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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 & 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 & 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 18 new tests accredited in FY 2017
- Animal Health Laboratory since January 2005, with 2 new tests accredited in FY 2017
- 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

Best Suggestion (Supporting Agency) Award

received from Pro-Enterprise Panel-Singapore Business Federation

Municipal Services Award (Community Category) for The "Management Of Stray Dog Issue through Public Education Efforts"

received from Municipal Services Office

Certificate of Commendation for Outstanding Work Done in Singapore to Combat Illegal Wildlife Trade

received from Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Secretary-General

NS Mark Accreditation

received from Ministry of Defence

Leading HR Practice in Employee Relations & Workplace Harmony Award

Leading HR Practice (Special Mention) in Quality Work-Life Integration

Leading HR Practice (Special Mention) in Learning & Development

Leading HR Practice (Special Mention) in Employee Engagement & Alignment

received from Singapore Human Resource Institute

Excellence in Workplace Wellbeing Silver Award

Excellence in Employee Engagement Bronze Award

received from Human Resource Excellence Awards

Singapore Health Awards Corporate Merit Award

received from Health Promotion Board

Ong Teng Cheong Labour Leadership Institute Workplace Partnership Award (Gold)

received jointly with AUSBE-AVA since 2015

Chairman's Statement

FY 2017 was an eventful year for AVA. We continued our effort to build a resilient and future-ready AVA that is well placed to meet an increasingly challenging and complex operating environment. Our focus is to nurture and build a vibrant and competitive agrifood sector that will provide safe, sustainable and healthy food for Singapore. At the same time, AVA adopted various measures that promote responsible pet ownership and peaceful co-existence between humans and animals.

“ We made good progress in delivering our missions of ensuring food security and safety, animal and plant health, and animal management and welfare. ”

In FY 2017, we made good progress in delivering our missions of ensuring food security and safety, animal and plant health, and animal management and welfare. Let me share some of our key achievements in the past year.



Food security

At AVA, we are deeply concerned about the increasing stress on the world's food supply. The world's population is expected to reach nearly 10 billion by 2050, from 7 billion now. Agricultural land and resources, on the other hand, are decreasing, not increasing. Climate change will compound the difficulties. On the other hand, rapid pace in urbanisation and increasing consumer demands complicate the situation and necessitate the need for innovation and finding new approaches to solutions. Not all is lost, as entrepreneurs, scientists and proactive governments and organisations have been actively seeking new solutions to these challenges and there is light at the end of the tunnel.

In turn, at AVA, we know we have to be prepared to respond to these challenging macro situations as they will affect us one way or another. We know we have to be prepared for various food contingencies and to secure our future demand for food. At the same time, we recognise that there are also economic opportunities in our agrifood sector that could strengthen our food security while providing quality jobs for Singaporeans.

To this end, we have started laying the foundation to significantly increase our local food production. In August 2017, AVA launched its first ever agriculture land tender via concept and price tender method to allow farmers to compete based on best concepts, with a focus on productivity gains rather than on land price alone. AVA awarded the tender for the first tranche of vegetable plots on 9 February 2018, with winning proposals featuring productive and innovative farming systems such as greenhouses with automation and smart controls, and multi-tier hydroponic systems using LED lights and data analytics to optimise growing conditions. AVA has also awarded the tender for the second tranche of food-fish farming plots on 18 April 2018 to companies that would have multi-storey facilities with automated fish pumps and advanced water treatment processes.

To overcome land and manpower constraints, our agriculture sector must

innovate and adopt modern farming practices and technology. AVA has led the way with technology sourcing trips, which were joined by our farmers. In April 2017, then Senior Minister of State for National Development Dr Koh Poh Koon visited several high-tech vegetable farms in China with AVA to learn more about land-based farming and some of the technologies that could be adopted in Singapore. In August 2017, Dr Koh also led a visit to Norway with AVA and our farmers to Aqua Nor – the world's largest aquaculture technology exhibition – to learn about various aquaculture technologies and methods such as deep sea farming. Our farmers were exposed to the latest technologies and automation that could be adopted for sustainable farming to boost productivity and increase capability.

To help our farmers undertake investments in productive technologies, AVA further enhanced the Agriculture Productivity Fund (APF) to increase the co-funding cap from \$700,000 to \$2 million for strategic food farms, and to support piloting and test-bedding of new systems and solutions.

Since late 2016, AVA has worked with the Ministry of Manpower, institutes of higher learning (IHLs), Workforce Singapore (WSG) and SkillsFuture Singapore (SSG) to develop a Singapore workforce for the agrifood industry. One of the initiatives is the development of the Earn and Learn Programme (ELP) to attract and emplace Institute of Technical Education (ITE) graduates into the aquaculture sector. The ELP is a work-study programme that gives ITE graduates a head-start in careers related to their discipline of study. Under this programme, for each ITE graduate employed, companies would enjoy government funding support of up to S\$15,000 for the costs they incur for sending their employees to IHLs for work-related studies. The ELP will build up a local talent pool of workforce with the relevant knowledge and skills.

It is important for our industry partners such as farmers to play a proactive role in the transformation of our farming sector. AVA is working with Singapore Agro-Food Enterprises Federation (SAFEF) – an



Then Senior Minister of State for National Development & Trade and Industry Dr Koh Poh Koon came to show his support for local farmers at SG Farmers' Market event.

industry-led, non-profit federation set up in October 2017 — to identify business opportunities, internationalise and promote local produce. In collaboration with SAFEF, AVA organised the second SG Farmers Market event at Singapore Turf Club in February 2018. The event gave our farmers the opportunity to share more about the various types of locally grown produce with visitors. AVA also worked with SAFEF to exhibit Singapore's fresh produce at the Food and Hotel Asia 2018 in April this year.

To align with AVA's function to ensure food supply resilience, AVA took over Pasir Panjang Wholesale Centre (PPWC) from HDB on 1 January 2018. About 40% of all fruit and vegetable imports pass through PPWC. AVA worked closely with PPWC Association to ensure a smooth transition in the handing over process.



An AVA officer inspecting pigs from Sarawak.

While greater effort is being made to increase local production of food, diversifying our food sources remains a

key strategy to enhance our food supply resilience. In FY 2017, we opened up new egg sources in Thailand, where the first shipment of Thailand eggs arrived in April 2017. Singapore also started regular import of eggs from Australia in June 2017. Adding on to our supply sources of live pigs, AVA facilitated the export of live pigs from Sarawak to Singapore. The first import of live pigs from Sarawak came in November 2017.

Food safety

Our food security strategies are underpinned by a robust food safety programme. We constantly review our food safety legislation to uphold our high food safety standards. The Sale of Food Act was amended in November 2017 to empower AVA to recall food products when contamination is suspected, and license non-retail food businesses such as warehouses, wholesalers or distributors to protect public health. To promote public health, AVA has also set out stricter rules on the labelling and advertising of food, including formula milk for babies.



An AVA scientist in one of our Veterinary Public Health Laboratories.

To stay ahead of developments in food safety testing, AVA has continued to develop new laboratory testing capabilities and repertoire to detect foodborne hazards. AVA also benchmarks its testing capabilities with international laboratories. As a World Organisation for Animal Health (OIE) Collaborating Centre for food safety,

AVA continues to collaborate with other countries and international organisations on capacity building to enhance laboratory testing capabilities in the region.

While our existing food safety regime has performed well, AVA is also looking to address new evolving trends in the food value chain and ensure that food remains safe for consumers. One new trend is novel food, which is food that does not have a long history of consumption. AVA started public consultation on the proposed definition and scope of novel foods in March 2018, the first in a series that will be held in relation to establishing a regulatory framework for novel foods and their ingredients in Singapore.

Another trend is the online retail of food products. Online grocery shopping provides convenience to consumers and is becoming more popular, but at the same time it can pose challenges to how we regulate this form of sale of food. AVA is currently consulting various stakeholders as we look to develop and strengthen our regulatory approach, including online purchase of food.

Animal and plant health

We have put in place bio-security measures to prevent the incursion of animal diseases that may disrupt food production and trade and impact public health. Antimicrobial resistance (AMR) is a serious global threat of increasing concern to human and animal health. AVA worked with other One Health

AMR agencies such as MOH, NEA and PUB to develop Singapore's National Strategic Plan on AMR. Launched in November 2017, the Plan sets out the framework for the national response to AMR. Regionally, AVA continues to lead in AMR initiatives to build up Singapore's status as the lead country in coordinating ASEAN efforts in the livestock and aquaculture sectors.

Regarding other transboundary animal diseases such as rabies and bird flu, we also collaborate closely with our neighbours in the fight against them. AVA continues to work closely with the Indonesian authorities to prevent and control bird flu in Kepri, even though there were no outbreaks of bird flu in FY 2017. In FY 2017, AVA contributed 37,000 doses of rabies vaccines to the Department of Veterinary Services Malaysia to support their fight against rabies outbreak in Sarawak.

For plant health, AVA continues with efforts to prevent the impact of plant pests on the environment, including the wildlife, biodiversity, local food production and trade in Singapore. AVA monitors and conducts surveillance on plant imports and local farms to manage pest issues. AVA also co-chaired ASEAN Expert Group Meetings on Soil and Nutrient Management in support of cultivating good soil for healthy plants.

Animal management

Inculcating a responsible pet ownership culture in Singapore and operating a responsive animal management system are



AVA was awarded the Community Award for Management of Punggol Stray Dog Issue through Public Education Efforts (Community Category) by the Municipal Services Office.

key objectives of the Animal Management Group in AVA. As the first responder for animal related issues, AVA receives wildlife-related feedback and coordinates with stakeholders (such as Government agencies and non-profit organisations) to find solutions to various animal issues. No less important, AVA safeguards animal welfare through regular public education initiatives and takes enforcement actions where necessary.

Managing the size of the stray dog population is one pillar of our animal management strategy. Last year, AVA announced a five-year sterilisation programme to reduce the size of the stray dog population in Singapore. Working closely with various animal welfare groups (AWGs), this initiative aims to sterilise 70% of the stray dogs in Singapore in five years using humane, science-based methods. The initiative will start in the second half of 2018. Additionally, regulation was put in place to improve the traceability of dogs, including licensing dogs at source, and to exercise control over the import and export of pet dogs.

Sustained effort was made on public education last year to shape the right attitudes towards animal welfare and responsible pet ownership. Regular public education and outreach programmes done in partnership with stakeholders, like free pet health checks, were popular and effective and will continue. In June 2017, AVA issued the Code of Animal Welfare for pet owners to set out minimum standards for accountability, animal housing and environment, and acceptable animal care.

Last year, AVA led the development of an animal lodging facility at Lim Chu Kang to house the 7,000 animals affected by the relocation of their premises in Loyang and Seletar. Funded by the government and built with input from various stakeholders, the AWGs, independent shelters and pet farms have started their move to the new home, which we now call The Animal Lodge. AVA will continue its effort to assist the various groups to settle into the new facility and iron out any teething problem.

We were happy that AVA was awarded the Community Award for Management of Punggol Stray Dog Issue through Public Education Efforts (Community Category) and Certificate of Commendation for Cat Management Efforts in Municipal Services Awards 2017 by the Municipal Services Office (MSO). These awards recognise the strong support that AVA has received from the various partners over the years.

International engagements

We had also been very active on the international front. Singapore hosted the Special Senior Officials Meeting of the 38th Meeting of the ASEAN Ministers on Agriculture and Forestry (AMAF) and related meetings. Under Singapore's chairmanship, progress was made on initiatives to strengthen ASEAN food security and enhance the competitiveness of ASEAN's food, agriculture and forestry sectors. The 39th AMAF meeting in Chiang Mai held on 28 September 2017 endorsed the ASEAN Guidelines on Prudent use of Antimicrobials in Livestock, which resulted from a Singapore proposal in 2016.



The Regional Consultation Meeting on Food Safety Indicators Development in Asia-Pacific and the Regional Workshop on strengthening capacities, policies and national action plans on prudent and responsible use of antimicrobials in fisheries.

FY 2017 saw AVA further strengthening its partnership with the Food and Agriculture Organisation of the United Nations (FAO). In December 2017, AVA and FAO jointly organised two workshops in Singapore, viz. the Regional Consultation Meeting on Food Safety Indicators Development in the Asia-Pacific and the Regional Workshop on strengthening capacities, policies and national action plans on prudent and responsible use of antimicrobials in fisheries.

Under the Singapore-Israel Third Country Technical Cooperation Programme, AVA co-delivered with Israel a one-week Food Safety Course at the Hebrew University of Jerusalem, which is part of a 3-week course "Feeding the future: food safety and technology in times of global changes". It covered emerging food safety issues, current food safety hazards, and Singapore's food safety system and capabilities.

Public Service Transformation for better service delivery

In line with the next phase of Government's Public Sector Transformation (PST) efforts, we have developed a 10-year Corporate Plan (FY 2018-2027) that charts our key strategies and initiatives towards our long term goals of nurturing a vibrant and competitive agrifood sector that will meet our food security requirements while providing good jobs for Singaporeans, a progressive safety regime that is respected internationally, and a responsible pet ownership culture that allows animals and man to co-exist harmoniously. We will pay particular attention to emerging trends and technologies and changing consumer needs, so that we can be ready for any opportunities and challenges that come along.

In recognition of our efforts in human resource excellence, AVA bagged four awards in Singapore HR Awards 2017, viz. Leading HR Practices in Employee Relations & Workplace Harmony (2nd time), Leading HR Practices (Special Mention) in Learning & Development, Employee Engagement & Alignment, and Quality Work-life Integration.

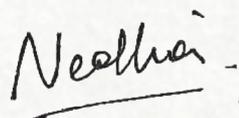
Concluding remarks

FY 2017 was another step forward in our transformation journey. Much more work lies ahead, as we continue to press forward with the transformation journey in FY 2018, for AVA and for the agrifood sector. It is a journey without end, as new challenges would require new solutions. In this journey, AVA does not walk alone. Industry partners, stakeholder associations and key government agencies are active participants too. I would like to thank them for their support in the past year, and I look forward to even stronger partnerships in the years ahead as we jointly march forward.

AVA is blessed with many committed and dedicated staff. Many have tried their best to give their best. On behalf of the Board, I would like to extend my appreciation to them for another year of good work done. In October 2017, we bade farewell to Ms Tan Poh Hong who served AVA diligently as its CEO for many years, and we welcome Mr Lim Kok Thai as the new CEO of AVA.

I cannot thank the Board members enough for their untiring effort in guiding and supporting the AVA management. In particular, I would like to specially thank Mrs Lee Ai Ming, Mr Yeo Guat Kwang, Mr Peter Chia, Professor David Chan, and Mr Tan Kok Yam who stepped down from AVA Board on 31 March 2018, having selflessly served AVA Board for many years. Mrs Lee Ai Ming was also the Chair of the Board Finance Committee. In turn, I would like to welcome Dr Ho Kim Wai, Mr Low Xin Wei and Ms Toh Hwee Tin and Mr Jim Lim to the AVA Board.

If we maintain the strong partnerships and accelerate the momentum of change, I am confident FY 2018 will be better than FY 2017.



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 MS TAN POH HONG (TILL 29 SEP 2017)

- CEO, AVA
- Board Director, AgriFood Technologies Pte Ltd
- Board Member, Tropical Marine Science Institute Management Board
- Board Member, Industries and Services Co-operative Society Pte Ltd

3 MR LIM KOK THAI (W.E.F. 1 OCT 2017)

- Chief Executive Officer (CEO), Agri-Food & Veterinary Authority of Singapore (AVA)
- Board Director, AgriFood Technologies Pte Ltd
- Board Member, Tropical Marine Science Institute Management Board

4 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
- Non-Executive Director, Jason Marine Limited
- Non-Executive Director, Sirius Investment Inc
- Non-Executive Chairman, CrimsonLogic Pte Ltd
- Non-Executive Director, Neo Group Limited
- Non-Executive Director, Singapore Kitchen Equipment Limited
- Non-Executive Director, Cargo Community Network Pte Ltd
- Non-Executive Director, Singapore Cruise Centre Pte Ltd
- Council Member, SBF China and North Asia Business Group
- Non-Executive Director, SCC Travel Services Pte Ltd
- Non-Executive Chairman, Gets Global Pte Ltd
- Council Member, China-Singapore Business Council
- Member, Food Science and Technology Industry Advisory Panel
- Non-Executive Vice Chairman, Japan Food Holdings Ltd
- Shareholder, OJJ Foods Pte Ltd
- Council Member, Malaysia-Singapore Business Council
- Management Committee – Captain of Power, SAF Yacht Club
- Non-Executive Director, Hargol Foodtech Ltd
- Business Advisor, Han Culture & Education Group
- Member, ASEAN- India Business Council

5 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

6 RADM (DR) TANG KONG CHOONG

- Chief of Medical Corps, Singapore Armed Forces

7 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

8 MR LAU TECK SIEN

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

9 MS HARASHA BAFANA

- Board Member, Creative Malay Arts & Culture
- Founder & Director, Adam & Hawa Network

Board of Directors



10 MR PETER CHIA (TILL 31 MAR 2018)

- Chief Executive Officer, Temasek Life Sciences Ventures Ltd
- Commissioner, PT Montori Nusantara
- Director, Bioforest Pte Ltd
- Director, JOil (s) Pte Ltd
- Director, JOil Africa Pte Ltd
- Director, Tridel Biosciences International Pte Ltd
- Director & Chief Executive Officer, Temasek Life Sciences Accelerator Pte Ltd
- Director & Chief Executive Officer, Temasek Life Sciences Laboratory Ltd

11 MRS LEE AI MING (TILL 31 MAR 2018)

- Independent Director, Keppel T&T Ltd
- Justice of Peace, Justice of Peace
- Member, Board of Visiting Justices
- Member, Singapore Copyright Tribunal
- Member, Steering Committee for IP Competency Framework
- Senior Consultant, Rodyk & Davidson LLP

12 MR TAN KOK YAM (TILL 31 MAR 2018)

- Chairman, Agrifood Technologies Pte Ltd

13 MR YEO GUAT KWANG (TILL 31 MAR 2018)

- Chairman, Migrant Workers' Centre
- Chairman, Centre for Domestic Employees
- Assistant Director-General, National Trades Union Congress
- Grassroots Advisor, Aljunied GRC Grassroots Organisations

14 PROF DAVID CHAN (TILL 31 MAR 2018)

- Adjunct Principal Scientist, Agency for Science, Technology and Research (A*STAR)
- Chairman, International Advisory Panel to the National Addictions Management Service (NAMS) and National Council on Problem Gambling (NCPG)
- Co-Director, Centre for Technology and Social Behavioural Insights, A*STAR-SMU
- Professor of Psychology, School of Social Sciences, Singapore Management University (SMU)
- Director, Behavioural Sciences Institute, SMU
- Member, Diabetes Prevention and Care Taskforce, Singapore
- Member, International Panel of Experts, Urban Redevelopment Authority
- Member, National Council on Problem Gambling
- Member, Research and Development Advisory Panel, Urban Redevelopment Authority
- Member, Resource Panel for National Environment Agency
- Member, Social Science Research Council, Singapore
- Member, Governing Board of the Workplace, Safety and Health Institute
- Member, International Advisory Panel, Workforce Singapore and SkillsFuture Singapore
- Member, International Advisory Board of the Centre for the Advancement of Research Methods and Analysis, United States
- Member, National Volunteer & Philanthropy Centre
- Member, Board of Directors, Singapore Corporation of Rehabilitative Enterprise

15 DR HO KIM WAI (W.E.F. 1 APR 2018)

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

16 MR JIM LIM (W.E.F. 1 APR 2018)

- 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

17 MS TOH HWEE TIN (W.E.F. 1 APR 2018)

- Executive Secretary, Attractions, Resorts & Entertainment Union
- Director, Woman and Family Unit
- Supervising Lead, Hospitality & Consumer Business Cluster
- Executive Secretary, Food, Drinks and Allied Workers' Union

18 MR LOW XIN WEI (W.E.F. 1 APR 2018)

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

Leadership Team



- | | |
|---|---|
| <p>1 MR LIM KOK THAI (W.E.F. 1 OCT 2017)
Chief Executive Officer (CEO)</p> | <p>6 DR CHANG SIOW FOONG
Group Director,
Agri Establishment Regulation Group</p> |
| <p>2 MS TAN POH HONG (TILL 29 SEP 2017)
CEO</p> | <p>7 MS JESSICA KWOK SWEE CHENG
Group Director,
Animal Management Group</p> |
| <p>3 DR TAN LEE KIM, KIM
Deputy CEO,
Corporate & Technology</p> | <p>8 DR CHOO LI NAH
Group Director,
Communications &
Corporate Relations Group</p> |
| <p>4 DR YAP HIM HOO
Director-General for Agri-Food
& Veterinary Services</p> <p>Deputy CEO,
Regulatory Programmes & Operations</p> | <p>9 MS MELIN LIM
Group Director,
Corporate Resource
Management Group</p> |
| <p>5 DR CHEW SIANG THAI
Managing Director,
Special Project</p> | |



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10 MR LESLIE PHUA TECK HENG

Group Director,
Food Establishment
Regulation Group

11 MR MELVIN CHOW WING CHUNG

Group Director,
Food Supply Resilience 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 & Organisational
Excellence Group

15 DR CHUA TZE HOONG

Group Director,
Quarantine & Inspection Group

16 DR ASTRID YEO POH KIM

Group Director,
Regulatory Administration Group

17 DR LEONG HON KEONG

Group Director,
Technology & Industry
Development Group

18 MRS TAN-LOW LAI KIM

Group Director, Special Duties,
Food Supply Resilience Group

Organisational Chart and Key Roles of Groups



OFFICER (CEO)

REGULATORY PROGRAMMES & OPERATIONS

SPECIAL PROJECT

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

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 with 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 2018, 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 forward 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

We diversify Singapore's food sources and boost local production to ensure Singapore will always enjoy a wide variety of safe food.

#KeyAchievements

- Continued to provide a stable supply of safe food from about 180 countries worldwide, and further diversified our food sources with live pigs from Sarawak, hen shell eggs from Thailand, poultry from Poland, as well as beef and rabbit meat from Hungary.
- Shaped the farming industry to be more progressive and technologically savvy. Bidders for farmland tenders now compete solely on concept rather than price. Farmers' efforts in piloting and test-bedding new technologies were also supported through the Agriculture Productivity Fund (co-funding cap was increased to \$2 million). At the same time, the next generation of local farmers were nurtured through newly developed internship programmes.
- Championed local produce and collaborated with local farmers through public outreach events such as the SG Farmers' Market.



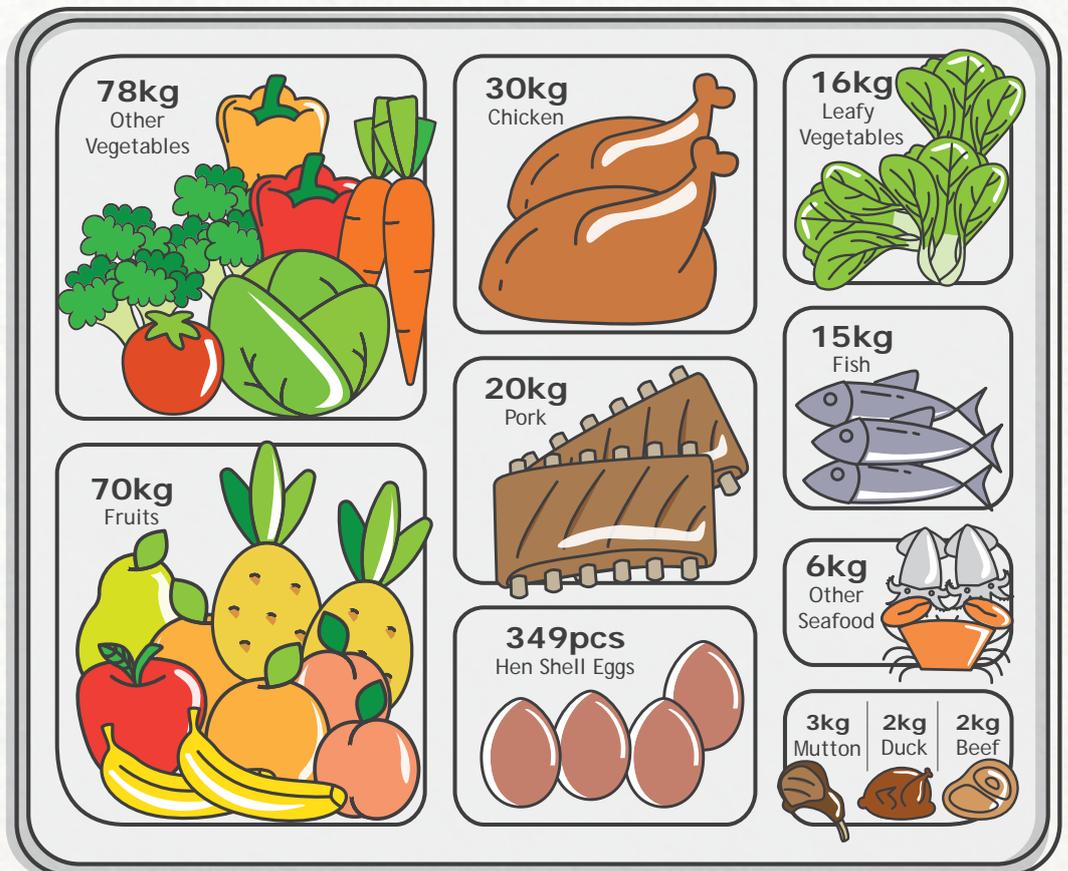
Food Supply Resilience

We enjoy a wide variety and stable supply of food in Singapore. Each food type is sourced from a diversified range of sources, so in times of food shortages or price volatility, the impact can be softened. As such, AVA is constantly on the lookout for new sources of food to import from.

Our reliance on imports must be effectively balanced with a greater measure of self-sufficiency that can tide us over any overseas supply disruption. A small percentage of what we eat is home-grown, and AVA supports farmers in their efforts to improve productivity. We also engage with the public continually on the importance of supporting local produce.

Food Supply in Singapore

Per capita consumption (FY 2017)

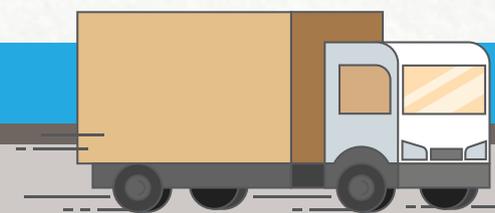
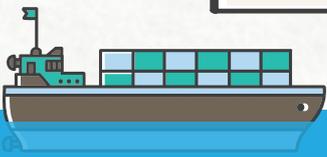
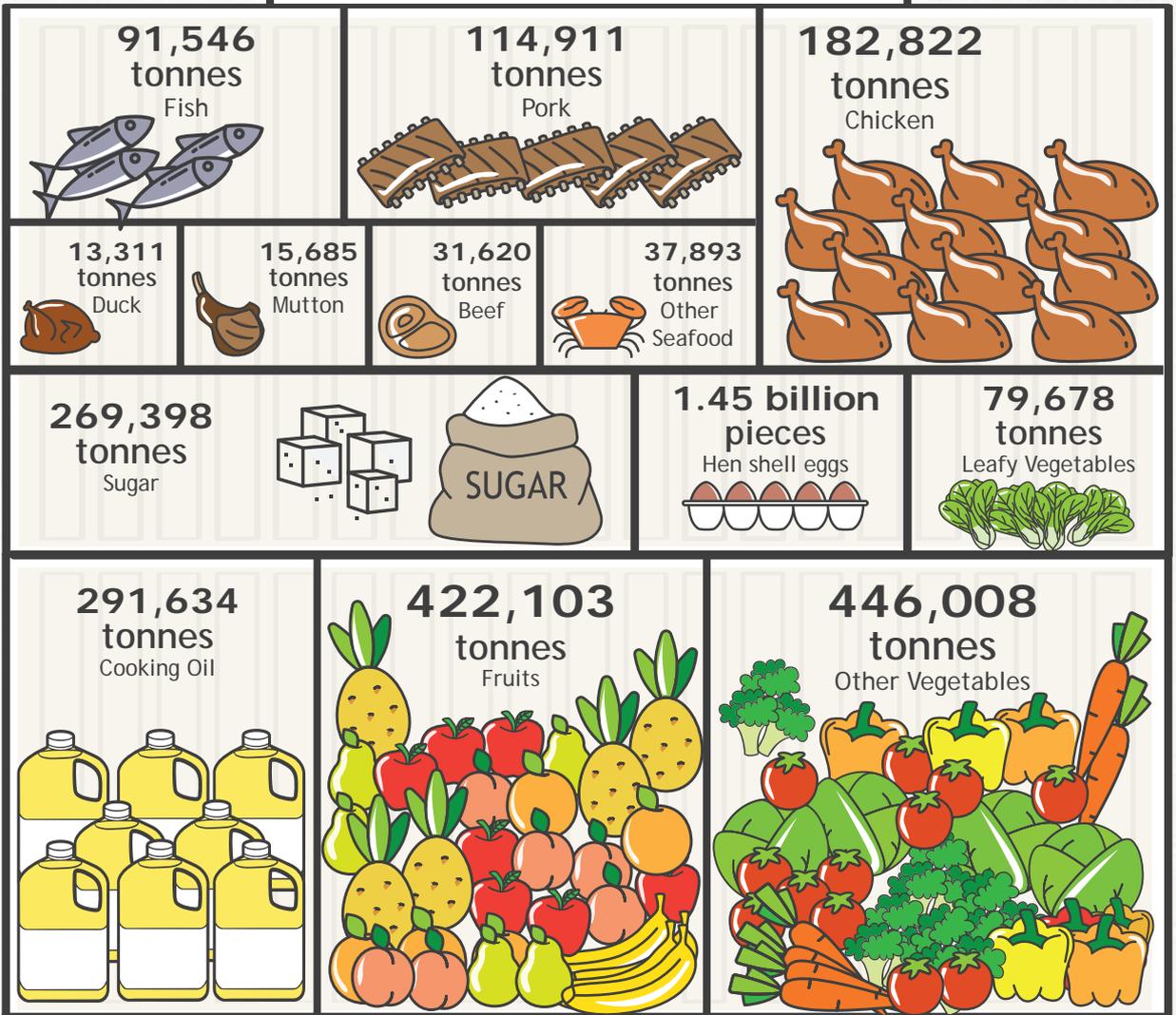
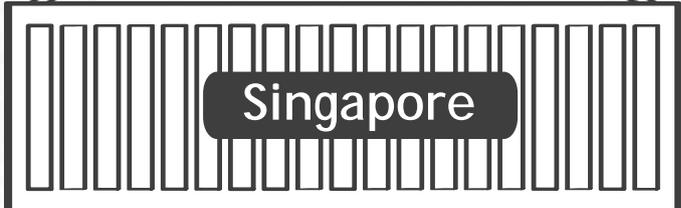
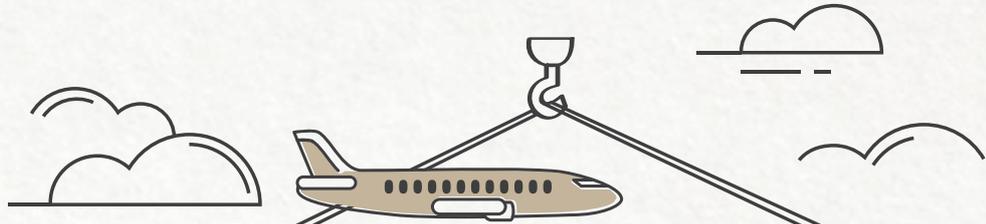


Major sources of supply of key food items (FY 2017)



Import and local production of key food items (2017)

Singapore imports more than **90%** of our food



The remaining are from local farms and landing



11,778
tonnes
Leafy Vegetables

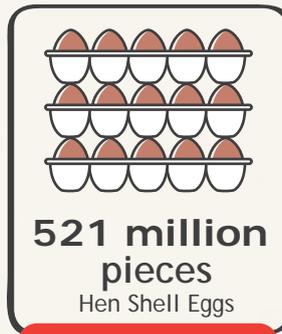
13%
of local
consumption

10,842
tonnes
Other Vegetables



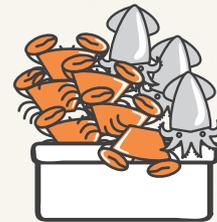
5,916
tonnes
Fish

10%
of local consumption



521 million
pieces
Hen Shell Eggs

27%
of local consumption



582
tonnes
Other Seafood



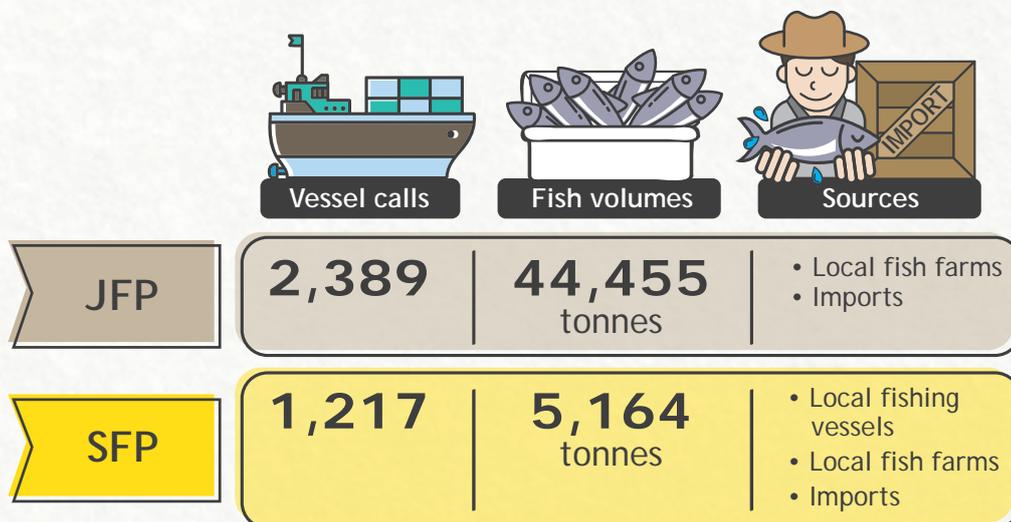
Facilitating Imports

Managing Jurong and Senoko Fishery Ports

AVA manages the Jurong Fishery Port (JFP) and Senoko Fishery Port (SFP), which serve as 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 Malaysia, Indonesia, Vietnam, China, and Thailand.



Vessel calls and fish volumes handled by JFP and SFP (FY 2017)



Taking Over Of Pasir Panjang Wholesale Centre

The Pasir Panjang Wholesale Centre (PPWC) is Singapore's main wholesale and distribution point for imported fruits and vegetables, as well as dried goods. In FY 2017, AVA took over the management of the PPWC from the Housing & Development Board (HDB). The transfer of management was an alignment of the agencies' functions, as AVA is the agency responsible for food supply resilience.

To ensure a smooth transition and to minimise impacts to PPWC tenants, engagement sessions were conducted to facilitate dialogue among members of the PPWC Association, tenants, AVA, and HDB.

Diversifying Sources of Import

With more than 90 percent of what we eat coming from abroad, AVA is constantly exploring new sources of food, so as to reduce Singapore's vulnerability to potential disruptions to supply.

Importing eggs from Thailand and Australia

In July 2016, AVA led a delegation to visit and assess Thailand as a potential additional source of hen shell eggs for Singapore. Following the trip, AVA approved layer farms in Thailand to export eggs to Singapore. As a result, Singapore began importing eggs from Thailand in April 2017.

In addition, another delegation visited Australia in 2016 to forge business ties with Australian egg suppliers. The trip was useful for our importers, who brought in new shipments of Australian eggs in June 2017.

Adding new sources of live pigs and meat

In July 2017, AVA approved the import of live pigs from a farm in Sarawak, Malaysia. This made Sarawak the second source of live pigs for Singapore, other than Bulan, Indonesia. During the FY, 3,800 live pigs from Sarawak were imported into Singapore.



In addition, AVA conducted inspection visits to Poland in May 2017 and Hungary in July 2017. Subsequently, we approved Poland to export frozen chicken, duck, turkey, and geese to Singapore. Hungary also received approval to export beef and rabbit meat to Singapore.

Facilitating pork imports from China

In 2010, AVA signed an agreement with the Jilin City government to establish and maintain a Foot-and-Mouth Disease-Free-Zone (DFZ) in Yongji County, Jilin Province, China. This was part of AVA's regionalisation approach to allow imports from DFZs within countries that are unable to declare freedom from the disease, subject to these DFZ imports meeting AVA's conditions for disease control and surveillance. With this DFZ, Jilin is expected to become a potential additional source of pork for Singapore. In September 2017, AVA conducted an audit of the DFZ to ascertain that it remains free of foot-and-mouth disease.

Linking importers with overseas partners

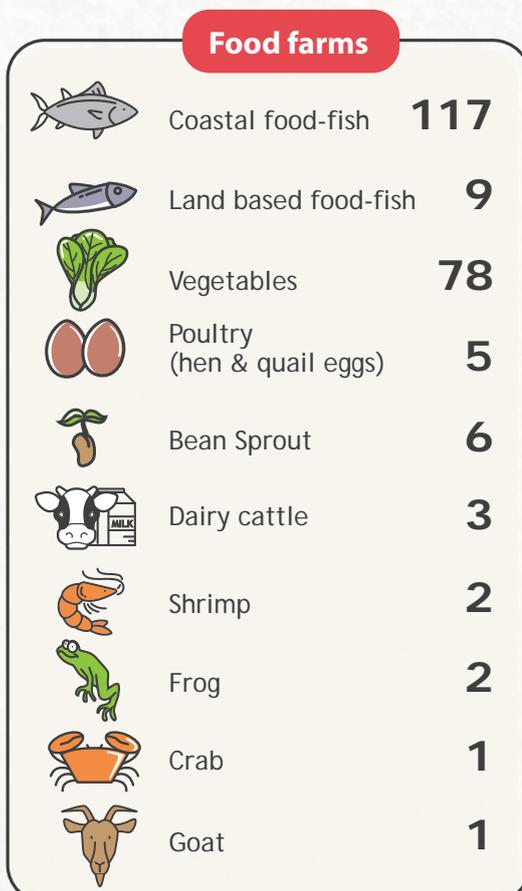
The following activities were conducted in FY 2017 for local importers and overseas partners to network and explore business opportunities.

24 Jul 2017	AVA organised and facilitated a networking session between a South Australia business delegation and Singapore's food retailers.
11-14 Sep 2017	AVA led a Singapore delegation to attend the 13th Indonesia-Singapore Agri-Business Working Group meeting. We also participated in a food sourcing trip and a business networking session in Bandung, Surabaya, and Cirebon, focusing on fruits, vegetables, and seafood.
28 Sep 2017	During the International Enterprise (IE) Singapore's Latin Asia Business Forum, AVA organised a business matching session for local and Latin American food companies.
11 Oct 2017	AVA worked with Innovation Norway (under the Norwegian embassy) to set up a networking dinner for fruit and vegetable industry members from Singapore and Norway.

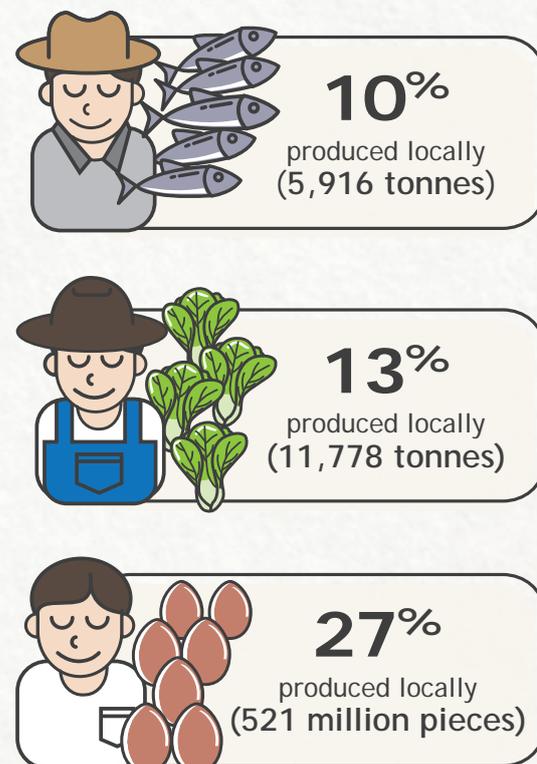
Boosting Local Production

Land-scarce Singapore produces limited amounts of food for local consumption. To be less reliant on imports and to mitigate any disruptions to our food supply, it is important for Singapore to increase local production by leveraging technology.

Licensed food farms in Singapore (FY 2017)



Local production of food-fish, leafy vegetables, and hen shell eggs (FY 2017)



Adopting a new approach to farmland tender

Local farms are encouraged to harness technology to optimise production. In view of this, farmlands are now tendered out using the 'fixed price' tender method, where the land price is set up-front and the bidders compete solely on concept. Concept proposals are evaluated based on production capability, production track record, relevant experience and qualification, as well as innovation and sustainability. This approach ensures that the best concept proposal wins, instead of the highest bid price.

In FY 2017, AVA tendered out 15 plots of land for vegetable and food-fish farming in Lim Chu Kang and Sungei Tengah on 20-year leases. On 9 February 2018, 10 plots of land for vegetable farming were awarded to eight companies.

To help farmers with the new tender process, three advisory sessions on the tender criteria were conducted for over 130 participants. Advice was also provided on the drafting of proposals and business plans.

Improving the evaluation of indoor farming licences

To apply for an indoor farm licence, applicants are first required to submit a farming proposal for AVA's evaluation. Applicants are also provided with a list of guiding questions to help them craft their proposals. In FY 2017, as part of our periodic review and based on industry feedback, we reviewed the farming proposal evaluation process and streamlined our internal workflow. As a result, the time taken for evaluation is reduced from two months to less than one month. At the same time, AVA identified the common issues found in applicants' proposals, and enhanced the list of guiding questions to address these issues. This helped applicants to draft proposals that are more comprehensive, which also helped to cut down the time required for evaluation and clarification.

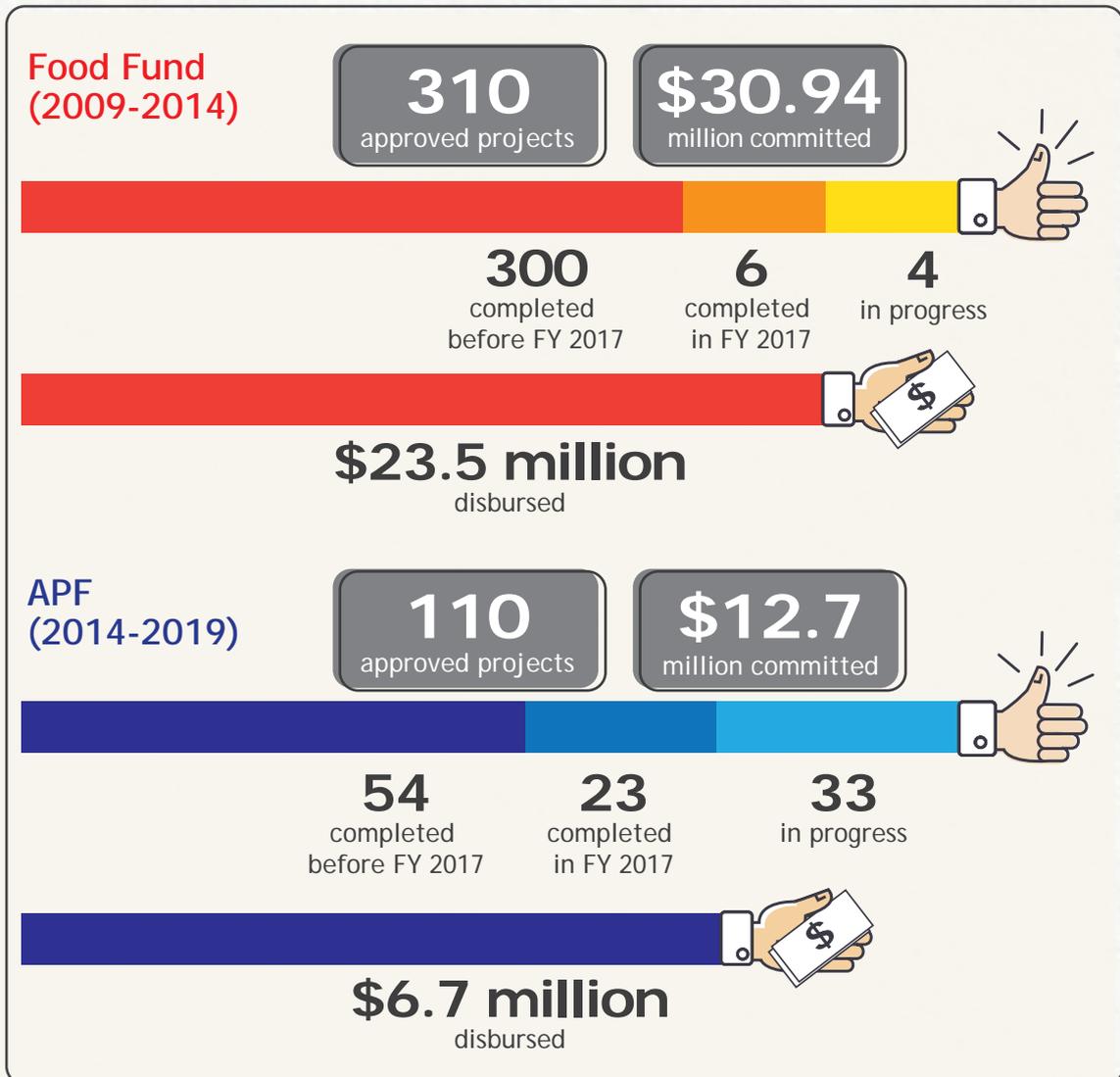
Funding farm upgrades

AVA helps local farms adopt technology through funding assistance for farm improvements, development of technology and innovation, and R&D. 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.

In FY 2017, AVA updated the APF to disburse up to 30% of the approved funding quantum upfront, capped at \$100,000, to help farms with their cash flows. To encourage farmers to adopt new technologies, we also announced that the funding quantum for APF's Productivity Enhancement Scheme will be raised from \$700,000 to up to \$2 million for egg, leafy vegetable, food-fish, and bean sprout farms, and up to \$300,000 per project for all other farms.



AVA's Food Fund & Agriculture Productivity Fund (APF) in review (FY 2017)



During the FY, a total of 29 projects under the Food Fund and APF were completed.

One of our Food Fund recipients, Kok Fah Technology Farm Pte Ltd (Kok Fah), constructed a fully-integrated, multi-purpose greenhouse, complete with an advanced environmental control system. This helped Kok Fah to improve productivity from 139 tonnes per hectare per year to 192 tonnes per hectare per year.

Max Koi Farm received the APF to set up its food-fish farming operations. The APF supported the farm's construction of a two-tier bio-secured facility to nurse food-fish fry. It aims to achieve a productivity of 1.5 million food-fish fry per hectare per year.

Recipients of the APF have cumulatively:

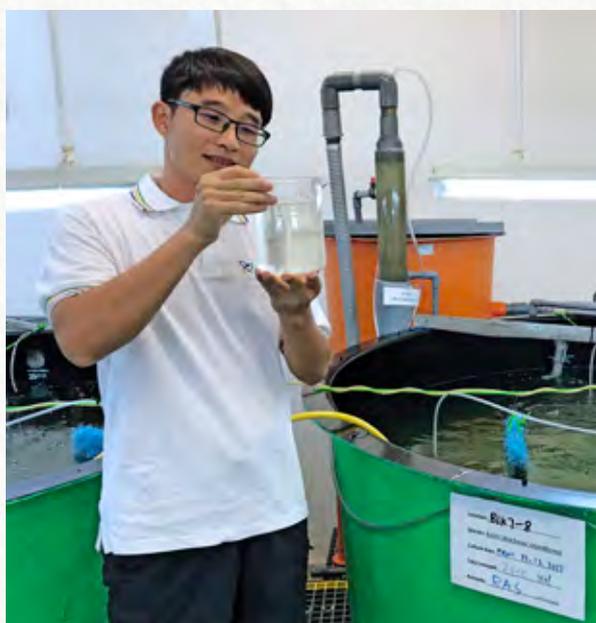
- Cut manpower by 118,100 man-hours
- Increased production of leafy vegetable by 1,019 tonnes
- Increased production of food-fish by 344 tonnes
- Increased production of hen shell egg by 4 million pieces

Encouraging agri-tech development and adoption

AVA's scientists and technologists are constantly researching on and developing agri-tech solutions that suit local farms. Through our projects, initiatives, and sharing with the agri-food industry, we help Singapore's agricultural professionals to intensify production, extend the shelf-life of food products, and minimise food waste. Our efforts are paving the way for Singapore to become a living technological laboratory for urban food production.

Enhancing hatchery productivity with better live feed production methods

Rotifers are small zooplankton used in aquaculture as food for fish larvae. In FY 2017, AVA's Marine Aquaculture Centre (MAC) designed a recirculating aquaculture system (RAS) for the intensive production of rotifers. With the RAS, rotifer production doubled while manpower requirements reduced by 70%. The system also uses less water. We will be sharing this technology and application with local hatcheries to help them increase productivity.



Reducing risk of injury during fish vaccination

Vaccination is an important strategy to protect fishes from infection. This requires physical injection using a needle syringe. For the person carrying out the process, there is a risk of being pricked by the needle. This may lead to injuries ranging from minor cuts to a bacterial infection at the wound or allergic reaction to the vaccine. As protective accessories are not readily available in the market, MAC developed a customised needle guard that protects the hands of the person administering the vaccine. We shared the design of the needle guard with local hatchery owners, who in turn have readily adopted it.



Optimising peat-based growing mix for vegetables

In FY 2017, a local vegetable farm sought technical assistance from AVA to optimise the growth of its crops, which are cultivated in a soil-less mixture containing a peat substrate and wood chips. AVA conducted various trials, and results showed that vegetables grown in 100% peat substrate achieved 54% higher yields than in a soil-based growing mix. Another viable mix was 75% peat substrate with 25% wood chips, which achieved a 24% yield increase. This formulation was introduced to farmers as a more cost-effective option.



Test-bedding hydroponics farming systems

AVA collaborated with Sumitomo Chemical Ltd to test-bed a hydroponics farming system for leafy vegetables in an urban environment. The first phase of the project was conducted from September 2015 to March 2017 at AVA's Sembawang Research Station, where we tested the system with Japanese vegetable varieties.

Following that, in FY 2017, the hydroponics system was replicated in a greenhouse constructed atop AVA's Post-Harvest Technology Centre to test the system in a rooftop environment. We carried out a shelf-life study on the vegetables grown there and the results were positive. The project's partners, which include Kaneko Seeds, and SanTerra, are keen to distribute the production system and vegetable seeds in the Singapore market.

Reducing heat in greenhouses with the use of anti-thermal films

AVA embarked on trials to determine the efficacy of anti-thermal film in reducing the amount of heat trapped in greenhouses, as high temperatures can adversely affect crop growth. The film was developed by researchers from the Nanyang Technological University, and commercialised by SMT Energy Asia. We tested the anti-thermal film at a hydroponics farm. The film allowed about 70% transmission of light required for crop growth, while reducing infrared radiation (heat) transmission by about 60%. Use of the anti-thermal film resulted in better growth uniformity and a 45% improvement in marketable yield on average, as compared to the use of standard polyethylene film. More than 10 local farms have expressed interest in using this anti-thermal film and at least one of them installed it during the FY.



Growing vegetables with artificial lighting

Light is one of the most critical and basic requirements in vegetable cultivation, especially in an indoor environment where artificial lighting needs to be introduced. Trials, sharing sessions, and technical advisories on lighting were conducted during the FY to benefit local vegetable farmers.

In FY 2017, AVA tested the effects of SpectralX shading and light-adjusting nets on the growth of leafy vegetables cultivated using the hydroponics method in modular growing houses. The use of the pink-coloured SpectralX nets slightly increased the amount of red light, which may stimulate plant growth. The nets also provided shade for the growing house, helping to reduce the amount of trapped heat within. The yield was similar when compared to vegetables planted in growing houses with common white-coloured nets. AVA will continue to test the efficacy of other cost-effective and efficient agriculture shading nets.

On 28 February 2018, AVA spoke about indoor vegetable cultivation at the TÜV SÜD Asia Pacific workshop on Lighting for Controlled Environment Horticulture. Following the talk, several companies reached out to AVA with requests to co-develop lighting solutions. Farmers also sought our assistance in overcoming technical challenges.



Monitoring temperature in real-time to ensure cold chain management

AVA collaborated with Ban Choon Marketing Pte Ltd to test-bed the efficacy of a real-time temperature monitoring system in ensuring effective cold chain management. Under this project, which was funded by SPRING's Capability Development Grant, automatic temperature data loggers were placed in the company's ante room, cold store, and delivery trucks. Data from the logger were compared against those collected manually in the previous year.

Results showed that the real-time temperature monitoring system was useful in improving and ensuring the integrity of a cold chain system. Staff were alerted automatically when temperatures fell below acceptable levels. The system also provided reliable data and reduced the need for manual temperature recording.

Learning and networking opportunities

In FY 2017, AVA organised overseas trips, trainings, and networking platforms for local farmers and agri-businesses to learn about the latest agri-tech developments, and forge ties with potential collaborators.

Agriculture

In April 2017, then Senior Minister of State for Trade & Industry and National Development Dr Koh Poh Koon led a study trip to Beijing, Hainan, and Guangdong to learn about greenhouse cultivation, vertical farming, and other vegetable farming technologies in China. Participants also learned how farms in these areas reaped the benefits of cultivating vegetables without soil medium, using the Internet-of-Things approach to create greater ease in farm management, and installing sensors and advanced monitoring systems. In another study trip in August 2017, Dr Koh and the Singapore delegation visited Norway to learn about Norway's successful aquaculture industry and source for suitable aquaculture technology at the AquaNor exhibition. The delegation also visited a vertically integrated fish farm and a fish processing plant.



In March and September 2017, we conducted two technology matching sessions for local fish and vegetable farmers, solution providers, members from institutes of higher learning, and agri-business investors to explore opportunities in productive and sustainable farming.

In May and November 2017, another two workshops were conducted, covering topics on workplace safety and health, antimicrobial resistance, use of disinfection techniques to reduce disease, and farm contingency planning.

Post-harvest

In April 2017, a workshop was jointly organised by AVA, the Singapore Manufacturing Federation Standards Development Organisation, and Food Innovation and Resource Centre to enhance the industry's understanding of the Technical Reference (TR) 49: 2016 Cold Chain Management of Frozen Fish and Seafood. The workshop covered the methods of assessing fish quality, cold chain technologies, and audit methodologies. Site visits to NTUC FairPrice and Jurong Coldstore were also conducted for participants to learn about the implementation of seafood cold chain systems there.

In May 2017, AVA conducted a seminar on fresh-cut produce processing, with support from the 'Project for Strengthening Capacity Building in Agriculture Sector in ASEAN Countries'. An expert from the Food Research Institute (National Agriculture Research Organisation) spoke at the seminar, along with speakers from Nanyang Polytechnic and AVA. Topics such as food safety, quality management, market trends, and technological updates related to fresh-cut produce and processing were covered. The expert also

visited three companies and provided on-site technical advisory.

In September 2017, AVA conducted a seminar on good handling practices of fresh leafy vegetables. Participants learned about advanced cold chain and packaging technologies that can help to preserve vegetable quality. We also demonstrated the application of a pre-cooling technology and a grading system for four common types of vegetables.



A fruit-cutting course was also co-organised by AVA, the Singapore Hotel and Tourism Education Centre, and Singapore Fruits & Vegetables Importers & Exporters Association, to impart good and safe handling and cutting techniques to members working in fruit processing plants and retail stores. Participants gained insights into preservation methods for cut fruits, automated cut-fruit processing technologies, the setting up of a fruit-cutting plant, and assessment of the quality of fruits for cutting.



Promoting post-harvest technology for fisheries in ASEAN...

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 programmes.

In July 2017, AVA successfully organised a regional training course titled 'Specimen Preservation and its Application in Harmful Algae Bloom Monitoring and Studies', which covered lectures and practical session on specimen preservation methods; species identification and enumeration methods through the use of fluorescence and electron microscopy; as well as flow cytometry. We also conducted a progress meeting on the development of guidelines for the cold chain management of seafood.

To commemorate the 50th anniversary of SEAFDEC, Singapore, together with other ASEAN member states and Japan, adopted a 'Resolution on the Future of SEAFDEC' in November 2017. The resolution highlighted plans for SEAFDEC to play a larger role in fisheries management and conservation in the region.

In addition, delegates from the Post-Harvest ASEAN-AVRDC (Asian Vegetable Research and Development Centre) Regional Network (PH-AARNET) workshop visited AVA's Post-Harvest Technology Centre, where they were presented with an overview of our post-harvest vegetable research and training programme, as well as vegetable post-harvest technologies.

Nurturing a future generation of agri-talents

Beyond equipment, technologies, and R&D, Singapore also needs to build a local pool of talents for farms of the future. Farming has to be seen as a viable career option so as to attract a future generation of locally bred agri-specialists.

In FY 2017, AVA worked with farms, the Republic Polytechnic, and Temasek Polytechnic to develop structured internship programmes. The internship allows students to apply their knowledge and practical skills learned at school. During the FY, we provided aquaculture training for two interns. In addition, 20 students were placed on internships at 10 local fish farms.

To enable continued education at the tertiary level, Temasek Polytechnic added a new aquaculture course to its list of 'SkillsFuture Earn-and-Learn' work-study programme. It targets graduates from Institutes of Technical Education who wish to deepen their skills in the aquaculture industry. Under this 12-month course, farms receive up to \$15,000 worth of incentives to defray the cost of training each course participant. Participants also have the option to further take up the remaining modules required to obtain a Diploma in Applied Science (Aquaculture).

Beyond working with polytechnics, AVA also collaborated with the James Cook University to organise a practical training session for undergraduates of the Bachelor of Business and Environmental Science (Aquaculture) degree course. Conducted at MAC, the session allowed participants to learn techniques of live feed production and zooplankton preparation.

During the FY, AVA hosted 14 learning journeys to MAC where over 300 students, teachers, and members of public learned about the R&D efforts and techniques that enable large-scale production of food-fish in Singapore.



Engaging with The Industry and Community

In FY 2017, AVA actively engaged with the farming industry and community to raise awareness of food security.

Engaging with the industry

On 29 March 2018, AVA organised a dialogue session for Senior Minister of State Dr Koh Poh Koon and AVA CEO Mr Lim Kok Thai to engage with more than 100 local farmers. Dr Koh and Mr Lim touched on the various initiatives that AVA has in place to support a hi-tech agricultural industry in Singapore. Participants had the opportunity to learn more about the enhancements AVA made to the APF, the 'SkillsFuture Earn-and-Learn' work-study programme for aquaculture, as well as the importance of agri-technology, and how it contributes to food security.

The 3rd AVA Food Industry Convention was held on 1 November 2017 at the Marina Bay Sands Expo and Convention Centre to increase the industry's awareness of food security. Minister for National Development and Second Minister for Finance, Mr Lawrence Wong, was the Guest-of-Honour. Over 470 guests from the industry, government agencies, academia, and overseas trade offices attended the convention. AVA also presented tokens of appreciation to over 100 industry stakeholders whom we have worked with in business clusters and task forces over the past two years.

Gardening in the community

Under the MasterGrower programme, community gardeners are trained by an AVA expert, who will teach them the basics of growing pesticide-free vegetables. Upon completion of the training, these community gardeners, or MasterGrowers, then share their skills with other community gardeners. The MasterGrower is also an advocate for local produce, helping to raise awareness of the importance of local produce to Singapore's food security. In total, more than 480 MasterGrowers had been trained.

Training was previously conducted at AVA's Horticulture Services Centre in Sembawang. In FY 2017, AVA worked with the National Parks Board (NParks) to hold the MasterGrower sessions at HortPark. We further collaborated with NParks by sponsoring seeds for its Community Edibles competition on 3 November 2017. MasterGrowers also gave a series of 'How-to-Grow' talks during the "NParks Gardeners' Days Out" events held between May and October 2017.

AVA has been working with the community gardeners in various Group Representation Constituencies (GRC) to help them grow more produce. We guided community gardeners from Sembawang GRC in growing vegetables and spices, which became part of the ingredients used to prepare food for an event in October 2017 that commemorated the 50th anniversary of National Service. We also developed a low-cost, vertical, leafy vegetable planting system that has been undergoing trials in the Ang Mo Kio-Teck Ghee GRC's community garden since November 2017.

In addition, between June and September 2017, AVA helped the Hindu Endowments Board-Ashram Halfway House in Sembawang to revamp its garden and trained its staff in vegetable growing.



Educating The Public On Local Produce and Frozen Meat

To complement the efforts of local farms in increasing productivity, AVA continues to encourage consumers to choose local produce and support our farmers. Through events, roadshows, promotions, and various digital outreach efforts, we raise public awareness of local produce as well as frozen meat as an alternative to chilled meat.



As part of AVA's efforts to raise public awareness of local produce, we organised the first SG Farmers' Market in September 2017 at myVillage mall in Serangoon Gardens. More than 10,000 residents from estates nearby came to buy home-grown vegetables, fish, and eggs, as well as enjoy the 'live' cooking demonstrations, stage games, and children's activities. In view of the good response, AVA co-organised a second Farmers' Market at Singapore Turf Club with the Singapore Agro-Food Enterprises Federation on 10-11 February 2018. More than 20 local farmers participated in each edition. A series of media publicity was rolled out to promote both events via the television, print, web, and social media.

AVA supported N.E.mation!12, an annual inter-school digital animation competition organised by Nexus, for students to creatively express their thoughts on Total Defence. For students producing animations based on the topic of food security, AVA conducted a briefing and organised a farm tour to Sky Greens. An animation, which featured Singapore's use of innovation to boost local food production, won the third prize.

AVA continued to participate in the annual Singapore Food Expo (May 2017) and Asia Pacific Food Expo (November 2017) organised by the Singapore Food Manufacturers' Association to raise awareness of locally farmed produce and food alternatives such

as frozen meat. We conducted cooking demonstrations featuring these food items. Visitors were given the opportunity to taste these dishes, as well as learn more about these food items through AVA's educational materials and quizzes.

AVA participated in the quarterly farmers' markets organised by the Kranji Countryside Association by setting up educational booths to engage with the public. Visitors also took part in our instant photo print and children's activities that carried messages on local produce.



AVA and NTUC FairPrice collaborated to promote local produce via quarterly consumer promotions, in-store branding, and newspaper advertisements that emphasised the quality and freshness of local produce. AVA also continued to support FairPrice's annual 'Made in Singapore' fair by conducting cooking demonstrations at participating outlets to encourage shoppers to choose local produce.



AVA and Google Singapore co-organised a Google-SG Farmers' Bazaar to raise awareness of local produce amongst 300 Google staff. As part of the bazaar at Google's premises, we invited Citizen Farm to conduct a talk during lunchtime and engaged with Google staff through a quiz on local produce.

AVA continued to work with Temasek Polytechnic's School of Culinary and Catering Management to incorporate the topic of local produce into its diploma course content.

To spread messages on local produce, AVA also participated in the Singapore Botanic Gardens Heritage Festival, Raffles City Farmers' Market, the National University of Singapore's sustainABLE event, and Ministry of Education's Nutrition & Food Science seminar.





Food Safety

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.

#KeyAchievements

- Enhanced the detection of drug and pesticide residues, chemical contaminants, toxins, viruses, and animal DNA in food, by improving the turnaround time, throughput, and accuracy of about 20 laboratory testing methods.
- Supported the industry in adopting and test-bedding new technology, by reviewing our regulatory framework to allow establishments to share expensive equipment and pilot facilities.
- Maintained a good level of food safety in the industry, with close to 60% of establishments achieving grades A and B in our audits. The number of Food Safety Excellence Award recipients also increased by 22%, a sign that more industry partners are sustaining their A grades and high food safety standards.



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 shared responsibility, AVA also engages with the industry and public to do their part in keeping food safe for consumption.



Regulating Imports

Staying abreast of international regulatory developments

Amendments to the Food Regulations came into effect on 28 March 2018. The majority of the amendments were related to the use of new additives, expanded use of existing additives, as well as stricter requirements. These amendments are in line with the latest scientific and regulatory developments by international standard-setting bodies. The amendments have:

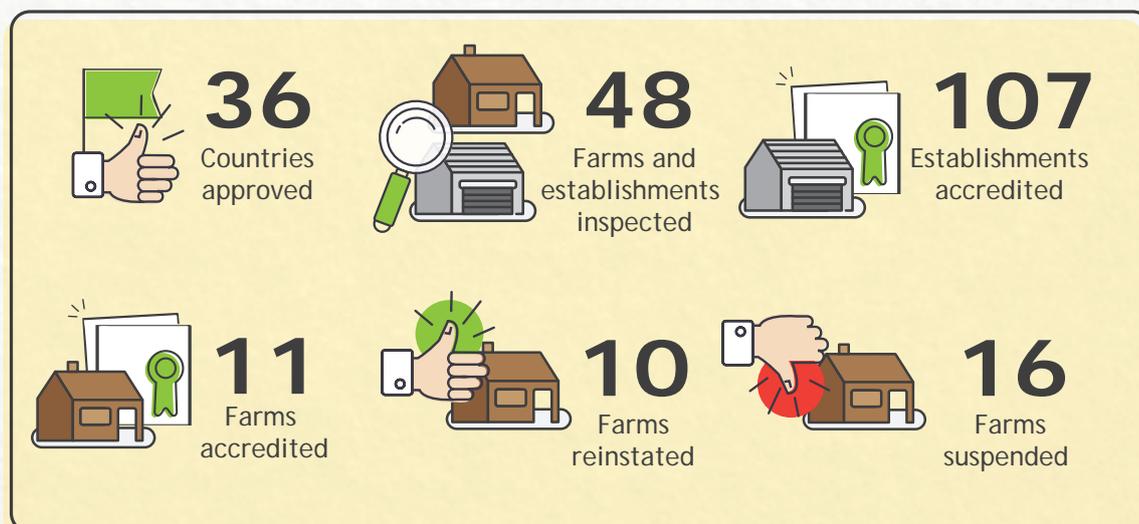
- Allowed the use of new additives and ingredients (e.g. calcium L-methylfolate as a source of calcium, and 2'-fucosyllactose, and Lacto-N-neotetraose, for use in infant formula).
- Extended the use of existing food additives to additional food categories (e.g. Sucralose for use in cheese-based preparations, at levels up to 500 ppm).
- Removed provisions for the use of propyl para-hydroxybenzoate and sodium propyl para-hydroxybenzoate in food, as these two preservatives are no longer considered safe for use as food additives.
- Removed the maximum residue limits (MRL) for six pesticides (Aldrin, DDT, Dieldrin, Endrin, Heptachlor and Lindane), as their usage worldwide had been phased out since 2004 under the Stockholm Convention. Due to their persistent properties, their residues can remain in the environment and may still be found in agricultural commodities. As such, AVA adopted the extraneous maximum residue limits (EMRLs) established by the Codex Alimentarius Commission for these six pesticides.

To stay abreast of international food safety developments, AVA participates in Codex Alimentarius meetings where food safety and quality standards are discussed. The 40th Codex Alimentarius Commission adopted 42 new and revised Codex standards. AVA will take these developments into consideration when reviewing our Food Regulations.

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 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 assess, evaluate, and take the necessary enforcement actions, such as suspension of import.

Accreditation of sources (FY 2017)



Previously, AVA-approved countries with a 'controlled risk' of BSE were only allowed to export deboned beef from cattle under 30 months of age. In addition, AVA-approved countries or zones that are Foot-and-Mouth Disease (FMD)-free with vaccination were only allowed to export boneless meat to Singapore. To align with guidelines from the World Organisation for Animal Health (OIE), AVA reviewed its import conditions in FY 2017. The following meat and meat products can now be imported into Singapore from the previously affected countries:

- De-boned beef cuts from cattle of all ages
- Bone-in beef cuts from cattle under 30 months of age
- Bone-in meat, and offal of ruminants and pigs from countries or zones that are FMD-free with vaccination

In addition, we also allowed accredited layer farms exporting eggs to Singapore to vaccinate their flocks against *Salmonella Enteritidis* (SE). Vaccination, together with proper bio-security and sanitary measures as well as flock management, will reduce the risk of SE contamination in eggs.

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 2017, AVA issued more than 900,000 import permits to about 14,000 licensed or registered traders.

Food import permits issued (FY 2017)

	Meat and Meat Products	Fish and Fish Products	Fruits and Vegetables	Processed Food	Egg and Egg Products	Total
No. of licences / registrations	2,387		1,166	10,305		13,858
No. of import permits issued	23,208	185,747	262,606	460,612	692	932,865

Inspecting and sampling food imports

Imported consignments are subjected 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 2017)

Type of food	Volume inspected (tonnes)	Value inspected (million)	Consignments inspected	Samples tested
Meat & Meat Products	273,375	1,217	81,417	7,646
Fish & Fish Products	3,983	56	2,867	2,437
Eggs & Egg Products	6,030	22	1,140	1,009
Fruits & Vegetables	3,034	5	7,897	7,558
Processed Food	10,005	23	4,810	3,300
Total	296,427 tonnes	\$1,323 million	98,131 consignments	21,950 samples

Fighting 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 2017)

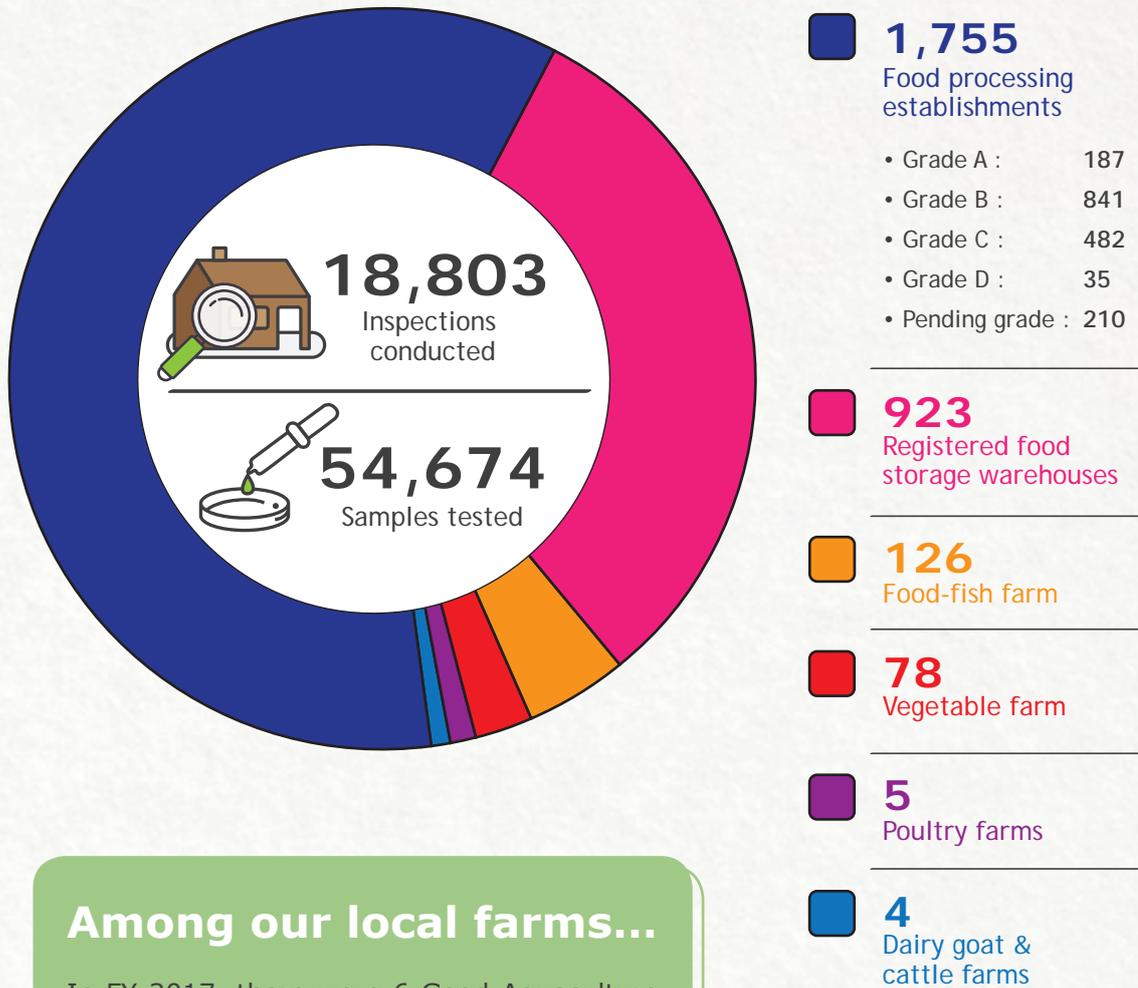
Type of food	Meat & Seafood products	Fruits & Vegetables	Processed food	Total
Prosecution	5	3	1	9
Compound fines	4	32	10	46
Warnings	10	5	338	353
Total	19	40	349	408

Regulating Local Food Production

AVA licenses all local farms and food establishments, including processing establishments, slaughterhouses, and cold stores. In addition, all food storage warehouses are encouraged to be registered with AVA on a voluntary basis. Site inspections are carried out to ensure that these establishments comply with our licensing conditions and observe proper bio-security, food safety, and hygiene practices. Samples are also taken for a range of tests for food safety hazards such as pesticide residues, heavy metals, microbiological contaminants (like *E. coli* and salmonella), and chemical contaminants. Licensed local food processing establishments are audited annually to determine their grading status. AVA also provides advice related to Good Hygiene Practices and Good Manufacturing Practices to help establishments improve and upgrade their premises.



Inspection and sampling in local farms and food processing establishments (FY 2017)



Among our local farms...

In FY 2017, there were 6 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.

Managing diseases in local animal farms

In June 2017, dioxins were detected in catfish samples from a local land-based fish farm. The affected batches were destroyed. Dioxins are a group of highly toxic environmental pollutants, which tend to accumulate in the food chain. AVA continued to monitor fish produce from this farm, to ensure food safety.

Facilitating religious slaughtering: Korban 2017

In FY 2017, AVA issued 39 special permits for religious slaughtering. These included 3,924 sheep from Australia, which were slaughtered at 27 approved premises for Korban on 31 August and 1 September 2017.

AVA worked closely together with the Singapore Mosques Korban Committee and the Islamic Religious Council of Singapore to ensure animal welfare and food hygiene standards are maintained. This included implementing effective standard operating procedures, training, and regulatory oversight at all the mosques. Emphasis was placed on making sure that sufficient ventilation was provided in the lairages and on improving the overall housing conditions of the animals. AVA inspected all 27 premises and found that animal welfare standards for Korban 2017 were satisfactory and in line with international standards and AVA's Code of Practice for Animal Welfare.

Supporting Local Food Industry

In FY 2017, AVA worked with industry partners to explore cost-effective ways to test and adopt new technologies, while ensuring food safety standards are met. A new regulatory framework was implemented to allow the shared use of the expensive high pressure processing (HPP) equipment, which kills food-borne pathogens and extends the shelf-life of food with ultra-high pressure. We also developed licensing conditions for pilot plants, where research and production facilities can be shared among companies. They can use these facilities to scale up production of food prototypes for market trials, before investing in a full-scale production line.

On 1 July 2017, AVA also revised the labelling requirement for pre-packed whole chilled poultry carcasses meant for supermarkets. Previously, a label bearing the slaughter date and name of the slaughterhouse must be affixed on the carcass. In response to industry feedback that such labelling placement was impractical, we removed restrictions on the placement of the labels to allow the labels to be placed on the packaging instead.

We also facilitate the export of food and food products by issuing internationally recognised certificates and permits. In FY 2017, AVA issued 7,139 free sale certificates, 3,764 food export certificates, and 2,812 veterinary health certificates for exported food and food products.

A Food Export (FoodEx) Certificate is issued for the export of processed products. The certification process involves booking of appointments, as well as waiting and paying for AVA to inspect, collect samples, and conduct laboratory testing of samples from all export consignments. As part of our regular review of our programmes, and taking into consideration industry's feedback, a FoodEx accreditation scheme was piloted in May 2017.

Under the pilot scheme, AVA accredits companies that maintain robust internal controls and food safety standards. Accredited exporters need not have every export consignment inspected and sampled for testing in order for AVA's FoodEx Certificates to be issued. As a result, accredited establishments enjoy savings in costs for inspection and laboratory tests, which are no longer required. The need and cost for storage is also reduced, as products need not be held while waiting for test results and certificates to be issued. In addition, the time required to obtain the FoodEx Certificate is reduced.

This FoodEx initiative earned AVA the 2017 Pro-Enterprise Panel-Singapore Business Federation (PEP-SBF) Award for Best Suggestion (Supporting Agency). The Singapore Food Manufacturers' Association (SFMA), which mooted the feedback on FoodEx certification, took home the PEP-SBF Award for Best Suggestion (Suggestor) [sic]. This award category recognises private-public collaborations that led to changes in rules and regulations.



Enhancing Laboratory Capabilities

AVA's Veterinary Public Health Laboratory (VPHL) is the national diagnostic laboratory for food-borne hazards and plays a pivotal role in enforcing our food safety standards. In FY 2017, VPHL generated more than 2.7 million laboratory results from tests conducted on about 51,000 samples of imported and locally produced food products. Under the One Health framework, we also provided testing services for the investigation of 36 food-borne disease outbreaks.



Volume of tests conducted at VPHL (FY 2017)

Functions	Export certification	Import control	Surveillance	Commercial	Inter-laboratory proficiency testing	Total
Samples tested	2,508	31,993	12,587	3,549	144	50,781
Laboratory tests performed	9,352	152,855	85,353	8,227	-	255,787
Results obtained	14,486	1,916,502	582,845	200,519	-	2,714,352

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 231 tests, which included 18 new tests accredited in FY 2017 (Table 1).

In addition, VPHL continued to benchmark its testing capabilities by participating in three inter-laboratory proficiency programmes administered by the UK's Food and Environment Research Agency in FY 2017, and continued to perform well in the following assessments: Food Examination Performance Assessment Scheme, Food Analysis Performance Assessment Scheme, as well as the Laboratory Environmental Analysis Proficiency Scheme (Emergency Contingency Scheme), which tested VPHL's capabilities in the non-targeted screening of an unknown contaminant in potable water. We also participated in 13 proficiency testing schemes and achieved good results.

During the FY, 31 additional methods were developed to establish new testing capabilities (Table 2), and 14 key enhancements were made to improve accuracy and turnaround time (Table 3).

In addition, a rapid GC-MS/MS method to detect fipronil residues was developed. This method allowed VPHL to efficiently test egg samples when the food scare of fipronil-tainted eggs broke out in the EU. Over 120 samples of fresh eggs and egg products from Singapore and various countries were tested using this method. None of them were tainted with fipronil residues.

Table 1: New tests accredited by SAC-SINGLAS (FY 2017)

- Determination of arsenic, cadmium, lead, copper, iron and zinc in sea water using ICP-MS
- Determination of copper, iron, selenium and zinc in seafood and seafood products using ICP-OES
- Determination of milk protein using ELISA
- General screening of GMO food by detecting 35S and NOS using Real-time Duplex PCR
- Qualitative detection of 68416 soya DNA by real time PCR
- Determination of multiple pesticide residues in fruits and vegetables using GC-MS/MS
- Determination of Patulin in juices using LC-MS/MS
- Detection of *Campylobacter* spp. in poultry via PCR
- Detection of *Campylobacter* spp. in poultry via culture isolation (in-house method)
- Detection of Hepatitis A virus in shellfish via Real-time PCR (qualitative)
- Detection of Norovirus in shellfish via Real-time PCR (qualitative)
- Detection of *S. agalactiae* in fish via PCR
- Detection of *S. agalactiae* in fish via culture isolation (in-house method)
- Detection of *Salmonella* spp. in food via culture isolation (in-house method)
- Detection of *L. monocytogenes* in food via culture enumeration (ISO 11290)
- Detection of *L. monocytogenes* in food via culture enumeration (in-house method)
- Antibiotic susceptibility testing of *E.coli* via microbroth dilution
- Antibiotic susceptibility testing of *Salmonella* spp. via microbroth dilution

Table 2: New methods developed and validated by VPHL (FY 2017)

<p>Drug residues</p> <ul style="list-style-type: none"> • HPLC-MS/MS for the confirmation of beta-lactams detection in milk
<p>Pesticide residues</p> <ul style="list-style-type: none"> • Rapid LC-MS/MS detection of residues of more than 200 pesticides
<p>Chemical contaminants</p> <ul style="list-style-type: none"> • Determination of inorganic arsenic in food using SPE/ICP-MS • Determination of Bisphenol-A in bottled drinking water using LC-MSMS • Determination of more than 60 elements in milk samples via microwave digestion followed by ICP-MS and ICP-OES used for elemental profiling for tracing of geographical origin
<p>Food-borne toxins</p> <ul style="list-style-type: none"> • Quantitative detection of multiple Ciguatera marine bio-toxins in mussels and seafood by LC-MSMS • Rapid screening of Paralytic Shellfish Poisons in shellfish and marine products using ELISA • Rapid screening of Bacillus Cerius Enterotoxins in food using OXIOD Reverse Phase Latex Agglutination method
<p>Genetically modified food</p> <ul style="list-style-type: none"> • MO80119 qualitative and quantitative detection of DAS-40278-9 maize DNA by Real-time PCR MO80119 • Detection of plant endogenous gene actin by Real-time PCR MO50020
<p>Food microbiology</p> <ul style="list-style-type: none"> • Use of swabs with transport media for pathogen testing (Salmonella spp., VRE and Campylobacter spp.) in poultry slaughterhouses • Enumeration method for V. parahaemolyticus using a chromogenic agar – Chromagar Vibrio

Table 3: Key enhancements made by VPHL (FY 2017)

<p>Drug residues</p> <ul style="list-style-type: none"> • Improved confirmation method with HPLC-MS/MS for the detection of triphenylmethane dyes in aquaculture products
<p>Pesticide residues</p> <ul style="list-style-type: none"> • Enhanced existing LC-MS/MS method for the determination of residues of more than 120 pesticides by optimising the programmed time segmentation for MRM pairs
<p>Chemical contaminants</p> <ul style="list-style-type: none"> • Widened test scope for determination of Bisphenol-A, Bisphenol-F, and their corresponding Diglycidyl Ethers (Badge and BFDGE) in food using LC-MSMS to include milk powder. • Alternative extraction method for determination of Polycyclic Aromatic Hydrocarbons in seawater
<p>Food-borne toxins</p> <ul style="list-style-type: none"> • Enhanced existing multi-component mycotoxins detection method (covering 16 mycotoxins) for food and cereal products • Enhanced existing multi-component detection method for marine bio-toxins (covering 17 marine bio-toxins) for shellfish and seafood • Enhanced existing multi-component detection method for 11 Pyrrolizidine Alkaloids for plant products

*Table 3: Key enhancements made by VPHL (FY 2017) continuation***Food authentication**

- Optimised detection of poultry DNA in raw and processed food by Poultry-Specific PCR
- Optimised detection of ovine DNA in raw and processed food by Ovine-Specific PCR
- Optimised detection of bovine DNA in raw and processed food by Bovine-Specific PCR
- Optimised detection of porcine DNA in raw and processed food by Porcine-Specific PCR
- Optimised detection of poultry, bovine, ovine, and porcine DNAs in raw and processed food by Multiplex PCR

Food microbiology

- Reviewed environmental swabbing procedure for virology in food poisoning investigations
- Validated automated nucleic acid extraction method for Norovirus and Hepatitis A testing

Food preservatives and additives**Sweeteners**

- Alitame
- Dulcoside A
- Neohesperidine Dihydrochalcone (NPDC)
- Rehaudioside A
- Rubusoside
- Steviolbioside

Colours

- Acid Red 73
- Aniline
- Auramine O (Basic yellow 2)
- Congo Red
- Fast garnet GBC (Solvent yellow 3)
- Fast Yellow AB (Acid yellow 9)
- Metanil Yellow
- Naphthol Yellow/Flavianic acid
- Ponceau 3R
- Dimethyl yellow
- Tolidine red
- Diethyl yellow

Assessing risks of dietary exposure to food chemicals

AVA conducts risk assessments on dietary exposures to food chemicals in our daily food intake. Our assessment on cyclamate, a sweetening agent, showed that the current regulatory maximum limits for cyclamate 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, AVA assessed the potential of metals being released into food via plastic food wares. These food wares were found to be safe for use.

Supporting regional development

As an OIE Collaborating Centre for Food Safety, and the ASEAN Reference Lab for Pesticides and Environmental Contaminants, VPHL supports the region in enhancing laboratory testing capabilities. In FY 2017, AVA conducted trainings in collaboration with the International Atomic Energy Agency (IAEA), OIE Collaborating Centres for Food Safety, FAO, ASEAN, and Nanyang Technological University (NTU).

22-26 May 2017	Inter-regional training course on pesticides, minor use/species, and related plant products of public health and trade importance
3-7 Jul 2017	Training attachment in genetically modified organism analysis for officials from the National Agency of Drug and Food Control (Indonesia)
14 Sep 2017	Training workshop on risk analysis for food safety regulation and implementation of risk analysis on food contaminant issues in ASEAN
9-13 Oct 2017	Inter-regional training course on radionuclides in food – sampling, analysis, standards and regulations, and its relevance to international trade
16 Oct - 3 Nov 2017	Laboratory attachment for an IAEA Fellow from Bangladesh, and training for two other scientists from Bangladesh, as part of an FAO/IAEA Technical Cooperation Project.
19 Oct 2017	Seminar on antimicrobial resistance (AMR): a food safety perspective
6-8 Dec 2017	Regional consultation on food safety indicators in Asia-Pacific
12-14 Dec 2017	Workshop on strengthening capacities, policies and national action plans on prudent and responsible use of antimicrobials in fisheries
5-9 Feb 2018	Workshop on applications for microbiological typing and AMR - the future of next generation sequencing in food safety and public health
27-29 Mar 2018	Regional training on pesticide residues analysis

Collaborating in research

AVA also continued to collaborate with FAO, IAEA, and European Committee for Standardisation on various research projects that enhance food safety laboratory testing:

Accessible technologies for the verification of origin of dairy products as an example control system to enhance global trade and food safety (2013-2018)

A collaboration with FAO and IAEA to establish methods to trace the origins of milk and milk products, and detect adulterations in them, using stable isotope signatures. Workflows were put in place for sampling and sample processing, and we established methods for the measurement of stable isotopes and trace elements. Databases and preliminary traceability models were also established.



Improving food safety through the creation of an inter-regional network that produces reliable scientific data using nuclear and isotopic techniques (2015 to 2019)

In collaboration with IAEA, this project aims to produce scientifically reliable data for international standard-setting. It also seeks to enhance the food safety systems and laboratory testing capabilities of participating countries. Under this collaboration, two AVA officers attended the Codex Committee on Methods of Analysis and Sampling in Hungary. Two trainings were also conducted by VPHL.

Novel analytical approach in ASEAN to test aquaculture chemicals by harnessing the power of high resolution mass spectrometry, triple quadrupole mass spectrometry, and stable isotopes (2015-2020)

A collaboration with FAO and IAEA that aims to effectively detect and control the use of chemicals in aquaculture products. Improvements in testing were achieved and broader surveillance was conducted with the developed methods. The results will be useful during a review of food safety sampling programmes. A specific test method was also developed for drugs-stilbenes.

Determining nitrofurazone in milk and milk products (2016-2017)

A collaboration with the International Dairy Federation and ISO to develop an internationally harmonised standard for testing intact nitrofurazone in milk and dried milk powder. Sample analyses were completed and a country report was submitted.



Inter-laboratory validation study on the analysis of Gossypol in feed (2017-2018)

In collaboration with the European Committee for Standardisation, we are looking into alternative ways to prepare new compound feed materials for the study.

Field-deployable analytical methods to assess the authenticity, safety, and quality of food (2017-2022)

A collaboration with FAO and IAEA to develop a robust system that screens food samples using the spectroscopic technique with built-in chemometrics software. Work is underway to purchase the spectroscopic device, devise a sampling plan, collect samples, and set up the preliminary database and library of spectra and statistical models.



Developing “VereBeef” assay to detect Salmonella and Shiga toxin-producing *E.coli* in beef samples

A collaboration with Veredus Laboratories to develop a VereBeef assay based on a PCR-hybridisation technology known as VereChip ‘Lab-on-Chip’. The assay facilitates simultaneous detection of Salmonella and Shiga toxin-producing *E.coli*, and completes the screening in a shorter time compared to the conventional culture method.

Contributing to scientific progress

On 19 October 2017, AVA presented two topics: (1) “ASEAN Regional Collaboration on AMR in the Livestock Sector – A regional effort to combat AMR”, and (2) “Surveillance of Food-borne AMR bacteria and drug residues – Singapore’s monitoring programme for imported food” at the OIE Collaborating Centres Seminar on AMR: a food safety perspective.

In addition, our paper on “DNA sequence of Malayopython reticulatus (Reticulated Python)” was deposited into GenBank, the National Centre for Biotechnology Information (US), which is accessible by researchers around the world for sequence comparison, development of assays, and research.

Engaging with The Industry and Public

Recognising the best in the industry

The annual AVA Food Safety Awards Night recognises food companies for their sustained efforts in upholding stringent food safety standards. It is also a platform for us to commend those who played an active role in food safety public education.

On 7 July 2017, four Platinum, six Gold, six Silver, and six Bronze awards as well as 169 Certificates of Commendation were presented to deserving local food companies with sustained A-grading. In addition, AVA acknowledged the public education efforts of our food safety partners. The food safety partnership status of seven companies was renewed. One new company, Fassler Gourmet Pte Ltd, also came on board as our food safety partner.

About 800 guests attended the event, which was graced by Dr Koh Poh Koon, then Senior Minister of State for National Development & Trade and Industry.



Engaging with the industry

In FY 2017, AVA continued to engage with the industry with the aim to enhance its food safety competency. Industry seminars and exhibitions were organised on 15 September 2017 and 7 March 2018 to heighten awareness of the HACCP food safety management system, good manufacturing practices, food defence, pest management, and use of personal protective equipment. AVA also collaborated with the Ministry of Manpower and the former SPRING Singapore to educate the industry on the average quantity system, as well as safety measures and requirements relating to the use of pressure vessels, boilers, and refrigerants in cold rooms.

Besides outreach through training events, AVA also engages with the industry in regular dialogues that facilitate mutual understanding and collaboration. Throughout the FY, nine sessions of dialogues between AVA and industry representatives were held. Topics such as food safety regulations, industry trainings, labelling, fee structures, contingency planning, facility leases, as well as inspection and export-related matters were discussed.

Educating the public

Food contamination can occur at any point of the food chain. In order to ensure food safety from farm to fork, all parties from the government to food industries to consumers must play their part. While food industries and the government continue to work together to ensure food sold in Singapore is safe for consumption, it is also important to make sure consumers are equipped with the knowledge of food safety risks and safe food practices to avoid the risks.



Food safety public education activities (FY 2017)



13

Food safety talks



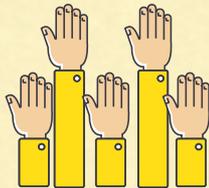
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Learning journeys



9

Community events



Reached out to about

22,200

People

47



Roadshows at Sheng Siong, NTUC FairPrice, and Cold Storage supermarket outlets, where promotional activities such as the appearance of AVA's food safety mascot 'Oscar', photography opportunities, and edu-taining games took place.

In addition, in conjunction with the Food Safety month in July 2017, print advertisements were put up in newspapers to educate the public on food safety messages. Tips on food safety were also posted regularly on AVA's Facebook page to reach out to consumers online, including sharing of food safety tips posted by our food safety partners.







Animal Health, Welfare & Management

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

#KeyAchievements

- Played a leading role in the development of regional guidelines on the use of antimicrobials in food-producing animals.
- Partnered animal welfare stakeholders, veterinarians, experts, and research bodies to develop a science-based approach to controlling stray dog and bird populations.
- Continued to educate the public on responsible pet ownership. At the same time, enlisted the cooperation of animal welfare groups and grassroots leaders to educate residents on how they should react to stray animals in their surroundings.
- Enhanced animal welfare and traceability with new and revised regulations for pet owners and businesses.
- Brought animal welfare groups on board the design and construction of an animal lodge to provide housing for 7,000 animals affected by the relocation of facilities.



Animal Health

AVA has in place a comprehensive and integrated animal health system that comprises import regulation and inspection, laboratory testing, and surveillance. This risk-based system has continued to keep out major animal diseases of public health and economic significance, such as Foot-and-Mouth disease, rabies, Highly Pathogenic Avian Influenza, Nipah virus, and Bovine Spongiform Encephalopathy. Our animal disease surveillance programme also covers local farms, where we conduct monitoring, inspection, and sampling, as part of efforts to prevent, detect, and manage an extensive list of pathogens.

Keeping Out Animal Diseases



Aligning with international standards

The World Organisation for Animal Health (OIE) is an inter-governmental body, which develops international standards to combat animal diseases. To keep abreast of these standards for animal health and the control of major animal diseases worldwide, AVA represented Singapore at the 85th General Session of the World Assembly of Delegates of the OIE on 21-26 May 2017.

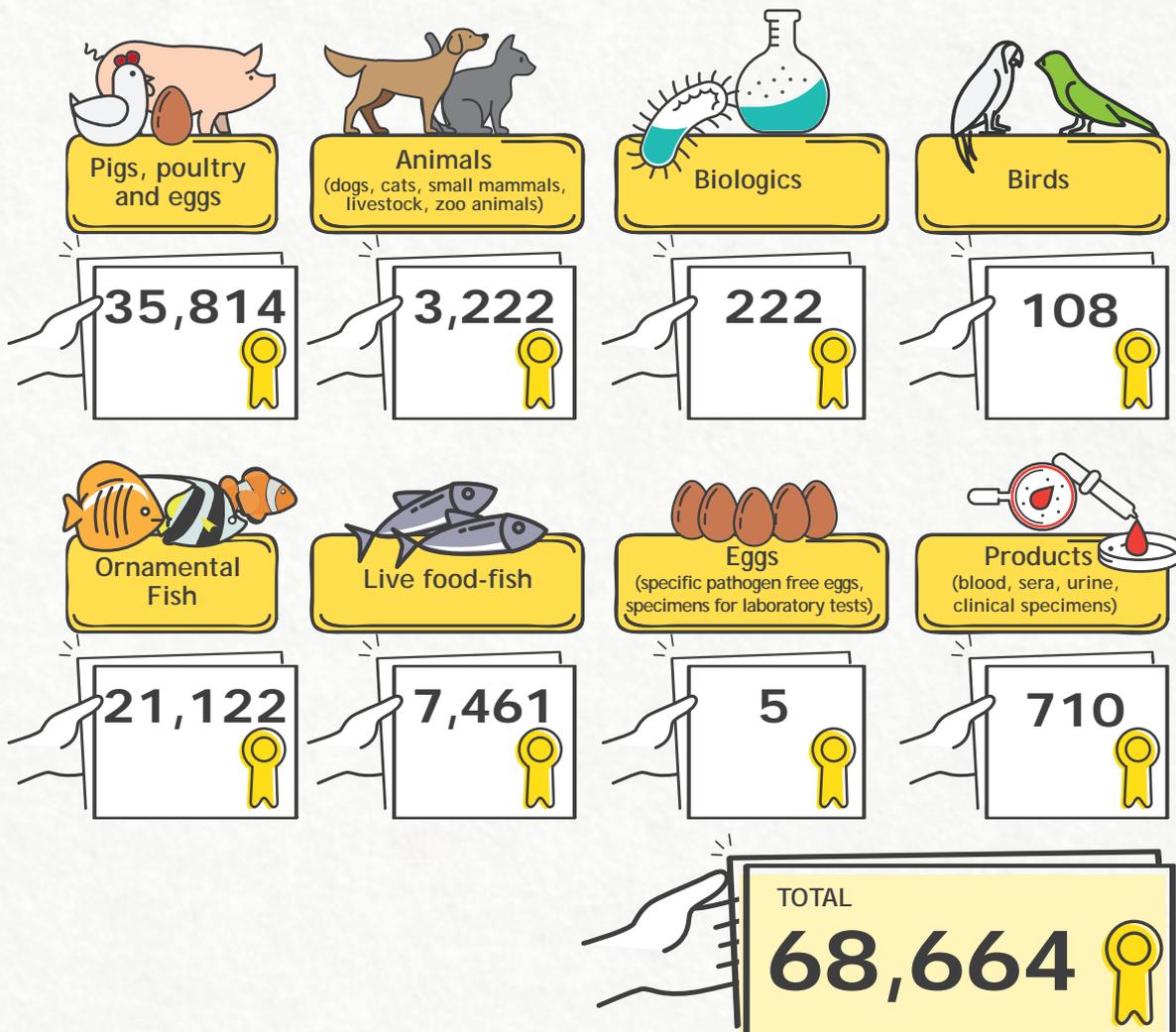
In total, the World Assembly adopted 39 new international standards and guidelines that serve to protect and improve animal health and welfare. As a member country of the OIE, AVA will take reference from these guidelines, and work with our stakeholders on the implementation, where relevant.

In addition, Singapore’s bid for the position of Secretary-General for the Regional Commission for Asia, the Far East, and Oceania was adopted. The Regional Commission develops programmes that are in line with the OIE, and provides technical support to the region to strengthen the surveillance and control of animal disease.

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 subjected to import conditions, which include vaccinations and health certification requirements, imported animal may also need to undergo post-arrival quarantine. In FY 2017, we issued a total of 68,664 licences, permits, and certificates for the import of animals and related products.

Licences, permits and health certificates issued for animal imports (FY 2017)



Combatting the illegal import of animals

Smuggled animals are of unknown health statuses and can pose a risk of introducing exotic diseases into Singapore. To keep our animals 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 2017, a man was fined \$5,000 for illegally importing 148 cooked embryonated duck eggs, commonly known as 'balut', into Singapore. Another woman, was fined \$2,500 for abetting the offence.

AVA also acted on a case involving the smuggling of 121 live birds. The offender was sentenced to five months' jail for abetting the import of 44 Fischer's Lovebirds, a protected species under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), without a permit, as well as three months' jail for abetting animal cruelty. Another sentence of three months' jail was also meted out for abetting the illegal import of 77 live birds.

Safeguarding against rabies

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. Rabies is a fatal viral disease that can be spread to humans through the saliva or bite from an infected animal.

AVA regularly reviews the status of countries, depending on their rabies situation. In FY 2017, AVA's assessment led to the classification of Latvia as a Category C country. Countries in this category have a controlled risk or low incidence of rabies. Other countries in this category include Canada, France, Germany, Netherlands, Spain and the USA.

As our coastal fish farms are potential high-risk spots for the incursion of rabies, we have been conducting vaccinations of dogs in coastal fish farms since September 2015. In FY 2017, more than 150 stray dogs in these areas were vaccinated with the assistance of veterinarians in the private practice and student volunteers from polytechnics.

AVA also collaborates with neighbouring countries to control the disease. In FY 2017, AVA contributed a total of 37,000 doses of rabies vaccines to the Department of Veterinary Services Malaysia to support their fight against a rabies outbreak in Sarawak.

Staying vigilant against bird flu

The 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 lead to death. Although Singapore is free from bird flu, it is endemic to the region. Thus, we need to remain vigilant. In FY 2017, we continued to conduct regular staff trainings on the proper use of the Personnel Protective Equipment.

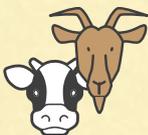
In addition, AVA continued to work closely with Indonesia in the control of bird flu in Kepulauan Riau (Kepri, or the Riau Islands). There were no reports of bird flu outbreaks in Kepri in FY 2017.



Keeping Watch Over Local Farms

AVA continued its surveillance and inspection of local farms for 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 2017, AVA issued 6,362 veterinary health certificates, 1,803 certificates for freedom from diseases, and 5,959 health certificates for exported animals and animal products.

Animal disease surveillance in local farms (FY 2017)

	Captive bird farms	3	<ul style="list-style-type: none"> • Bird flu • Newcastle Disease
	Dairy goat & cattle farms	4	<ul style="list-style-type: none"> • Bovine Tuberculosis • BSE • Campylobacter • Contagious Bovine Pleuropneumonia • FMD • Brucella
	Poultry farms	5	<ul style="list-style-type: none"> • Bird flu • Newcastle Disease
	Land-based fish farms	9	<ul style="list-style-type: none"> • Chytrid Fungus • Epizootic Ulcerative Syndrome (EUS) • Red Seabream Iridovirus (RSIV)
	Coastal fish farms	117	<ul style="list-style-type: none"> • EUS • RSIV
	Ornamental fish farms	60	<ul style="list-style-type: none"> • Aeromonas Salmonicida • Chytrid Fungus • Epizootic Haematopoietic Necrosis Virus • Infectious Haematopoietic Necrosis Virus • Infectious Spleen and Kidney Necrosis Virus • Koi Herpes Virus • Megalocytivirus • Spring Viraemia Carp Virus • Viral Haemorrhagic Septicaemia • White Spot Syndrome Virus
		TOTAL	198

Combating Antimicrobial Resistance

On 1 November 2017, the One Health Antimicrobial Resistance (AMR) Workgroup — comprising the Ministry of Health, AVA, National Environment Agency and PUB, Singapore's National Water Agency — launched the National Strategic Action Plan on Antimicrobial Resistance.

The plan provides a framework to strengthen and enhance activities to combat AMR across the human, animal, food, and environment sectors. It is aligned with the World Health Organisation's (WHO) Global Action Plan on AMR, as well as the standards and guidelines established by inter-governmental bodies such as the Food and Agriculture Organisation of the United Nations (FAO) and OIE.

Practising veterinarians play a role in this framework, and AVA is raising awareness of the prudent use of antimicrobials in veterinary medicine among the private veterinarian profession. AVA regulates the veterinary profession in Singapore to ensure veterinarians comply with the Code of Ethics for Veterinarians. As at 31 December 2017, there were 81 licensed veterinary centres and 375 licensed veterinarians. We will be working closely with the veterinary profession to enhance knowledge, communication, and education on AMR-related matters.

AVA also plays an active role in regional efforts to combat AMR in the livestock and aquaculture sectors, including working with ASEAN members to develop regional guidelines on the use of antimicrobials in food-producing animals. This led to the production of the ASEAN Guidelines on Prudent Use of Antimicrobials in Livestock as well as the ASEAN Cooperation Activities for AMR in the Aquaculture Sector.

As part of an FAO project, AVA hosted a workshop on the prudent and responsible use of antimicrobials in fisheries, in collaboration with INFOFISH Malaysia in December 2017. Regional delegates discussed and learned about the science behind AMR, governance mechanisms to support national action plans on AMR within the One Health framework, food-fish safety hazards, best practices, as well as disease prevention, diagnostic, and management.

Enhancing Laboratory Capabilities

AVA's Animal Health Laboratories (AHL) is the national reference laboratory for animal diseases and carries out testing of animal vaccines.



Maintaining high testing standards

AHL'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, AHL attained accreditations for a total of 116 tests, which included two new tests accredited in FY 2017.

In addition, AHL continued to benchmark its testing capabilities by participating in the inter-laboratory proficiency quality assurance testing programme administered by the Animal & Plant Health Agency (UK), Pirbright Institute (UK), University of Arizona (USA), Australian Animal Health Laboratory, as well as the French Agency for Food, Environmental and Occupational Health & Safety. We also participated in 20 proficiency testing programmes and achieved 100-percent accurate results.

In FY 2017, AHL performed about 117,000 laboratory tests to detect and identify diseases in more than 216,000 samples of animals.

Volume of tests conducted at AHL (FY 2017)

Functions	Export certification	Import control	Routine Surveillance	Disease investigation	Commercial	Inter-laboratory Proficiency testing	Total
Samples tested	19,172	1,798	171,895	7,190	16,031	179	216,265
Laboratory tests performed	8,088	1,552	90,094	4,841	12,108	179	116,862

Developing new diagnostic methods

As part of efforts to expand AHL's testing capabilities, six new diagnostic methods were successfully developed in FY 2017.

- Real-Time Polymerase Chain Reaction (PCR) for *Streptococcus equi subspecies equi*, in nasopharyngeal swab, abscess swab, guttural pouch wash, and bacteria isolate/suspension
- Classical Swine Fever-Neutralisation Peroxidase linked assay on serum samples from pig and pig product
- Isolation of *Yersinia ruckeri* in fish liver and kidney
- PCR for *Yersinia ruckeri* in bacterial culture
- Isolation of *Salmonella* in quail egg
- PCR for *Borrelia burgdorferi* in animal organs

Collaborating on new test methods

In FY 2017, AVA 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)

A collaboration with the Irish Equine Centre was established to support the control of selected horse diseases. The collaboration covers the validation of the Equine Influenza Real Time RT-PCR Assay that is to be incorporated in the OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals and in a study on the immune response of Equine Influenza vaccination.

Surveillance of zoo animals (2016–2021)

A collaboration on molecular and serological testing was established with Wildlife Reserves Singapore and Duke-National University of Singapore (NUS), as part of the surveillance of zoo animals. A novel Canine Parvovirus was detected in wild Asian Palm Civets through this collaboration.

Phylogenetic analysis of *Streptococcus equi* subspecies *equi* isolates (2017–2018)

The UK's Animal Health Trust (AHT) is running a phylogenetic analysis of isolates from around the world to establish a global outlook of emerging *S. equi* ssp. *equi* strains. AVA collaborated in this project by sharing our archived local *S. equi* ssp. *equi* isolates Next Generation Sequencing data with AHT.

Detection of pathogens through air sampling (2018–2019)

A collaboration with Singapore's Defence Science Organisation (DSO) National Laboratories on air sampling was established to study the feasibility and efficiency of using air samplers to detect animal pathogens.

Establishment and validation of an Indirect Haemagglutination Assay (IHA) for the detection of *Burkholderia pseudomallei* antibodies in horses (2018–2019)

In collaboration with DSO National Laboratories, AVA established and validated an IHA as a confirmatory test for the detection of *Burkholderia mallei* antibodies in horses. Method optimisation and validation is in progress.

Detection of Avian Influenza Virus (AIV) (2018–2020)

A collaboration with the Office of the Chief Science and Technology Officer under the Ministry of Home Affairs was established to validate a new technology for the early detection of AIV at our borders. Method validation and evaluation have been conducted and final project details are being drawn up with our collaborator.

Development of testing capability for rabies (2018–2022)

AVA will be collaborating with Duke-NUS to enhance diagnostic capabilities in testing for rabies in case of an outbreak.

Supporting disease investigation

In FY 2017, AHL provided the following diagnostic services:

- Detection of *Echinococcus equinus* in horses
- Identification of old world screw-worm from wildlife mammals
- Detection of *Leishmania infantum* antibodies from imported dog

Contributing to scientific progress

AVA contributes to scientific publications to share our research findings with the international scientific community. In FY 2017, our scientists made four poster presentations at the Singapore International Infectious Disease Conference. Two papers were accepted for publication in the 'Emerging Infectious Disease' and 'Herpetological Review' journals.



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. In addition, AVA 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.

Animal Welfare

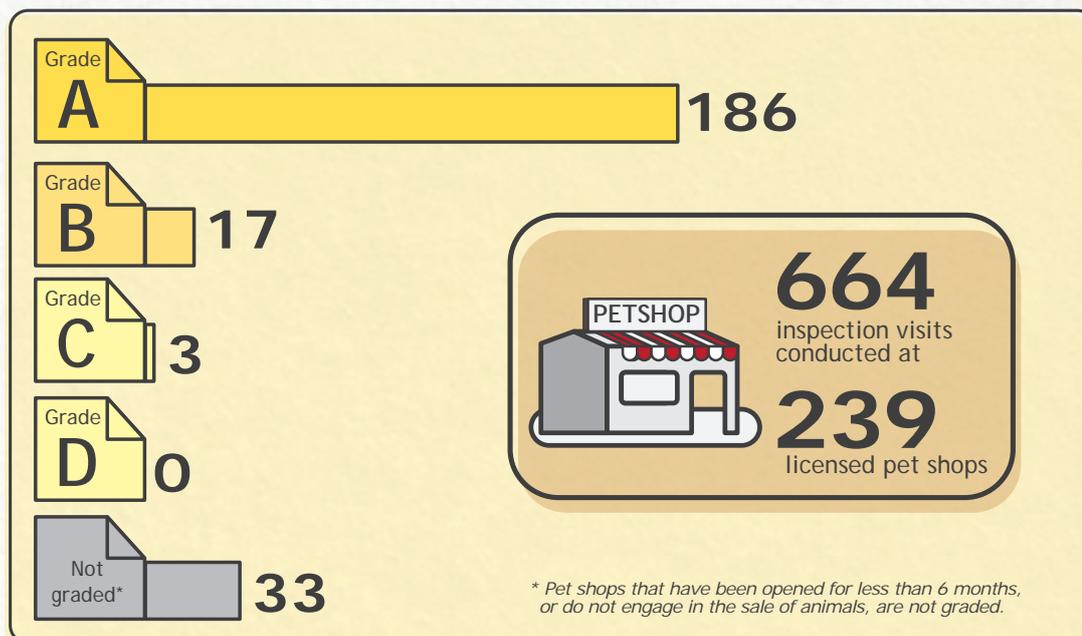
Enhancing Animal Welfare Regulations



Licensing of Pet Shops and Dogs

AVA licenses and inspects pet shops to ensure they comply with licensing conditions, which specify the standard of care for animals. Pet shops are also graded, so that the public is informed of the standard of care for animals provided by the pet shops they patronise. In addition, as dogs are the main host and transmitter of rabies, AVA licenses pet dogs to facilitate contact tracing in the event of an outbreak. Dog licensing also establishes accountability for the care and management of dogs by pet owners.

Licensing and grading of pet shops (FY 2017)



Revising licensing rules

AVA introduced new rules governing licensing for pet businesses on 1 April 2017. The rules were made to improve the housing, management, and healthcare of animals, and will enhance the traceability of animals as well as accountability of the pet businesses concerned.

With effect from 1 March 2018, AVA allowed dog owners to apply for and renew the licences of their pet dogs for a period of one, two, or three years. Previously, dog owners could only apply for annual licences. Dog owners who opt for a two-year or three-year licence enjoy an average discount of 10 percent or 15 percent, respectively. Furthermore, a 10 percent rebate will be extended to dog owners who make payments via electronic platforms.

Implementing a new code of animal welfare (for pet owners)

AVA's Code of Animal Welfare (for Pet Owners) took effect on 15 June 2017. The code provides minimum standards for accountability of pet owners, as well as for the housing, environment, management, and care of the animals. All pet owners are expected to take reference from these standards. Although failure to meet a minimum standard in the code is not an offence, it can be used to support prosecution or other enforcement actions for animal welfare breaches or lack of duty of care.

The codes were formulated in collaboration with the Multi-Stakeholder Collaboration Committee for Animal Welfare (MSCC), which was formed in October 2013 and chaired by Mr Alex Yam (Member of Parliament for Marsiling-Yew Tee GRC). The MSCC comprises representatives from both the public and private sectors, such as the Government, community, animal welfare groups, pet industry, and veterinary professions.

Enforcing Against Animal Cruelty

AVA investigates all alleged animal welfare and cruelty cases, including those on pet abandonment. Where necessary, we work with the relevant agencies and animal welfare groups on these cases. AVA takes enforcement action against anyone who has committed an act of animal cruelty. Any owner found guilty for failure in duty of care is liable to a maximum fine of \$10,000 and/or 12 months' jail term for first convictions. Individuals who commit an act of animal cruelty are liable to a maximum fine of \$15,000 and/or 18 months' jail term for first conviction.

In FY 2017, a pet farm was fined \$180,000 for failing to care for animals in his farm, breaching pet farm licence conditions, and operating an unlicensed pet shop. He was also disqualified from operating any animal-related business for six months.

In another case, a pet shop licensee was fined \$11,000 for operating a pet farm without a licence and keeping unlicensed dogs in her premises.

In addition, a man was sentenced to 20 months of imprisonment for cruelty to his pet dogs and for pet abandonment. He was also banned from owning any animals for 12 months upon release from prison.

Educating and Engaging with The Public

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



Spreading messages of animal welfare

Working with the People's Association and National Library Board, AVA conducted storytelling sessions in libraries to share details of the Code of Animal Welfare (Pet Owners) in FY 2017.

Encouraging Responsible Pet Ownership

As part of our RPO programme, we organised the second edition of the 'Happy Pets Happy 'Hood' event at Waterway Point mall in November 2017. The event highlighted the concepts of RPO, considerate pet ownership, and living in harmony with stray animals. Guided tours were conducted for 300 preschool pupils and teachers. More than 23,000 visitors enjoyed dog obedience demonstrations and other educational performances at the event. Twelve of AVA's animal re-homing partners participated in the event to help spread RPO messages and raise funds for their respective organisations.



Educating the young to be responsible pet owners

In FY 2017, we engaged with more than 60,000 children through school talks, learning journeys, and 'hot-seat' classroom sessions whereby students can pose any pet-related questions to the speaker. In addition, all Primary 4 students continued to learn about RPO through the Character and Citizenship curriculum.

We continued to take part in the Early Childhood & Development Agency's Start Small Dream Big event and reached out to over 22,000 pre-schoolers with our educational collaterals. In FY 2017, we also rolled out our preschool programme to teach children about responsible pet ownership through our talks and learning journeys.

Supporting animal adoption drives

AVA continued to support animal welfare groups in their pet adoption efforts. In the FY, AVA supported three adoption drives. One of them was organised by Exclusively Mongrels, while the other two were organised by Action for Singapore Dogs.

Cat Welfare Society, with AVA and the Silent Foundation as co-sponsors, developed a 'Catopia' exhibition to teach the public and students about responsible cat ownership and responsible stray feeding. This exhibition will be set up in various locations in Singapore in FY 2018.

AVA, Wellness pet food, animal welfare groups, and TheSmartLocal online news portal collaborated on an article and a video that featured pet dog owners. Through their stories, they encouraged others to give careful thought before deciding to get a pet dog, during the Lunar Year of the Dog. Another key message from them was to consider adoption first.

Providing free health checks for pets

AVA continued to organise free health checks for pets in FY 2017 to highlight the importance of proper veterinary care. More than 30 veterinarians from private clinics and educational institutions volunteered their time and expertise for a total of five rounds of free pet health checks. They also provided free microchipping services to 421 pets.





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.

Animal Management

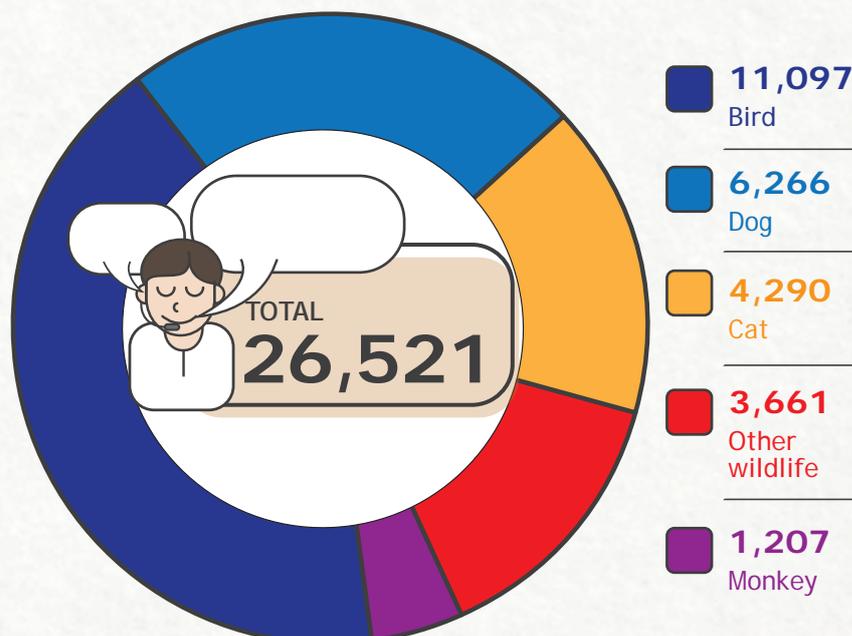
Leading the development of new animal lodge

In FY 2017, AVA led the development of an animal facility in Sungei Tengah to house about 7,000 animals affected by land leases expiring in Loyang, Seletar, and Lim Chu Kang. We worked closely with animal welfare groups and commercial operators in the design and construction of the new facility, and will continue to engage with them during the transition process. In addition, financial support was extended to tenants.

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.

Volume of animal-related feedback handled (FY 2017)



Enhancing Stray Dog Population Control Measures

Controlling the stray dog population humanely

In June 2017, AVA engaged with animal welfare groups to seek feedback and suggestions on a Trap-Neuter-Release-Manage (TNRM) programme for stray dogs. On 21 December 2017, AVA announced plans to work with animal welfare groups and veterinarians to embark on a five-year TNRM programme to manage the stray dog population in Singapore. Animal welfare groups will play a crucial supportive and facilitative role in the implementation of this programme, by galvanising stray dog feeders and volunteers.



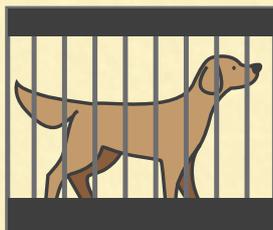
The programme is expected to begin in the second half of 2018, and will involve humanely catching stray dogs and sterilising them. Efforts will be made to re-home as many of the sterilised animals as possible. Those that are unable to be re-homed will be released at suitable locations for them to live out their lives naturally. The target is to sterilise more than 70% of the stray dogs in Singapore within five years. Based on scientific literature and mathematical modelling, sustained sterilisation at this rate or more is necessary to stabilise or reduce a stray dog population.

Engaging with residents on stray dog encounters

In July 2016, AVA piloted a walkabout session to engage with residents living in Punggol, a hotspot for stray dog sightings and feedback. We partnered animal welfare group SOSD, the People's Association, and grassroots leaders to conduct the walkabout to educate the public on how to react should they encounter stray dogs.

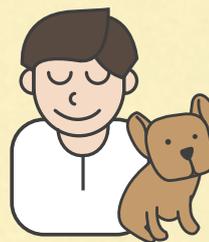
The walkabout session was well received by residents, SOSD, and grassroots leaders, who appreciated AVA's initiative in raising these residents' awareness of stray dogs living in their surroundings. AVA subsequently extended the walkabout sessions to other estates such as Sembawang. On 26 October 2017, we received the Municipal Services Award (community category) for the "Management of Stray Dog Issue through Public Education Efforts".

Impounded and re-homed dogs (FY 2017)



Impounded dogs

710



Re-homed dogs

196

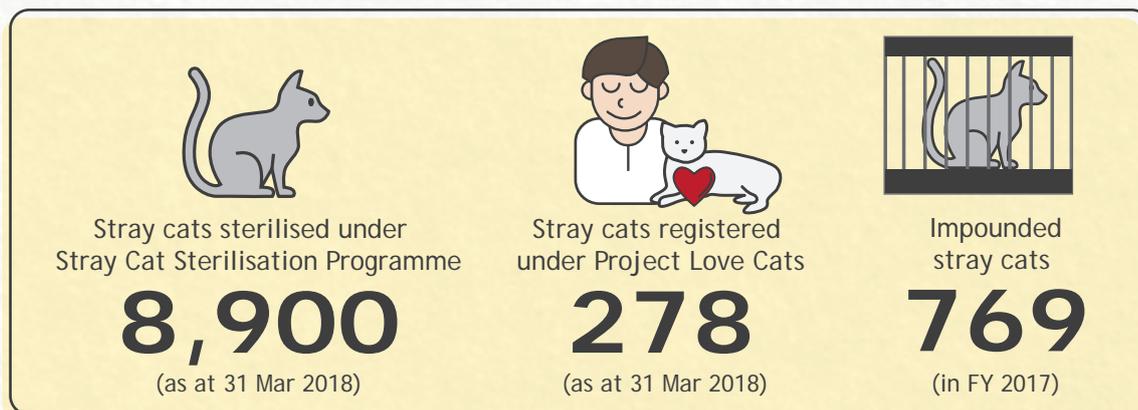
Managing Stray Cats

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

In FY 2017, AVA continued to provide 50% (up to \$30 for male cats and \$60 for female cats) funding for the sterilisation of stray cats, and \$20 subsidies for microchipping costs. As at 31 March 2018, in total, about 200 volunteers had registered themselves as stray cat caregivers and 8,900 stray cats were sterilised under the programme.

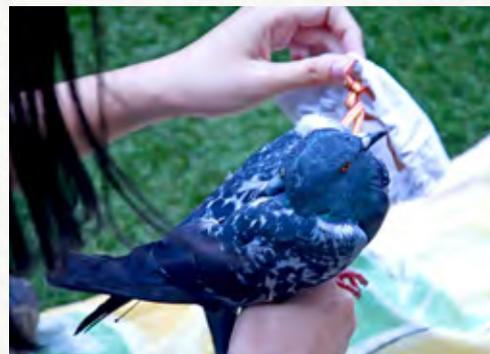
Project Love Cats, a pilot cat ownership project led by CWS with the support of Member of Parliament for Nee Soon Group Representation Constituency Mr K Shanmugam, was initiated to test out the responsible ownership of cats in the Chong Pang estate. As of 31 March 2018, there were 126 HDB households owning a total of 278 cats under this project.

Sterilised, re-homed, and impounded cats



Studying New Bird Control Methods

AVA commissioned the National University of Singapore to conduct a study on selected species of urban birds such as crows and pigeons. The study identified certain environmental and social factors that contributed to some of the bird-related issues faced by residents. These factors included the prevalence of food sources provided by humans, as well as current building infrastructure and design elements that allow birds to nest.



Following the study, AVA installed an electrical deterrent system onto a roadside tree to test its effectiveness in preventing birds from roosting in the area. The system uses a low electric current that encourages birds to stay away. Trials on the system are still undergoing.

To raise public awareness and discourage pigeon-feeding, AVA worked with eight Town Councils to install standees at targeted spots. These standees contained information that urges the public not to feed pigeons, as it is an offence. We also partnered the Thomson Sin Ming Court Residents' Committee, People's Association, and Ai Tong School to design and distribute recycled bags with the relevant messages.





Plant Health

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

#KeyAchievements

- Initiated a survey of pests in local vegetable farms to help us better understand the plant pest challenges at hand.
- Improved methods of controlling Diamondback Moths in local vegetables farms.
- Set regional and national standards for the identification of the South American Leaf Blight, management of soil and nutrient, and specifications for composts.



Plant Health

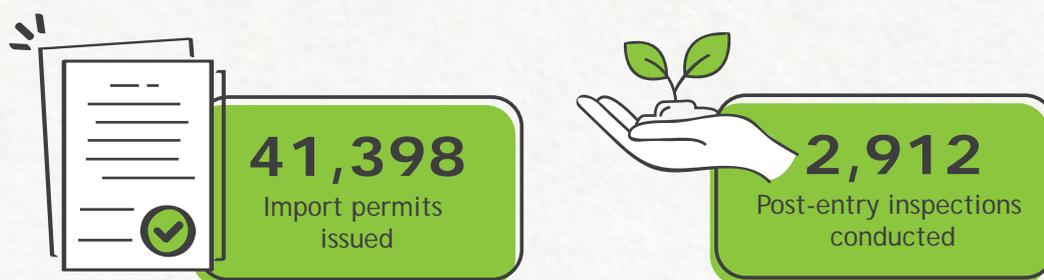
As the national authority for plant health, AVA protects Singapore's farms, nurseries, and greenery from exotic and emerging plant pests that may cause significant economic losses. Our comprehensive plant health programmes, comprising import regulation and inspection, risk analysis, as well as laboratory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

Preventing The 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, surveillance visits are conducted and samples are collected for laboratory analysis.



Control and surveillance of imported plants (FY 2017)



In FY 2017, as part of our surveillance, 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. It was not detected during the FY and Singapore continued to be free from the pest.

During our surveillance in 2013, *Aphelenchoides fragariae* was detected in a local plant establishment. Since then, we continued our surveillance of the *Aphelenchoides fragariae* in import and re-export consignments to ensure that Singapore is free from this quarantine pest.

Detecting and Monitoring New Plant Pests

In FY 2017, AVA detected four new pathogens — *Stemphylium spp.*; *Septoria spp.*; *Phakopsora cherimoliae*; and *Peronospora belbaharii* — for the first time in Singapore. Pest control measures, such as the use of common fungicides and disease-resistant cultivars, were recommended to the relevant stakeholders. We will continue to monitor these pests to ensure minimal impact to the horticulture sector.



In addition, 13 new insect pests were detected for the first time in Singapore:

- *Aleurothrixus trachoides* Back
- *Aleurocanthus woglumi* Ashby
- *Coccidohystrix insolita* Green
- *Pauropsylla tuberculata* Crawford (Psyllidae)
- *Paraleyrodes bondari* Peracchi
- *Asiothrixus antidesmae* Takahashi
- *Aulacaspis rosarum* Borchsenius (Diaspidae)
- *Criconema* sp. Hofmanner & Manzel
- *Cryptolestes pusillus* Schönherr (Laemophloeidae)
- *Eriophyes boisi* Gerb (Eriophyiidae)
- *Minutaleyrodes minuta* Singh
- *Neohydatothrips* sp. John (Thripidae)
- *Singhiella citrifolii* Morgan

Of these, the first five are pests of significance to Singapore, as they may spread easily and cause significant damage to a wide range of plants. We will continue to monitor these pests and determine the potential impacts and mitigation measures required.

Supporting Local Farmers

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. This allows us to detect and control pests in a timely manner.

We also facilitate the export of plants and plant products by issuing internationally recognised certificates and permits. In FY 2017, we issued 10,060 phytosanitary certificates for exported plants and plant products.



Initiating new survey of pests in vegetable farms

In October 2017, AVA initiated a survey of pests in local vegetable farms. The survey results will form a basis for the judicious use of pesticides and help us better understand the plant pest challenges at hand. During the FY, we surveyed 20 farms and found the pest incidence rates to be generally low. Appropriate recommendations were shared with farmers to help them manage specific issues, such as minor infections caused by leaf miners, flea beetles, diamondback moths (DBM), *Thrips palmi*, and the *Fusarium oxysporum* fungus. The survey will be continued in FY 2018 to gather more data based on additional seasonal and environmental parameters.

Improving DBM control methods

AVA continued to help local vegetable farmers control the population of DBMs through the use of pheromone lures. In July 2017, we organised an engagement session to teach farmers how to prepare and use these lures. About 5,000 lures were then distributed to all local vegetable farmers, who found these lures useful.



To further improve the pheromone lure, we developed another version with food attractants added. To test the efficacy of this pheromone-cum-food lure, a trial was conducted in one farm, which was plagued by large populations of DBMs. The results were encouraging. Further trials will be conducted to establish the efficacy of such lures in farms with low to moderate population densities of DBM.



Controlling the use of pesticides

To ensure food, environmental, and workers' safety, AVA registers, approves, and manages the use of all agricultural pesticides in vegetable and ornamental plant farms. During the FY, AVA conducted 382 pest-usage inspections and certified 110 pesticide operators. Trainings and proficiency tests were also organised for these operators.

Surveillance in local plant farms (FY 2017)

Conducted about **1,000** surveillance visits to assess pest population and monitor pest traps



Close to **3,900** pest traps were deployed

About **50,000** samples were inspected on-site

Of these, **2,000** samples were brought back for further laboratory testing and pest diagnosis



Enhancing Laboratory Capabilities



AVA's Plant Health Laboratory (PHL) provides diagnostic services on a wide range of plant pests. In addition, it has the expertise to analyse an extensive range of nutrients in soil and planting media.

Maintaining high testing standards

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 addition, PHL continued to benchmark its testing capabilities by participating in the inter-laboratory proficiency quality assurance testing programme administered by the Wageningen Evaluating Programmes for Analytical Laboratories, the Netherlands. In addition, PHL's new taxonomical identification expertise in insects and nematodes was confirmed by specialists from organisations in Australia, New Zealand, South Africa, and the USA. Satisfactory results were achieved in these programmes.

In FY 2017, PHL performed about 34,000 tests on more than 15,000 samples. Ninety-eight percent of these laboratory testing requests were completed within 10 working days.

Volume of tests conducted at PHL (FY 2017)

Functions	Export certification	Import control	Surveillance	Commercial	Total
Samples tested	400	827	5,309	995	7,531
Laboratory tests performed	555	1,965	8,173	6,463	17,156

Developing ASEAN and Singapore standards

In FY 2017, PHL developed an ASEAN standard protocol for the molecular identification of the SALB, a quarantine pest of concern in the region, where rubber industries thrive. The protocol underwent refinements with assistance of the Asia and Pacific Plant Protection Commission, and will be presented for ASEAN endorsement in FY 2018.

In addition, AVA continued to collaborate with ASEAN partners to improve soil health management. AVA co-chaired the ASEAN Expert Group Meetings on Soil and Nutrient Management under the ASEAN Sustainable Agrifood Systems. The ASEAN guidelines on Soil and Nutrient Management were adopted during the 39th ASEAN Ministerial Meeting on Agriculture and Forestry in September 2017.

A working group co-chaired by AVA and SPRING Singapore also developed a Singapore Standard on the Specification for Compost used in Agriculture and Horticulture (SS 628:2017). The standard will provide stakeholders and gardening enthusiasts with a tool to assess compost quality, and help them make informed decisions in the purchase and use of composts.

Developing new diagnostic methods

As part of efforts to expand PHL's testing capabilities, two new diagnostic methods were successfully developed in FY 2017.

- **Molecular diagnostic method for *Puccinia psidii* (*Austropuccinia psidii*)**

The *Puccinia psidii* (*Austropuccinia psidii*) is a rust fungus that attacks young plants. When left untreated, the plant could suffer from deformed leaves, defoliation, stunted growth, and death. PHL established a molecular technique to identify and confirm this quarantine pest. The method was successfully validated by the European and Mediterranean Plant Protection Organisation for adoption in FY 2017.

- **Electronic morphological keys for identification of mites**

Mites are common in Singapore and the region. Without timely and proper control, an infested plant may eventually lose all its leaves. During the FY, we developed an electronic morphological key for the identification of mites in Singapore. By keying in important features of a mite sample into a programme on the LUCID software, we are now able to easily and quickly identify the species of mites from imported and local plants.

Cultivating Good Soil for Healthy Plants

PHL provides testing services to landscapers to help them determine the organic matter levels in their soil mixes. Of the soil mix samples tested in FY 2017, the pH level in 75% of the samples was found to be within the acceptable range. However, only 32% of samples were tested to have an organic matter level within the specified limit. The cation exchange capacity, a property that helps the soil to hold certain nutrients, was found to be within the specified limit in nearly 60% of samples. Recommendations were provided for remedial actions.

Sharing Research Findings with Scientific Community

AVA contributes to scientific publications to share our research findings with the international scientific community. In FY 2017, our scientists made two presentations at the Asia and Pacific Plant Protection Commission training programme on SALB in Brazil. One poster was presented at the Science Protecting Plant Health conference in Australia.

In addition, a monthly plant health newsletter 'Plant Health Brief' was disseminated to the horticulture industry and members of the plant pest surveillance network to keep them updated on the latest pest detections.



Special Senior Officials Meeting of the 38th Meeting of the
ASEAN Ministers on Agriculture and Forestry

14 August 2017, Singapore



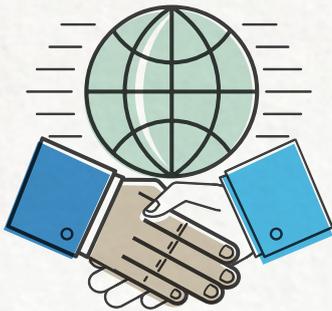


International Relations

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

#KeyAchievements

- Advanced regional cooperation in food security, through the hosting and chairing of the Special Senior Officials Meeting of the 38th Meeting of the ASEAN Ministers on Agriculture and Forestry.
- Received the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Secretary-General's Certificate of Commendation in recognition of AVA's outstanding work done in Singapore to combat illegal wildlife trade.



International Relations

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

Forging Stronger International Relations



In FY 2017, AVA continued to participate actively in bilateral, regional, and international meetings and collaborations. These included ASEAN, Southeast Asian Fisheries Development Centre (SEAFDEC), APEC, G20, FAO, OIE, Codex Alimentarius Commission, and Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) meetings where high level officials discussed cooperation in food security, food safety, fisheries, livestock, crops, sanitary, and phytosanitary measures.

Meeting of the ASEAN Ministers on Agriculture and Forestry (AMAF)

On 14-17 August 2017, Singapore (led by AVA) successfully hosted the Special Senior Officials Meeting (SOM) of the 38th Meeting of the AMAF, the Special SOM of the 16th Meeting of the AMAF Plus Three, and the 2nd ASEAN-Russian Federation SOM on Agriculture.

Under Singapore's chairmanship, the Senior Officials and meeting participants advanced dialogue on ASEAN's cooperation, as well as initiatives to strengthen food security and enhance the international competitiveness of ASEAN's food, agriculture, and forestry sectors.

Meeting with the Department of Veterinary Services, Malaysia

On 3 August 2017, the AVA-DVS (Department of Veterinary Services, Malaysia) bilateral meeting was held in Malacca, Malaysia. Parties discussed issues relating to cross-border trade in horses, pet animals, poultry, and meat products. The meeting also agreed to establish working groups to address matters on Avian Influenza zoning or compartmentalisation, mutual assistance for emergency animal disease outbreaks, and sharing of information to strengthen border biosecurity.

Cooperating with Hungary on food safety

On 26 September 2017, a Memorandum of Understanding (MOU) on Food Safety Cooperation between Singapore and Hungary was signed by Minister for Agriculture of Hungary, H.E. Sandor Fazekas and Singapore's Minister of Social and Family Development and 2nd Minister for National Development Desmond Lee. To foster mutual understanding on food safety, the MOU provides an official framework for AVA and Hungary's National Food Chain Safety Office of Hungary to cooperate through technical exchanges and sharing of expertise.

Partnering CSIRO on animal health laboratory testing

AVA and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) signed a Master Agreement in November 2017, as part of an initiative under the Singapore-Australia Comprehensive Strategic Partnership. This agreement provides AVA with the opportunity to work with CSIRO's Australian Animal Health Laboratory (AAHL) through technical exchanges and laboratory attachments. AVA and AAHL will also collaborate on projects such as providing proficiency testing to the region as well as the assay development and validation of diagnostic tests.

Partnering International Stakeholders in Conservation

Singapore is a Party to the CITES, an international agreement that prevents trade from threatening the survival of wildlife species. In efforts to curb wildlife smuggling, AVA cooperates and collaborates with stakeholders to conduct checks, investigations, and enforcement actions. In FY 2017, AVA furthered its engagement and collaboration with CITES through various meetings, trainings, and visits.

AVA participated in the 13th and 14th Meeting of the ASEAN Working Group on CITES and Wildlife Enforcement (AWG-CITES and WE) in April 2017 and March 2018 to discuss CITES implementation and wildlife enforcement issues. The meetings also covered initiatives to strengthen national CITES legislations, build capacity, share best practices, and enhance public awareness.

On 25-27 April 2017, Singapore hosted the CITES Tortoises and Freshwater Turtles Task Force Meeting, which was co-organised by AVA, the CITES Secretariat, and Wildlife Reserves Singapore. At the meeting, participants from over 15 African, Asian, and American countries identified the gaps and best practices in curbing the illegal trans-boundary trade of tortoises and freshwater turtles. The task force's recommendations were subsequently presented at the 69th Meeting of the CITES Standing Committee in November 2017.



On 31 October 2017, AVA participated in a training workshop on illegal wildlife trade, which was organised by the Singapore Airlines with funding from the United States Agency for International Development. During the workshop, AVA delivered a briefing on CITES and AVA's enforcement efforts in tackling the illegal wildlife trade.

AVA also hosted visits by officers from the CITES Secretariat, CITES Standing Committee, Interpol Wildlife Working Group, and Canadian High Commission from April to October 2017. To help them better understand the comprehensive whole-of-government measures Singapore has in place to combat the illegal wildlife and ivory trade, the programme included briefings by AVA, the Singapore Customs, Immigration & Checkpoints Authority, and the Port of Singapore Authority, as well as site visits to Singapore's air and sea checkpoints.

On 22 July 2017, Singapore received the CITES Secretary-General's Certificate of Commendation, in recognition of its successful interception of an illegal shipment containing 3,235 tonnes of CITES-listed rosewood logs on 14 March 2014. Speaking at the award ceremony, CITES Secretary-General John E. Scanlon said: "The efforts by Singapore's CITES Management Authority, the AVA, are testament to the outstanding work being done in Singapore to combat wildlife and forest crime."

To mark the 50th anniversary of the establishment of diplomatic relations between Brazil and Singapore, the Jurong Bird Park welcomed the world's rarest blue macaws to its park. AVA worked with the Jurong Bird Park to facilitate the macaws' entry into Singapore. The blue macaws, which are critically endangered and native to Brazil, are on a 10-year loan to support the breeding and conservation of the species.

Enforcing CITES in Singapore

CITES Parties regulate the import, export, and re-export of CITES species through the issuance of CITES permits and certificates. As the national authority for implementing and enforcing CITES, AVA issued 15,285 CITES permits and certificates in FY 2017.

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 enforcement actions. We work closely with the Immigration & Checkpoints Authority (ICA) and Singapore Customs to detect and detain illegal shipments of endangered flora and fauna. In FY 2017, AVA investigated and took enforcement actions on 22 cases related to illegal wildlife trade. These included the successful interceptions and seizures of 80 pieces of live corals; six pieces of ivory accessories; eight rhinoceros horns; 44 Fischer's lovebirds; one bag of rhinoceros shavings; and 3.5 tonnes of ivory tusks. Offenders were jailed up to 15 months or fined up to \$10,000.

Hosting Distinguished Visitors

During the FY, AVA received several foreign dignitaries and overseas officials for exchanges and collaborative work. Many came to learn about our regulatory control and functions, and visit our facilities and centres.

3 Apr 2017	H.E. Dr Petra Pana, Deputy State Secretary of Foreign Affairs and Trade of Hungary
18 May 2017	H.E. Mr Nathán Wolf, Mexican Ambassador to Singapore
18 May 2017	H.E. Mr Jacek Bogucki, Secretary of State at the Polish Ministry of Agriculture and Rural Development
21 Jun 2017	Ms Hayley Horan, New Zealand Trade Commissioner in Singapore
23 Jun 2017	H.E. Mr Federico Alejandro Barttfeld Ambassador of Argentina to Singapore
25 Aug 2017	Dr Enrique Sanchez Cruz, Director in Chief of the National Service for Agroalimentary Public Health, Safety and Quality of Mexico
5 Oct 2017	Mr Sheldon Jordan, Director General Wildlife Enforcement Directorate, Environment and Climate Change Canada and Chair of Interpol Wildlife Working Group
4 Dec 2017	H.E. Dr Jonathan Austin, New Zealand High Commissioner to Singapore
10 Jan 2018	Mr Nurdin Basirun, Governor of Kepri Province, Indonesia
9 Feb 2018	Mr Eumar Roberto Novacki, Vice Minister for Ministry of Agriculture, Livestock and Food Supply
8 Mar 2018	H.E. Federico Alejandro Barttfeld, Ambassador of Argentina to Singapore
21 Mar 2018	H.E. Mr Jumaga Nadeak, Head of House Representative of Kepri Province, Indonesia
	Mr Rudi Chua, Member of Commission 2 of House Representative, Kepri Province, Indonesia
	Drs. Ahmad Izhar, Head office of Food Security, Agriculture and Animal Health Services, Kepri Province, Indonesia
	Drh. Honismandri, Head Division of Livestock and Animal Health for Food Security, Agriculture and Animal Health Services of Kepri Province



10 YEAR CORPORATE PLAN

EXCELLENCE

PEOPLE

PROCESSES

INNOVATION

KNOWLEDGE

PARTNERSHIP

PERFORMANCE



Organisational Excellence

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.

#KeyAchievements

- Developed a 10-year corporate plan to chart our long-term goals and key strategies, which include assessing future scenarios in an effort to ensure we remain prepared for challenges.
- Deepened AVA's scientific competencies in food safety through trainings led by experts from international standard-setting bodies and training institutes.
- Maintained the robustness of our contingency and business continuity plans through an exercise that tested our operational readiness in case of a flu pandemic.
- Provided greater convenience for customers by implementing an automatic form-filling feature for our e-services, a new customer relationship management system, and an interactive voice response system that allows self-help via the telephone.



Organisational Excellence

The environment that AVA operates in is becoming increasingly dynamic and complex. Globally and within Singapore, we are facing more uncertainties in geopolitical developments, food security, disease outbreaks, and cyber security. To meet these challenges and prepare us for the future, we must transform the way we work and continually hone our skills, nurture our talents, and deliver excellent service to the public. We also strive to foster greater collaboration in the whole-of-government (WOG) and within AVA, including leveraging on technology and digitalisation to transform the way we serve Singapore.

Strategising for The Future

To build a future-ready organisation, we need to be aware of, and prepare for the risks and challenges ahead. In FY 2017, AVA refined its long-term goals and strengthened its approach to corporate planning. Initiatives were also put in place to enhance our capabilities in navigating the future and scanning global developments.

Strengthening our long-term planning approach

In line with Government's Public Sector Transformation (PST) efforts, AVA embarked on a transformation journey to achieve our long-term goals of:

- Ensuring a stable supply and wide variety of safe food for Singapore.
- Preventing the incursion of animal diseases and plant pests that disrupt food production and trade, and impact public health.
- Fostering peaceful co-existence between humans and animals.

To chart our key strategies and initiatives towards these goals, a 10-year corporate plan (FY 2018-2027) was developed in FY 2017. We also strengthened the mechanisms for better tracking of our progress towards this plan. To bring staff on-board the transformation journey, AVA initiated a series of dialogues to facilitate discussions on the corporate plan and its implementation among staff and the leadership team.



Preparing for the future

A new Strategic Futures Department (SFD) was set up in early 2017 to assess future scenarios and their implications to AVA. Research focus would be on areas such as the future of food and the future of human-animal interface. During the FY, SFD began nurturing an AVA-wide network of futurists, and growing our linkages with foresight practitioners across and beyond the public service.

Scanning the horizon

AVA continued to scan the horizon for food alerts and key global developments that can potentially offer opportunities or pose a threat to overall food safety, food supply, animal, plant, and public health in Singapore. During the FY, we expanded our scanning coverage to include fisheries, animal management, and wildlife trade.

Preparing for Emergencies

AVA reviews and formulates its crisis management work plan every two years to address issues of concern. To maintain operational readiness in times of emergencies, AVA also conducts annual exercises to test the robustness of our contingency and business continuity plans. On 15 September 2017, we conducted a table-top exercise to test our ability in scaling operations down to essential functions during a flu pandemic.

We also continued to introduce measures to safeguard our Information and Communications Technology systems against cyber threats. In an effort to secure information technology network and data, AVA joined the WOG initiative in disallowing unauthorised electronic portable storage devices on computers that are connected to the public service server.

Building Competencies

AVA continued to invest in developing the skills and competencies of its officers so that they are future-ready and well-equipped to perform their duties. Various frameworks are in place to hone officers' competencies. In FY 2017, a total of 8.75 learning-days per officer was achieved.

A Special Project team was set up in 2017 to deepen AVA's scientific and regulatory capabilities in the areas of food safety, animal and plant health, animal welfare and management, and agriculture. During the year, the team organised two workshops and a seminar. Topics covered included nutrition, health claims, applications for microbiological typing and antimicrobial resistance, as well as food safety risk analysis. These trainings were led by experts from the European Union, Codex Alimentarius, OIE, FAO, WHO, US Food and Drug Administration, Technical University of Denmark, University of Tokyo, Rakuno Gakuen University, Genome Institute of Singapore, Tan Tock Seng Hospital, Nanyang Food Technology Centre, and AVA. In addition, experts from the International Food Protection Training Institute facilitated a curriculum framework development session for AVA's food safety scientists. Through the session, we developed a curriculum for AVA's Veterinary and Public Health Laboratories scientists.



AVA also organised in-house lectures on food safety, legislations, and risk analysis. Sharing sessions were conducted on topics such as smart regulation, policy positions on food derived from cloned animals, negotiations with the United Nations General Assembly, best practices in procurement, and evaluations of tender bids.

In efforts to strengthen AVA's capabilities in international relations, an AVA officer is currently attached to the Food and Agriculture Organisation (FAO), and another was attached to the United Nations. These attachment programmes allow officers to gain experience in working with overseas counterparts on global issues. Internally, AVA scholars were also rotated to AVA's International Relations Group for exposure.

In addition, three undergraduate scholarships were awarded in the areas of environmental science, food manufacturing engineering, and zoology. Two postgraduate scholarships were awarded in the area of agricultural sciences and public administration. We offered the Specialist Diploma in One Health to four officers. The diploma was jointly developed with Temasek Polytechnic, Ministry of Health, and National Environment Agency to provide officers with theoretical and practical knowledge on public health.

Putting Customers First

As a customer-oriented organisation, we are constantly improving our service delivery to meet rising public expectations. Our efforts in FY 2017 continued to focus on providing greater convenience and a seamless customer experience. Initiatives were also put in place to inculcate a culture of customer service excellence in AVA.

Bringing ease to online transactions

In December 2016, AVA's online Pet Animal Licensing System was enhanced with "MyInfo", a consent-based feature that allows government e-forms to be automatically filled out. In 2017, we completed integrating "MyInfo" into all other AVA e-services. Customers no longer need to repeatedly fill out their personal data for these e-services.

Improving customer relationship management

AVA's customer relationship management system, named "Customer360", was implemented on 27 November 2017. With "Customer360", staff will be able to have a single and complete view of each customer's profile and history of interaction with AVA, regardless of the mode of communication (i.e. phone, email, etc.). Besides improving our feedback management process, "Customer360" also enhances the service experience for our customers, as they will not need to repeat their case history when they interact with different staff across AVA.

Leveraging on technology to enable customer self-help

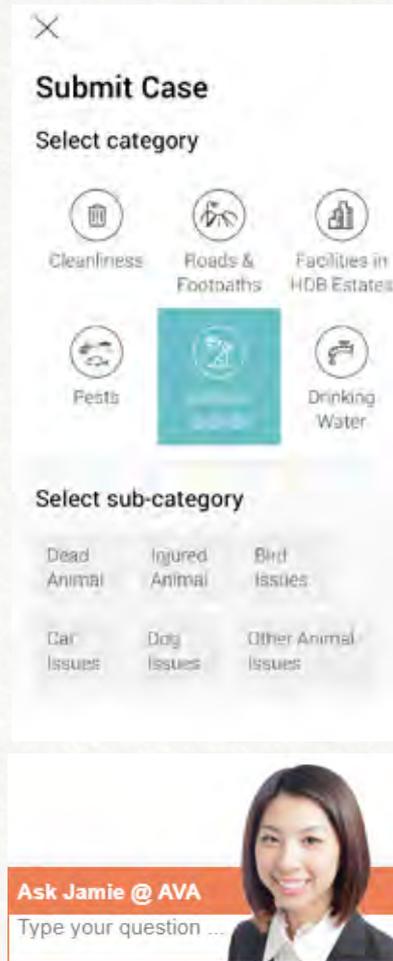
On 10 November 2017, AVA incorporated the Interactive Voice Response System (IVRS) into its customer hotline service. With pre-recorded messages, the IVRS guides callers to the relevant department or information that they need. These initiatives allow us to re-deploy resources to handle and manage more complex feedback and issues.

In addition, AVA worked with the Municipal Services Office to improve menu functions related to the reporting of animal issues in the OneService (OS) mobile application (app). The improved OS app was launched in July 2017, and cases received through it increased by 30%.

In October 2017, AVA embarked on the project to introduce "Ask Jamie @ AVA", a virtual assistant system programmed to deliver information via an automated chat function, on AVA's website. During the FY, we built up the knowledge base of the system and conducted an internal trial to test its effectiveness in answering more than 1,600 questions that customers may ask. When launched in 2018, customers can make use of "Ask Jamie @ AVA" to address their queries.

Celebrating excellent service

The annual AVA Service Day was held on 12 July 2017 to celebrate excellent customer service, and inculcate staff with an appreciation for quality service. In total, two Distinguished Service Awards, 46 Excellent Service Awards, and eight Quarterly Service Star Awards were given out. In addition, to promote a culture of excellent and seamless service delivery, members of the leadership team shared their efforts in enhancing the customer service experience for food traders and manufacturers, who transact with AVA through their entire supply chain. A 'CARE Struck' quiz was also held to reinforce the audience's awareness of AVA's service principles.



Exemplifying AVA's Values

At AVA, we are guided by our corporate values of excellence, care, integrity, and teamwork (ExCITe). In FY 2017, we continued to inspire and encourage our officers to exemplify these values through various efforts and activities.

The annual Organisational Excellence Festival (OEF) is a platform for the AVA family to recognise, celebrate, and reinforce its corporate value of excellence in the organisation. Our staff participated in many enriching events and workshops during the festival on 28 June-24 July 2017.

The AVA Achievement Award celebrates and recognises cross-departmental and inter-agency efforts that demonstrate AVA's corporate values. In FY 2017, the award was presented to eight AVA teams, which included those who worked on plankton blooms, the Meeting of the ASEAN Ministers on Agriculture and Forestry, and One Health Coordination Committee. In addition, nine officers received the "ExCITables" awards for exemplifying AVA's corporate values in their daily work.



We continued to engage with staff through internal communication platforms such as the "Life@AVA" newsletter. Officers who best exhibited AVA's values were featured in the newsletter, to serve as role models or inspiration for others. Content related to AVA's corporate values and the associated desired behaviours were also regularly disseminated via email and the intranet.



Sparking innovation

In terms of innovation, the following schemes are in place to encourage innovation among staff.

TWINKLE

(Tapping Wild and Innovative Ideas for Knowledge, Learning and Exchange)

Individual officers submit suggestions on how to improve service delivery or efficiency



336 TWINKLE ideas accepted for implementation

STAR

STAR (STriving and Aiming for Excellence through TeamwoRk)

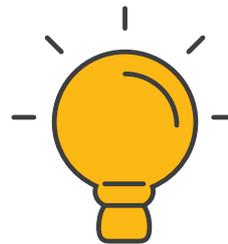
Officers form project teams that look into improving services or processes



33 projects completed

Innovation Challenge

Officers form project teams, and transform innovative ideas into prototypes with a funding of up to \$10,000



2 projects were completed

STAR and Innovation Challenge project teams also won:



7 awards (Star and Gold)

from the Singapore Productivity Association's Team Excellence Assessment

Caring for our people, community and environment

AVA cares for its people as well as the community and environment around it. A wide range of recreational, health, and family-oriented activities was organised throughout the FY to help staff build esprit de corps, lead a healthy lifestyle, contribute to our community, and conserve resources.

Active Day

- Series of events that encouraged staff to lead a healthy lifestyle, including health talks and bazaars, carnival games, and a K-pop mass workout



Health Talks

- Organised a series of talks on topics such as nutrition, mental well-being, cholesterol management, eye health, and cancer awareness



AVA Corporate "Steps" Challenge

- AVA officers participated in Health Promotion Board's national challenge to clock at least 10,000 steps per day



Annual Health Screening

- Comprised complimentary basic package for all staff
- A mask-fitting session was organised to teach officers how to wear a mask correctly in the event of a bird flu outbreak



Health Bazaars

- 2 health and wellness-themed bazaars with vendors selling healthy products and fitness apparels



Bi-monthly Fruit Day

- To promote general well-being and encourage staff to eat healthily, all staff continued to receive a fruit every 2 months



Bonding with colleagues and family

Family Day

- The "Bond with your Family" Day was organised as a lead-up to AVA's Organisational Excellence Festival, which coincided with the commemoration of 50 years of National Service (NS) in Singapore
- Comprised a piñata making workshop and a guided tour of the Army Museum and Singapore Discovery Centre
- As part of the biennial MND Family Day for agencies under the MND family (including AVA), we organised an outing to Universal Studios Singapore.



Celebrating NS50

- Officers coordinated their outfits of the day to wear green, to show their support for NS men. A photo contest was also conducted

Dinner and Dance

- Organised a casual "Night Festival" at PicnicSG, an indoor food truck in a park setting

Staff engagement

- 16 engagement sessions organised for the leadership team and officers to communicate and build relationships
- Conducted briefings on re-employment and the extended management executive scheme
- AVA Alumni and officers networked at events such as Dinner and Dance and volunteers' engagement session
- AVA and Ministry of National Development (MND) Alumni was invited to visit the MND Family Exhibition and Founders' Memorial Showcase at Gardens by the Bay, as well as the MND Family Alumni Get-together. They also had the opportunity to interact with MND Senior Management and mingle with fellow alumni from the MND family
- Organised tours to AVA's Marine Aquaculture Centre and a brewery for staff in AVA and MND



Supporting our adopted charity, Community Chest (ComChest)

- Put in place the Social Help and Assistance Raised by Employees (SHARE) Auto-Inclusion Scheme to provide an easy and convenient way for officers to contribute at least \$1 per month to ComChest



- Organised the annual Charity Bazaar and raised close to \$28,000



- Sponsored more than 100 of its child beneficiaries to a movie. These children were accompanied by AVA staff, who also enjoyed subsidised movie ticket rates

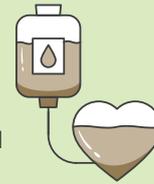


- Participated in ComChest's Fú Dài initiative by helping to pack daily necessities, and delivered them to the needy during the Lunar New Year period



Organising a blood donation drive

- Organised in collaboration with the Singapore Red Cross to encourage healthy staff to regularly donate blood and save lives



Workplace Safety and Health (WSH) Committee

- Sent officers for training in bizSAFE workplace safety courses
- Reviewed the WSH policy and challenges
- Ensured risk assessment are up-to-date and applicable to the ever-changing work environment



Environmental Sustainability Committee

- Participated in Earth Hour 2017 by turning off all lights at AVA centres where there were no night operations
- Reviewed the use of air-conditioning at AVA's Sembawang Animal Quarantine Station and the Animal & Plant Health Centre in efforts to conserve energy
- Discontinued the printing of annual corporate diaries for staff



Performance Indicators

Veterinary Public Health & Food Safety

Outcome Indicators / Objectives

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	2 cases per 100,000 population
	Number of key food items that has 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	4 business cluster meetings and 1 combined cluster meeting
To conduct food sourcing missions/ study trips	1 food sourcing trip conducted (Indonesia) 3 study trips conducted (Norway, Netherlands/UK and China)
To monitor the compliance status of locally manufactured/ processed food with Food Regulations	94.73% of the total number of inspections conducted in FY 2017 was in compliance with the Sale of Food Act and the Wholesome Meat and Fish Act 99.16% of the total number of samples collected in FY 2017 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 carried out on the scheduled dates.
To process application for food establishments' licenses within five working days from the date of receipt of application	100% of applications for food establishments' licences 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	134,156 tests
To provide training and certify farm workers on proper handling of pesticides	A total of 90 POC certifications were issued for FY 2017, of which 29 were new applicants and 61 were recertification

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"> • Eggs: 10,345,402/hectare • Coastal fish farms: 40.54 tonnes/hectare • Land-based food-fish farms: 15.44 tonnes/hectare • Leafy vegetables: 113.66 Tonnes/hectare

Output Indicators

Activity	Volume
Accreditation of overseas food sources	48 inspections
Number of food samples tested	50,637 samples
Number of laboratory tests performed	255,787 tests
To manage farms in agrotechnology parks and fish farming zones	268 land-based farms and 117 coastal 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% rejected

Output Indicators

Activity	Actual Volume
To issue export and import documents for animal, plant, and food products	CITES - 15,285 CITES permits and certificates

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

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