for regional development.



### This FY

AVA maintained Singapore's interests and cooperation with ASEAN partners at the 40th AMAF and related meetings. We also organised the ASEAN Genetically Modified Food Testing Network, as well as ASEAN Laboratory Directors' Forum where animal health matters were discussed.

# International Relations

AVA maintains close ties with the international community in the spirit of exchange, collaboration, and conservation.

## Strengthening International Relations

In FY 2018, AVA continued to participate in international, regional, and bilateral meetings and collaborations to discuss topics such as food security, cross-border trade, animal/plant health, and wildlife conservation.

### Negotiating Free Trade Agreements

AVA actively participates in Free Trade Agreement (FTA) negotiations together with the Ministry of Trade and Industry to advance Singapore's interests. During the FY, AVA's focussed on negotiating the relevant Sanitary and Phytosanitary Chapters to facilitate agri-trade, safeguard animal and plant health, as well as ensure the safety of imported food in Singapore.

### Extending Singapore-FAO Memoranda of Understanding

In June 2018, Singapore and the Food and Agriculture Organisation of the United Nations (FAO) extended the Singapore-FAO Memoranda of Understanding (MOU) for three years until 2021. The MOU underpins our collaboration with FAO in knowledge exchange and technical consultation pertaining to areas of food security, food safety, and animal/plant health.

### Supporting global cooperation in food safety capacity building

Singapore is a member of the World Bank's Global Food Safety Partnership (GFSP), which supports and promotes global cooperation in food safety capacity building. As part of the GFSP, AVA provided training to officials from developing countries to enhance their laboratory competency. In May 2018, we also organised a study visit for officials from India to learn more about Singapore's food safety regulatory system. Subsequently, laboratory training workshops were conducted for Myanmar and Indian officials at AVA's Veterinary Public Health Laboratory in September 2018 and January 2019, respectively.

### Exploring collaboration with United Arab Emirates

The United Arab Emirates (UAE) Minister of State for Future Food Security, Mariam Al Mehairi, as part of her visit to Singapore in August 2018, met with Senior Parliamentary Secretary for National Development & Home Affairs Ms Sun Xueling and officials from AVA, A\*STAR, and the National Environment Agency. During the meeting, the UAE delegation was given insights into Singapore's food security strategies, as well as food waste and recycling programmes.

The delegation also visited food-related research facilities of leading agri-companies in Singapore, and networked with local agri-food industry members. As both countries share similarities in food security challenges, the meeting covered potential collaborations in the areas of research and development, technological innovations for urban food solutions, and capacity building for the future agri-food workforce.

### Partnering ASEAN in food security and animal health

At the 40th ASEAN Ministers on Agriculture and Forestry (AMAF) and related meetings held in Vietnam in October 2018, AMAF leaders took note of the successful implementation of initiatives that support the Vision and Strategic Plan for ASEAN Cooperation in Food, Agriculture and Forestry 2016-2025. In addition, two MOUs and one agreement on food security were signed: ASEAN-China MOU on Food and Agriculture Cooperation; ASEAN-FAO MOU on Strengthening Cooperation in Agriculture and Forestry; and Amendment Protocol to the ASEAN Plus Three Emergency Rice Reserve (APTERR) Agreement. AVA developed Singapore's inputs to these MOUs and agreement in consultation with relevant agencies. We also ensured that these inputs were taken into consideration during the negotiation of the MOUs and agreement.

In addition, AVA organised the 15th meeting of the ASEAN Genetically Modified Food Testing Network (25-29 June 2018), where a workshop on the quantitative detection of genetically modified organism was also conducted. We also organised the 6th ASEAN Laboratory Directors' Forum (31 October - 2 November 2018). Topics such as animal health, building a strong laboratory network in the region to address transboundary animal diseases, and regional efforts to combat antimicrobial resistance were discussed.



## Reaffirming collaboration and relations with Indonesia

At the 14th Indonesia–Singapore Agri–business Working Group meeting in October 2018, AVA met with Indonesia’s Ministry of Agriculture to reaffirm both Governments’ commitment to boost agri–trade between the two countries, explore potential collaborative opportunities, and foster closer bilateral relations. The Indonesian delegation also visited the Pasir Panjang Wholesale Centre, where they networked with local fruit and vegetable traders.



## Working with Malaysia on animal health

AVA hosted Malaysian counterparts from the Department of Veterinary Services (DVS) and the Malaysian Quarantine and Inspection Services (MAQIS) in October 2018 to discuss issues relating to Avian Influenza, rabies, and African Swine Fever as well as to explore ways to better facilitate the safe trade of livestock.

# Partnering International Stakeholders in Wildlife Conservation

Singapore is a Party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), an international agreement that prevents trade from threatening the survival of wildlife species. As the national authority for implementing and enforcing CITES, AVA partners international and local stakeholders in regulating the trade of controlled species and combatting the illegal trade of endangered wildlife.

## Enforcing CITES in Singapore

AVA regulates the import, export, and re–export of CITES species through the issuance of CITES permits and certificates. In FY 2018, AVA issued a total of 13,564 CITES permits and certificates for the trade in both CITES animals and plants, including their parts and products.

AVA also administers the Endangered Species (Import and Export) Act, which gives effect to CITES by controlling the trade of wildlife species and enabling AVA to carry out enforcement actions. To combat the illegal trafficking of wildlife, AVA cooperates and collaborates with stakeholders to conduct checks and investigations, and take enforcement actions whenever necessary.

In FY 2018, AVA investigated and took enforcement actions on 52 cases related to illegal wildlife trade. These included the successful interceptions and seizures of one live Leopard tortoise and one live Sulcata tortoise; one Black hornbill chick; 29 Fischer’s lovebirds, three Crimson–bellied conures, four Sun/hybrid conures; and 55 live Tarantulas. Five persons were prosecuted in court and offenders were fined up to \$11,400.

## Collaborating to tackle illegal ivory trade upstream

In April 2018, AVA worked with leading conservation biologist and University of Washington Research Professor, Dr Samuel K Wasser, as well as representatives from the US Homeland Security Investigations, to conduct DNA sampling of an illegal shipment of 3.5 tonnes of ivory tusks seized in Singapore. More than 250 ivory samples were collected for forensic analysis by Dr Wasser to trace the geographical origin of the poached elephants. Such information enables conservation law enforcers in identified source countries to take action against poachers.



## Representing Singapore at wildlife enforcement platforms

On 28 August 2018, AVA participated in the Combatting Illegal Wildlife Trade in Transit Workshop, hosted by the British High Commission Singapore. International representatives from customs authorities, the embassy, airfreight industry, and Wildlife Conservation Society shed light on their measures in combatting illegal wildlife trade. AVA also gave a presentation on CITES enforcement in Singapore and the importance of inter–agency cooperation in curbing illegal wildlife trade.

On 25 January 2019, AVA participated in the Special ASEAN Working Group on CITES and Wildlife Enforcement to endorse the documents required for the Special ASEAN Ministerial Meeting on Illegal Wildlife Trade.

# Hosting Distinguished Visitors

During the FY, AVA received several foreign dignitaries and officials, many of whom came to learn about our regulatory control and functions, as well as to visit our facilities and centres.

25 Apr 2018	H.E. Dr Tran Thanh Nam, Deputy Minister, Ministry of Agriculture and Rural Development, Vietnam
25 Apr 2018	H.E. Mr Jacek Bogucki, Secretary of State, Ministry of Agriculture and Rural Development, Poland
30 Apr 2018	H.E. Mr Flavio Damico, Ambassador of Brazil to Singapore
24 May 2018	H.E. Dato Haji Dr Abdul Manaf, Permanent Secretary, Ministry of Primary Resources and Tourism, Brunei Darussalam
21 Jun 2018	H.E. Ms Constantina Koliou, Ambassador of Greece to Singapore
17 Aug 2018	H.E. Mr Dmytro Senik, Ambassador of Ukraine to Singapore
16 Nov 2018	Mr Suzuki Eikei, Governor, Mie Prefectural Government, Japan
21 Nov 2018	H.E. Ms Magdalena Bogdziewicz, Ambassador of Poland to Singapore
17 Jan 2019	Mr Atsuo Watanabe, Deputy Director–General for Export Promotion, Ministry of Agriculture, Forestry, and Fisheries, Japan
21 Jan 2019	H.E. Dr Lajos Bogнар, Chief Veterinary Officer, Deputy State Secretary and Chief Veterinary Officer for Food Chain Control, Ministry of Agriculture, Hungary
18 Feb 2019	H.E. Mr Jun Yamazaki, Ambassador of Japan to Singapore



# Organisational Excellence

## GOAL:

We continue to **prepare for the future** and inculcate AVA's core values in our people. We also **build competencies** in our staff and **deliver excellent service** to the public.

## WE HAVE...

- Embarked on the reorganisation of AVA's food, animal, and plant related functions, and worked towards the formation of the Singapore Food Agency and the Animal & Veterinary Service (under National Parks Board) on 1 April 2019.
- Brought greater convenience to customers by enhancing permit application and payment processes.
- Analysed customer feedback for operational insights, which were helpful in the development of solutions to nuisance caused by birds and stray dogs.
- Achieved 99% compliance ratio and top 3 ranking in the Public Service Division's Minimum Service Standards Audits.



## NOTES:

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## OUR MOMENTS AT WORK: PAST & PRESENT

### In 2006

AVA cares for its people. In addition to various staff welfare initiatives, we organised regular meet-ups between the CEO and staff to promote dialogue and feedback.



### This FY

AVA carried on its engagement with staff through numerous platforms, including newsletters, health/recreational activities, and dialogue sessions with the CEO.

# Organisational Excellence

Globally and within Singapore, we are facing more uncertainties in food security and disease outbreaks. The public also has increasing demands on our services in this digital age. To meet these challenges, we focus on preparing for the future, putting customers first, and honing our skills.

## Preparing for Future Opportunities and Threats

As the issue of food security as well as plant and disease management grows increasingly complex with world trade, geopolitical developments, and climate change, AVA took big strides in FY 2018 in the reorganisation of our functions and transition into a new agency. We also continued to scan the horizon for emerging opportunities, and manage potential risks.

### Reorganising to seize future opportunities

In July 2018, the Government announced the reorganisation of AVA's food, plant, and animal related functions with effect from 1 April 2019.

The Singapore Food Agency (SFA), a new statutory board, will be formed under the Ministry of the Environment and Water Resources (MEWR) to oversee food safety and security. SFA will bring together food-related functions and harmonise regulations currently under AVA, the National Environment Agency (NEA) and the Health Sciences Authority (HSA). The integration will enhance regulatory oversight over all food-related matters from farm to fork and further strengthen our food safety regime. It will also facilitate better partnership with food businesses in developing new capabilities and solutions, and seize future opportunities.

To deepen our capabilities in food safety, a National Centre for Food Science (NCFS) will be established under SFA to consolidate the food laboratory capabilities of the three agencies under one roof. The NCFS will bring together key competencies in food diagnostics and R&D in food safety to ensure that food continues to be safe for consumption and standards are benchmarked internationally.

In parallel, all non-food plant and animal related functions of AVA will be transferred to the National Parks Board (NParks) under the Ministry of National Development (MND). A new Animal & Veterinary Service (AVS) under NParks will be set up and become the lead agency for animal and wildlife management, as well as animal and plant health. AVS under NParks will work closely with the community and other stakeholders to enhance Singapore's positioning as a City in a Garden.

Various engagement and dialogues were held with staff across AVA, NEA, HSA, and NParks, as well as with our industry stakeholders. The AVA leadership team regularly engaged staff through some 20 dialogue sessions to bring them on-board the transformation journey and exchange ideas. A dedicated microsite was created and regularly updated to keep all staff informed of the past and upcoming developments during the transition. Staff were also encouraged to send feedback directly to the leadership team or Human Resource Department to have their concerns and queries addressed.



### Staying prepared and responsive

Global developments and trends can potentially become opportunities or threats to Singapore's overall wellbeing. AVA carries out horizon scanning to stay informed of international news and food alerts related to food safety, food supply, animal/plant health, public health, fisheries, animal management, and wildlife trade. This continued to provide critical lead time for AVA to analyse and assess risks, or promptly respond with mitigation measures.

In addition, crisis management plans are put in place and regularly reviewed to keep pace with the changing global environment. Beyond our emergency response plans for food-related incidents, we continued to study other evolving scenarios, such as food supply disruptions caused by environmental hazards and island-wide power outages.

To ensure we remain operationally ready, annual exercises are conducted to test our contingency and business continuity plans. On the national level, AVA continued to support whole-of-Government peacetime crisis responses and the SG Secure movement to counter the threat of terror.

### Anticipating the future

AVA also continued to study pertinent emerging strategic issues and future scenarios. An internal newsletter on the subject was launched to broaden foresight and increase awareness of the issues related to strategies of the future.

# Putting Customers First

As a customer-oriented organisation, AVA is constantly improving its service delivery to meet ever-rising public expectations. In FY 2018, we continued to focus on providing greater convenience and a seamless customer experience.

## Improving payment process for permit application

Previously, to obtain a permit, fees had to be fully paid first, either via GIRO or at AVA's Service Centre. To provide greater convenience to applicants without GIRO accounts, a trial was initiated for them to be given permit approval before payment was completed, and an option to pay for the permit fee online. The trial was successful and the improved application process was officially implemented in FY 2018.

## Analysing data for operational insights

To gain customer insights and better understand their needs, we analyse customer enquiries and feedback received from various touchpoints. In FY 2018, our analysis identified hot spots for nuisance caused by birds and stray dogs, and the corresponding conditions that led to their congregation. These insights helped our operational teams to develop policies and solutions to resolve issues.

## Enhancing our website and e-Services

AVA's Virtual Assistant, known as 'Ask Jamie @ AVA' was launched on 30 April 2018. As at 31 March 2019, 'Ask Jamie @ AVA' has achieved more than 90% accuracy in providing correct answers to queries. We also made improvements to our online feedback form to enable the uploading of attachments, and to enhance greater accuracy in categorising and channelling feedback to the relevant departments.

In addition, enhancements were made to LicenceOne, a whole-of-Government one-stop business licensing system. It now included the option to apply for licences to treat animals and birds; possess veterinary biologics; and manufacture and process animal feed (feedmill licence), as well as licences for animal research facilities and veterinary centres.



# Performing well in service audit and customer satisfaction

The Minimum Service Standards Audits (MSSA), commissioned by the Public Service Division (PSD), measures agencies' minimum service delivery standards across all touchpoints (i.e. service counter, hotline, and email/online feedback), as well as serves to identify areas for better customer experience and enhanced service delivery. For FY 2018, AVA performed consistently well in the MSSA, and achieved an overall compliance ratio of 99% in the latest audit.

PSD's Customer Satisfaction Index of Singapore measures the overall satisfaction of Singapore residents with public agencies. It comprises four components: customer expectations; perceived overall quality; complaint behaviour; and user trust. In FY 2018, our ranking moved up from 14th to sixth.

# Strengthening Our Values

At AVA, we are guided by our corporate values of excellence, care, integrity and teamwork (ExCITe). In FY 2018, we continued to inspire and encourage our officers to exemplify these values.

## Celebrating excellence

The AVA Achievement Award celebrates and recognises significant inter- or intra-agency projects that exemplify our ExCITe Values. In FY 2018, the award recognised nine outstanding teams that worked on projects related to the Animal Lodge; sighting of monkeys in Segar estate; evaluation of biologics; Trap-Neuter-Release-Manage programme; sale of farmlands; engagement and communications activities by the farm working group; combatting of antimicrobial resistance; and area-wide management of Diamondback Moths. In addition, nine officers received the 'ExCITables' Awards for exemplifying AVA's corporate values in their daily work.

As part of AVA's Reward & Recognition (R&R) programme, five Star, 14 Gold, and 15 Silver AVA Excellent Service Awards were given out to staff who provided consistent good service in FY 2018.

These awards were presented on AVA Service Day in November 2018. The Service Day event highlighted AVA's efforts that were in line with Singapore's Smart Nation aspirations to empower citizens, energise businesses, and engage internationally. AVA's initiatives and achievements in enhancing our service delivery through digital services were also shared.



## Spurring innovation

To create a culture of innovation, AVA has in place initiatives including the TWINKLE (Tapping Wild and INnovative ideas for Knowledge, Learning, and Exchange) and STAR (Striving and Aiming for excellence through teamwORK) schemes, as well as the Innovation Challenge where staff work individually or in teams to improve processes, innovate, and solve problems.

A 'Pain-points and Challenges' (PC) Campaign was launched in December 2017 to provide an open channel for staff to give feedback on issues they encounter at work. These pain points were then addressed by AVA management, and progress updates were reported in our internal newsletters.

With feedback received from the PC Campaign, we reviewed the TWINKLE and STAR schemes, and no longer specified individual targets for TWINKLE and STAR. Instead, officers were encouraged to place greater emphasis on the quality of their ideas. Similarly, the AVA Innovation Challenge was enhanced to enable the transformation of highly innovative ideas into prototypes, thereby encouraging more impactful and meaningful projects.

## Learning Fiesta

AVA's Learning Fiesta is an annual event that fosters the spirit of team bonding and lifelong learning. Themed 'Every day, a learning day,' AVA's Learning Fiesta 2018 featured learning journeys to hi-tech and innovative farms, workshops on wildlife encounters, stakeholder engagement, and latte art.

Learning Fiesta was held on AVA's Innovation Day to the theme of 'Dream, Play, Innovate'. Attendees learned useful insights from presentations by seven teams of officers who worked on various projects such as combatting food fraud through testing, and reducing manual work in processing purchase orders.



## Building Competencies

AVA continued to invest in developing the skills and competencies of our officers so that they are future-ready and well-equipped to perform their duties. In FY 2018, a total of 5.45 learning days per officer was achieved.

AVA's comprehensive training framework is aligned to the ethos of the Public Service and AVA's corporate values. Staff can also access a variety of local and overseas training to boost their technical expertise. During the FY, AVA collaborated with various agencies to organise the following programmes to deepen our scientific and regulatory capabilities:



- **Seminar on current issues in aquaculture and fisheries** – conducted by Professor Alan Reilly, University College Dublin / former CEO of Food Safety Authority of Ireland
- **Workshop on value chain analysis for assessing veterinary surveillance systems and outbreak investigation** – delivered by Professor Dirk Pfeiffer, City University of Hong Kong / former Chief Epidemiologist of the Animal & Plant Health Agency of UK
- **Presentation on the French and German experiences in meeting the challenges of ensuring food safety in Europe** – conducted by the Director-General and senior officials from the French Agency for Food, Environmental and Occupational Health & Safety and the German Federal Institute for Risk Assessment
- **iFood Conference 2019: Advancing food security, safety, and sustainability** – led by world-renowned institutions and industries in the US, Europe and Asia Pacific

AVA also co-organised a workshop on food chemical risk assessment with the International Life Sciences Institute – South East Asia Region under the Global Food Safety Partnership (GFSP). Three overseas experts facilitated the workshop: (1) Dr Paul Brent, Principal Scientific Consultant, Global Food and Chemical Risk Assessment and Risk Assessment Solutions cum lead consultant for GFSP Food Chemical Risk Assessment Programme; (2) Dr Samuel Godefroy, Professor of Food Risk Analysis and Regulatory Systems, University Laval, Canada; and (3) Dr Silvia Dominguez, University Laval, Canada. Additional case studies were contributed by Dr Pharrunrat Tanaviyutpakdee, Assistant Professor, Mahidol University, Thailand and Dr Puspo Edi Giriwono, Assistant Professor, Bogor Agriculture University (IPB), Indonesia.

In addition, staff benefitted from learning programmes offered by the European Union–Better Training for Safer Food (EU–BTSF). Six officers attended two EU–BTSF overseas workshops on safety of aquaculture products and animal disease preparedness. EU–BTSF's e-learning modules on veterinary disease control, food trade and manufacture, aquaculture and seafood processing, and plant/crop sciences were also made accessible to AVA staff. These provided useful technical knowledge that is unavailable locally.

Throughout the FY, in-house training and sharing sessions were conducted, including the first International Relations module which was introduced for officers to acquire relevant skills such as diplomacy. A sharing session was organised to raise awareness of the One Health perspective on battling antimicrobial resistance.

In efforts to develop a pool of talents for the organisation, two undergraduate scholarships were awarded in the areas of environmental science and veterinary science, and one postgraduate scholarship was awarded in the area of One Health.

## Caring for Our People, The Community, and Environment

AVA cares for its people as well as the community and environment. In FY 2018, we continued to engage with staff through our internal newsletters, which featured role models who won the AVA Achievement Award, 'ExCITables' Awards, and AVA Excellent Service Awards. In addition, a series of health, recreational, and family-oriented activities were organised to help staff build esprit de corps, lead a healthy lifestyle, contribute to our community, and conserve resources.

### Health



#### Annual health screening

Complimentary basic package for all staff.

#### Emails containing messages on workplace safety and health

Reminder on workplace safety and health, and how to prevent accidents at work.

#### Health talks

Topics such as eye health, healthy eating, osteoporosis, otorhinolaryngology, and stress management were covered.

#### Bi-monthly fruit day

Complimentary fruit given out as a reminder to eat healthy.

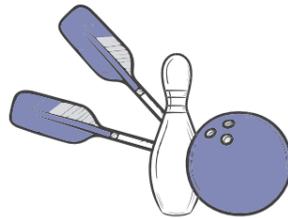
#### Active day

Mass Qigong and Pound Fitness workouts gave participants a chance to sweat it out.

#### Health bazaar

Health and wellness-themed bazaar with vendors selling healthy products and fitness apparel.

### Sports



#### Bowling competition

Annual bowling competition to encourage active lifestyle and staff bonding.

#### Ministry of National Development Recreation Club (MNDRC) cross-country competition

AVA officers, including AVA CEO Mr Lim Kok Thai, participated. The Men's Team came in 1st, Women's Team was 2nd, and Senior Men's Team won 3rd place.

#### MNDRC - Club HDB dragon boat race

AVA Team won two silvers in inter-agency races.

### Bonding



#### Family day

An outing at River Safari and Rainforest Lumina was organised for staff and family.

#### Dinner event

Current and former AVA staff gathered at Marina Bay Sands Ballroom to celebrate and commemorate AVA's achievements.

### Personal wellbeing



#### Financial talks

Basic understanding of investing, money management, and insurance.

#### Change management and wellness talks

Topics covered included work place change and transition, empathic communication, positive work environment, and neck and shoulder massage therapy.

### AVA alumni engagement



#### Outings and visits

Special concession rates for AVA Alumni who visited the Singapore Garden Festival. Alumni members were invited to tour the AVA HQ and attend AVA's final dinner event.

### Corporate social responsibility



#### Blood donation drive

#### President's Challenge 2018

#### International Coastal Clean-Up Day

#### Charity bazaar

Raised more than \$21,000 for our adopted charity Community Chest.

#### Movie screening

Staff sponsored a movie for less privileged children from Community Chest beneficiaries.

#### Environmental sustainability efforts

- Participated in the Annual Earth Hour 2018 by turning off lights at AVA centres with no night operations.
- Made a declaration of climate action pledge and eliminated single-use plastic water bottles at meetings and events.
- Replaced the motor-powered water feature in AVA's Animal & Plant Health Centre with a planter box.
- Discontinued use of battery-operated clocks and removed them from meeting rooms.

# Performance Indicators

## Veterinary Public Health & Food Safety

### Outcome Indicators

Objective	Outcome Indicators	Performance
Ensure a resilient supply of safe and wholesome food to Singapore	Number of cases of food-borne illnesses per 100,000 population directly attributable to AVA	0.57 cases per 100,000 population
	Number of key food items with less than 50% of supply from a single country	Achieved for key food items; pork, chicken, and fish

### Output Indicators

Activity	Volume
To hold business cluster meetings/ trade association meetings	6 engagement luncheons with retailers and association; 5 dialogue sessions with industry/associations
To conduct food sourcing missions/ study trips	1 study trip and 1 sourcing trip
To monitor the compliance status of locally manufactured/ processed food with Food Regulations	94.33% of the total number of inspections conducted in FY 2018 was in compliance with the Sale of Food Act and the Wholesome Meat and Fish Act.  98.7% of the total number of samples collected in FY 2018 was in compliance with the Sale of Food Act and the Wholesome Meat and Fish Act.
To conduct inspection and sampling of export consignments within three working days	100% of the export consignments were inspected and sampled on dates requested by or agreed with manufacturers/exporters.
To process applications for food establishments' licenses within five working days from the date of receipt of application	100% of applications for food establishments' licenses were processed within five working days from the date of receipt of application.

## Animal & Plant Health

### Outcome Indicators

Objective	Outcome Indicators	Performance
Safeguarding animal and plant health	Percentage of freedom from important animal and plant disease outbreaks	94.8% freedom or free from outbreaks of at least 110 out of 116 important animal and plant diseases

### Output Indicators

Activity	Volume
To provide laboratory diagnostic and analytic services to identify and manage animal diseases and plant pests, as well as soil health related problems	289,800 tests
To provide training and certify farm workers on proper handling of pesticides	A total of 36 POC certifications were issued for FY 2018, of which 21 were new applicants and 15 were re-certification

## Food Supply And Technology

### Outcome Indicators

Objective	Outcome Indicators	Performance
Management of the local agri-industry (farming sector)	Level of productivity of vegetable, fish, and layer farms in Agrotechnology Parks and coastal fish culture farms	<ul style="list-style-type: none"> <li>Eggs: 10,825,053 eggs/ha</li> <li>Coastal fish farms: 42.2 tonnes/ha</li> <li>Land-based food-fish farms: 6.33 tonnes/ha</li> <li>Leafy vegetables: 116.45 tonnes/ha</li> </ul>

### Output Indicators

Activity	Volume
Accreditation of overseas food sources	54 inspections
Number of food samples tested	48,429 samples
Number of laboratory tests performed	261,881 tests
To manage farms in agrotechnology parks and fish farming zones	204 land-based farms and 111 coastal fish farms

## Agri-Trade Facilitation Services

### Outcome Indicators

Objective	Outcome Indicators	Performance
Facilitate trade of animal, plant and food product	Ensure no more than 0.3% of certified export consignments are rejected from importing countries	0% rejection

## International And Regional Commitments

### Output Indicators

Activity	Volume
To manage the Marine Fisheries Research Department (MFRD/SEAFDEC) programmes through the provision of infrastructure (land, buildings and supporting facilities) and local staff	Successfully implemented in a timely manner, all regional projects and activities under the MFRD/SEAFDEC programmes, i.e. two regional projects and the SEAFDEC information programme

