

★ THINK ★ **FRESH**

ANNUAL REPORT 2013 / 2014





THINK FRESH

The world we live in is constantly changing. To stay relevant and keep up with the times, we have to creatively and consistently adapt the way we think and do things.

 + 
FRESH Ideas **NEW** Solutions

- 18 Food Supply Resilience
- 28 Food Safety
- 46 Animal Health and Welfare
- 58 Plant Health
- 66 Agrotechnology
- 78 Agri-Trade
- 86 Organisational Excellence

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 our customers, 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

ISO/IEC 17025 SAC-SINGLAS ACCREDITATION AWARDS

AWARDED TO:

Veterinary Public Health Laboratory
since 2000, with 11 new tests accredited in FY 2013

Animal Health Laboratory
since January 2005

Plant Health Laboratory
since June 2005, with three new tests accredited in FY 2013

MINISTRY OF NATIONAL DEVELOPMENT MINISTER'S (TEAM) AWARD

for "Review of Animal Welfare Legislation in Singapore" project

MERITORIOUS DEFENCE PARTNER AWARD for Total Defence Award 2013

SHARE GOLD AWARD 2013

DISTINGUISHED HOME TEAM PARTNER AWARD under the Home Team NS Award 2013

ONG TENG CHEONG LABOUR LEADERSHIP INSTITUTE'S WORKPLACE PARTNERSHIP AWARD 2013 received jointly with AUSBE

SINGAPORE PRODUCTIVITY ASSOCIATION'S TEAM EXCELLENCE SYMPOSIUM (TES) 2013

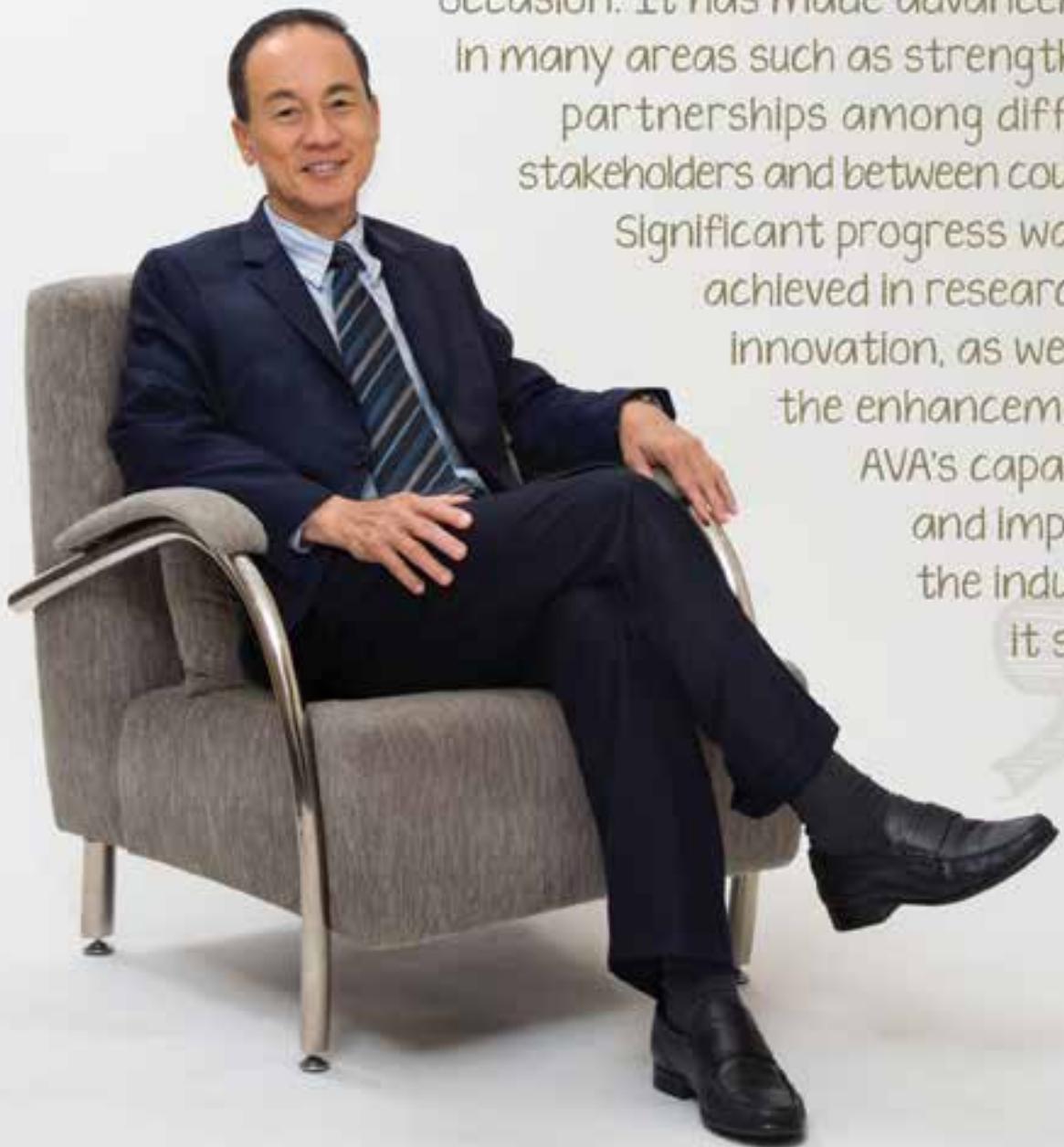
Two Gold Award, Three Silver Awards

CHAIRMAN'S STATEMENT



To tackle these challenges, AVA has to continue with its transformation and do things smarter. I am proud to note that throughout the Financial Year (FY) 2013 (ending 31 March 2014), AVA has risen to the occasion. It has made advancements in many areas such as strengthening partnerships among different stakeholders and between countries.

Significant progress was also achieved in research and innovation, as well as in the enhancement of AVA's capabilities and improving the industries it serves.





AVA pledges to transform itself and do things better.

DYNAMISM IN THE FACE OF CHALLENGES

Changes and unexpected developments around the world and at home pose a host of challenges to our efforts in safeguarding and diversifying our supply of food, as well as in keeping animal and plant diseases at bay. Besides tackling these cross-boundary concerns, AVA is also engaged with complex issues at home, amidst increasingly diverse social attitudes and citizens' rising expectations of the Public Service.

To tackle these challenges, AVA has to continue with its transformation and do things smarter. I am proud to note that throughout the Financial Year (FY) 2013 (ending 31 March 2014), AVA has risen to the occasion. It has made advancements in many areas such as strengthening partnerships among different stakeholders and between countries. Significant progress was also achieved in research and innovation, as well as in the enhancement of AVA's capabilities and improving the industries it serves.

TRANSFORMING BEYOND THE BASICS

Building on its foundations, AVA's policies and programmes are continually refreshed to ensure that the organisation remains well-prepared to take on greater challenges of the changing environment. These efforts are in line with the ethos of a Public Sector Transformation (PST), which calls for the Public Service to work as one, as we put our citizens at the centre of what we do, engaging them, understanding their needs, and keeping their trust.

During the FY, AVA extended its engagement with its partners; not only in the implementation of policies and initiatives, but also during the planning stages. This can be seen through AVA's expanded role in animal management. AVA provided secretariat and technical support for the Animal Welfare Legislation Review Committee (AWLRC), Singapore's first large-scale national review and consultation on animal welfare. A great range of feedback

from diverse stakeholders was received and considered. Thereafter, a Multi-Stakeholder Collaboration Committee (MSCC), chaired by Member of Parliament, Mr Alex Yam, was established in October 2013, to work towards the shared goal of promoting animal welfare in Singapore. I am glad that all parties can share perspectives, build mutual understanding, and co-operate on animal welfare matters via this platform.

Stakeholders' feedback has also helped us improve the way we provide technical assistance. For example, through industry consultations, we learned that it is usually difficult for workers from food establishments to attend food safety seminars conducted by AVA during working hours. Therefore, we brought the "classroom" closer to them through a series of Food Safety Roadshows held over lunchtime in their vicinity. We also extended our "green" expertise to professionalise community gardens. With the assistance of other agencies such as the People's Association, the National Parks Board, Town Councils, and Residents' Committees, AVA conducted weekly lessons at five model gardens in Woodlands, and coached community gardeners on growing a good crop of vegetables.



Minister of State for National Development, Mr Desmond Lee, with participating animal welfare groups, at a Responsible Pet Ownership roadshow organised by AVA.



→ While unscrupulous food adulteration incidents have caused concern in some countries, AVA maintains its vigilance and Singapore can enjoy a continued supply of safe food on our tables.

SAFEGUARDING FOOD SECURITY

Food security is a crucial issue for Singapore and it is not easy ensuring a steady supply of safe food at affordable prices for our nation. Because safe food is readily available all the time, many Singaporeans take this for granted.

We import over 90 percent of our food, and are therefore considerably exposed to global price and supply fluctuations. Amidst persistent threats of food supply disruption and food contamination internationally, AVA has been at the forefront in ensuring food security and safety for our country. This includes supporting the increase of accredited overseas meat sources for Singapore, to better manage risks on food security.

Global Engagement and Food Diversification

As part of our efforts in ensuring food security, Singapore officially became a member of the Food and Agriculture Organisation (FAO) in June 2013. This is a major step forward. This would enable AVA to keep abreast of food security issues and hence can be more proactive in developing strategies to address them.

AVA has been actively engaged in international development. For example, AVA has been working with its partners to facilitate and monitor the development of an integrated pig farm and the maintenance of a Foot-and-Mouth Disease-free Zone within the Singapore-Jilin Food Zone. The farm is set to enhance Singapore's food supply resilience in several key areas, starting with pork and pork products. Following the food zone's critical success in attaining a Foot-and-Mouth Disease-Free Zone status, Singapore is a step closer to bringing in quality imports from another reliable source.

While these global engagements would safeguard Singapore's food security, AVA's food source diversification strategy is rooted in intimate partnerships with the industry, as well as in having an effective food safety risk assessment programme. Sourcing missions to Poland and Denmark were launched during the FY to help our importers find new food sources.



→ Food processing facilities we have visited during sourcing missions to Poland and Denmark.



Boosts for Farmers on the Home Front

I am happy to report that AVA has made significant strides in food security on the home front as well. AVA's Food Fund continues to facilitate our farmers' efforts to boost productivity and capabilities. During the inaugural Food Industry Convention held in October 2013, Minister for National Development Mr Khaw Boon Wan announced a \$10 million addition to the Food Fund (III), with several improvements made to the scheme to provide greater support for farmers.



→ Minister for National Development announces the addition of \$10 million to the Food Fund (III), during the inaugural Food Industry Convention organised by AVA.

By the end of the FY, close to 40 percent of Singapore's farms had benefited from the Food Fund. For example, Kok Fah Technology Farm received support from the Food Fund to purchase machinery and upgrade its growing houses. The farm was thus able to enjoy a 60-percent reduction in manpower for one of its processes and increase annual yield by 20 percent.

For local production to be successful, it must gain the support of consumers. AVA continued to promote local produce to Singaporeans during the FY. A good example is the two-week "Made-in-Singapore Fair" where we partnered NTUC FairPrice to raise public awareness of the attractiveness of local produce.

In bolstering local production, I can proudly say that AVA has truly gone the extra mile. Early this year, our coastal fish farms were unfortunately hit by mass fish fatalities. Without hesitation, AVA staff worked long hours and responded quickly with funding packages to aid farms in replenishing stocks and to help them resume operations in a very short time. I would like to extend my appreciation to all the AVA staff who worked tirelessly to advise and assist the affected farmers through the difficult period.

Beyond funding assistance, AVA also actively advances technology and best practices for the industry. In mid 2013, AVA led a multi-stakeholder study trip to Israel, where numerous agri-technologies were identified with potential for adaptation by Singapore's food farms. As part of expertise transfer, we have also introduced other new technologies to local farmers, such as water-saving irrigation techniques, indoor farming technology, brood stock development of new food-fish species, and a water-recirculation system for aquaculture.

Strengthening Food Safety Capabilities

The stringent tests conducted by AVA's laboratories on food products have been instrumental in helping to maintain food safety in Singapore. To enhance our capabilities in tracing sources of food samples, AVA's Veterinary Public Health Centre has begun using nuclear techniques such as stable isotope and trace element analyses. Existing competencies in radioactivity testing, non-targeted testing, and molecular characterisation were also further strengthened. These enhancements will equip AVA with the relevant capabilities to better respond to more complex food safety issues.

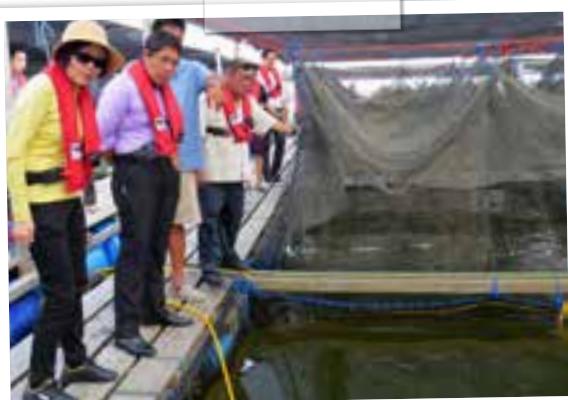
AVA's achievements in food safety were taken farther in 2013, when it became the lead agency for Singapore's involvement in the Global Food Safety Partnership. The international public-private partnership initiative aims to improve the safety of food across countries and facilitate trade in agri-food products. In this leadership role, AVA brings together relevant public and private sectors in Singapore to collaborate in capacity-building initiatives that strengthen international food safety.



→ Kok Fah Technology Farm, one of the recipients of the Food Fund, has successfully achieved savings manpower costs and increased output.



→ Senior Minister of State for Trade & Industry and National Development, Mr Lee Yi Shyan, at the "Made in Singapore Fair", along AVA CEO and the management of NTUC FairPrice Cooperative Ltd.



→ Minister of State for National Development & Defence, Dr Mohamad Maliki Bin Osman and AVA CEO visit a fish farm that was affected by mass fish fatalities.



→ AVA CEO with World Bank delegates at the 2nd Annual Conference of the Global Food Safety Partnership.



→ AVA's leadership team regularly engage staff through orientations, tea sessions, and dialogues.

RECOGNITION IN ANIMAL HEALTH

Singapore enjoys a track record of freedom from serious animal and plant diseases, because AVA has in place robust animal and plant health programmes. I would like to applaud AVA for the sustained accomplishment, as well as for being recognised by the World Organisation for Animal Health (OIE) in May 2013 to be free from African Horse Sickness. In addition, Exercise Gallus VII, an exercise to test our readiness to tackle bird flu outbreak, was successfully conducted during the FY, as we stay prepared against a potential avian flu outbreak.

LISTENING, ENGAGING, SERVING

AVA must do more in service delivery and stakeholder engagement, in order to win public confidence. The First Responder Protocol is a good example. After listening to and understanding the needs of our customers, our role in the First Responder Protocol pilot now provides citizens with a one-stop channel for all animal-related feedback. Inputs across various agencies are coordinated behind the scenes to ensure

an effective and timely response. This seamless and integrated approach brings greater convenience and higher quality of service to the public.

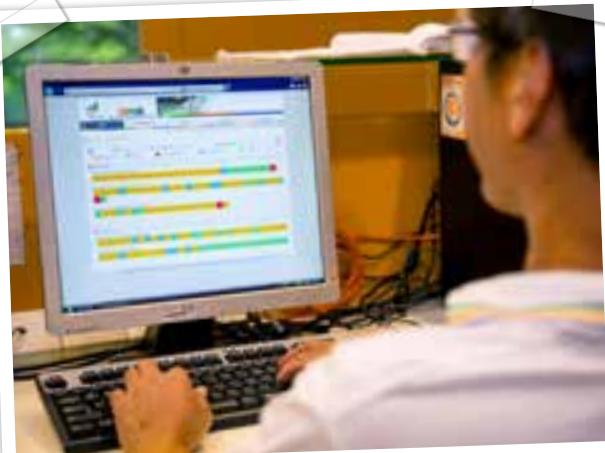
The new online Quarantine Management System is another example of how AVA strides to improve customer service delivery. The online animal quarantine space reservation system contains features that help to cut down the time and hassle previously required in the submission of hardcopy documents by both pet owners and agents.

In addition, AVA continues to hold dialogue sessions and business cluster meetings to foster stronger collaboration with our industry partners. During the FY, a new Food Manufacturers Business Cluster was established to address issues concerning food safety management, strengthen public-private partnerships, and improve the overall competency of Singapore's food manufacturing industry. The cluster will also be charting the direction for our food manufacturing industry to stay competitive, by enhancing productivity and embracing innovation, as well as through capability upgrading in small to medium sized enterprises. The cluster has already begun working jointly on projects that help establishments with poorer track records to improve their food safety standards.

NURTURING OUR PEOPLE

The heart and soul of an excellent organisation lies in the quality and attitude of its people. Recognising these, customised trainings were held for AVA staff to help them learn new approaches to rulemaking and hone their service competencies.

In addition to developing staff and helping them to improve their work processes, I am heartened to see a lot more efforts invested by AVA towards closer management-staff engagement. The inaugural AVA Town Hall session held last September, and the leadership team's regular tea sessions and dialogues are important steps taken to understand and address ground sentiments.



→ The new online animal Quarantine Management System (QMS).



AVA's refresher orientation programme includes interaction with the leadership team.

AVA is paying special attention to long-serving officers who have seen the organisation going through many years of evolution. To ensure they stay relevant with AVA's continuing transformation, refresher orientation programmes have been specially designed for them. These programmes have been running since last September.

MOVING FORWARD

Over the past FY, much has been achieved. However, there is much more to be done. We will continue to actively steer and support the work of the Inter-Ministry Committee on Food Security. New work groups have been formed under the Committee to look into greater R&D efforts that address our food security needs along the whole food value chain. The work groups will also identify potential overseas food-related investments for Singapore.

In plant health as well as animal health, welfare, and management, AVA has worked out strategic roadmaps to chart our path ahead. Our goals include greater international recognition of Singapore's standards, so as to enhance trade facilitation. AVA has to ensure that this initiative is successful.

At the same time, our policies, programmes, and regulatory frameworks need to be continuously refreshed. Already, the Animals and Birds Act has been reviewed to give our officers greater empowerment in the areas of animal health, welfare, and management. AVA's regulatory surveillance programme will also be boosted to widen our knowledge of the local animal health situation, improve analysis of surveillance data, and sharpen our response plans for the mitigation of disease risks.

AVA's list of milestones and endeavours shows that it has embarked wholeheartedly on the Public Service-wide journey towards PST. It is encouraging to see that AVA's leadership has demonstrated strong commitment to the transformation. I urge all AVA staff and stakeholders to double your support and engagement towards AVA's PST journey.

HEARTFELT APPRECIATION

I would like to thank my fellow Board members for their valuable contributions and advice given to the management. Also, a very warm welcome to Mr Dileep Nair who has just come on board to join us starting 1 January 2014.

Lastly, I would like to say a big thank you to all the AVA's staff and leadership team for their unstinting efforts in bringing the organisation to greater heights. I look forward to AVA reaching greater heights in the coming year!

Koh Soo Keong
Chairman

BOARD OF DIRECTORS



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01 / Chairman, Mr Koh Soo Keong

- Managing Director, EcoSave Pte Ltd
- Chairman, ABL Asia Pte Ltd
- Chairman, Ascendas Funds Management (S) Ltd
- Independent Director, ECS Holdings Ltd
- Independent Director, Noel Gifts International Ltd
- Independent Director, Northern Technologies International Corporation
- Director, Sino-Singapore (Chengdu) Innovation Park Development Co. Ltd
- Director, Zerust Singapore Pte Ltd
- Director, Agape Pte Ltd
- Director Sinclair-School of Design, New Media & the Arts Pte Ltd (w.e.f. 19 Sep 2013)

02 / Prof Zhou Weibiao

- Director, Food Science and Technology Programme, Department of Chemistry, National University of Singapore (NUS)
- Council Member, Singapore Institute of Food Science and Technology (till 24 April 2014)
- Member, Food Standards Committee, SPRING Singapore, MTI Singapore
- Member, Food Manufacturing Independent Expert Panel, SPRING Singapore, MTI Singapore
- Member, Panel of Experts, Advertising Standards Authority of Singapore
- Member-at-large, Executive Committee, International Society of Food Engineering
- Governing Board Member, The International Food Information Service (IFIS Publishing), Limited, UK

03 / Ms Tan Poh Hong

- Chief Executive Officer, Agri-Food and Veterinary Authority
- Board Member, Agri-Food and Veterinary Authority
- Board Member, Singapore Corporation of Rehabilitative Enterprise (SCORE)
- Director, AgriFood Technologies Pte Ltd
- Member, Liquors Licensing Board

04 / Mr Peter Chia

- Chief Operating Officer, Temasek Life Sciences Laboratory Ltd
- Chief Executive Officer, Temasek Life Sciences Ventures Pte Ltd
- Commissioner, PT Monfori Nusantara
- Director, Bioforest Pte Ltd
- Director, JOII (S) Pte Ltd
- Director, Tridel Biosciences International Pte Ltd

05 / Dr Azlinda Anwar

- Assistant Director (Research & Enterprise Development), Temasek Life Sciences Laboratory Ltd
- District Councillor, South West CDC 5th Council

06 / Mrs Lee Ai Ming

- Senior Partner, Rodyk & Davidson LLP
- Independent Director, Keppel Land Ltd
- Independent Director, HTL Holdings Ltd
- Member, Singapore Copyright Tribunal
- Member, Steering Committee for IP Competency Framework



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07 / Mr Yeo Guat Kwang

- Assistant Secretary-General, NTUC (w.e.f 1 Feb 2014)
- Director, Workplace Safety & Health, NTUC
- Member of Parliament
- Chairman, Migrant Workers Centre
- Co-Chairman, GEMS Up CCI Working Committee
- Cluster-Lead, Hospitality and Consumer Business

08 / RADM (Dr) Kang Wee Lee

- Chief of Medical Corps, Singapore Armed Forces

09 / Mr Teo Eng Cheong

- Chief Executive Officer, International Enterprise Singapore
- Chairman, IE Singapore Holdings Pte Ltd
- Independent Director, Ascendas Funds Management (S) Ltd
- Board Member, Agri-Food & Veterinary Authority
- Board Member, Council for Private Education
- Board of Director, ASEAN Infrastructure Fund Ltd
- Deputy Chairman, Singapore Cooperation Enterprise

10 / Mr Tan Kok Yam

- Chairman, AgriFood Technologies Pte Ltd
- Director Manpower, Ministry of Defence (till 30 Jun 2013)
- Director, Singapore Technology Engineering (till 30 Jun 2013)
- Director, ST Electronics (e-Services) Pte Ltd (till 30 Jun 2013)
- General Secretary, SAF Reservist Association (till 30 Jun 2013)
- Vice President, NS Resort & Country Club (till 30 Jun 2013)

11 / Mr Wong Hin Sun Eugene

- Founder and Managing Director, Sirius Venture Capital Pte Ltd
- Chairman, CrimsonLogic Pte Ltd
- Director, Sirius SME Growth Partners I Ltd
- Non Executive Director, Ajisen (China) Holdings Ltd
- Non Executive Director, Japan Food Holdings Ltd
- Non Executive Director, Jason Marine Ltd
- Non Executive Director, International Enterprise (IE) Singapore Board
- Non Executive Director, Sirius Angel Fund Pte Ltd
- Non Executive Director, Sirius Investment Inc
- Non Executive Director, Neo Group Limited
- Non Executive Independent Director, TMC Education Corporation Ltd
- Non Executive Director, Singapore Kitchen Equipment Limited
- Non Executive Director, Cargo Community Network Pte Ltd

12 / Mr Felix Soh

- Editor, Digital Media Group, Digital Division, Singapore Press Holdings Ltd

13 / Mr Dileep Nair

- Singapore High Commissioner to Ghana

SENIOR MANAGEMENT



01 / Ms Tan Poh Hong
Chief Executive Officer

02 / Dr Chew Slang Thai
Director-General for Agri-Food &
Veterinary Services
Deputy Chief Executive Officer
(Regulatory Programmes &
Operations)

03 / Mr Lee Kwang Weng
Deputy Chief Executive Officer
(Corporate & Technology)

04 / Ms Melin Lim
Group Director
Corporate Resource Management

05 / Dr Tan Lee Kim, Klm
Group Director
Planning & Organisational Excellence

06 / Dr Paul Chiew
Group Director
Labs

**07 / Dr Choo Li Nah**

Group Director
Communications & Corporate
Relations

08 / Dr Yap Hm Hoo

Group Director
Quarantine and Inspection

09 / Mrs Tan-Low Lai Kim

Group Director
Food Supply Resilience

10 / Dr Astrid Yeo

Group Director
Regulatory Administration &
Food Establishment Regulation
(concurrent appointments)

11 / Dr Wong Hon Mun

Group Director
Agri Establishment Regulation

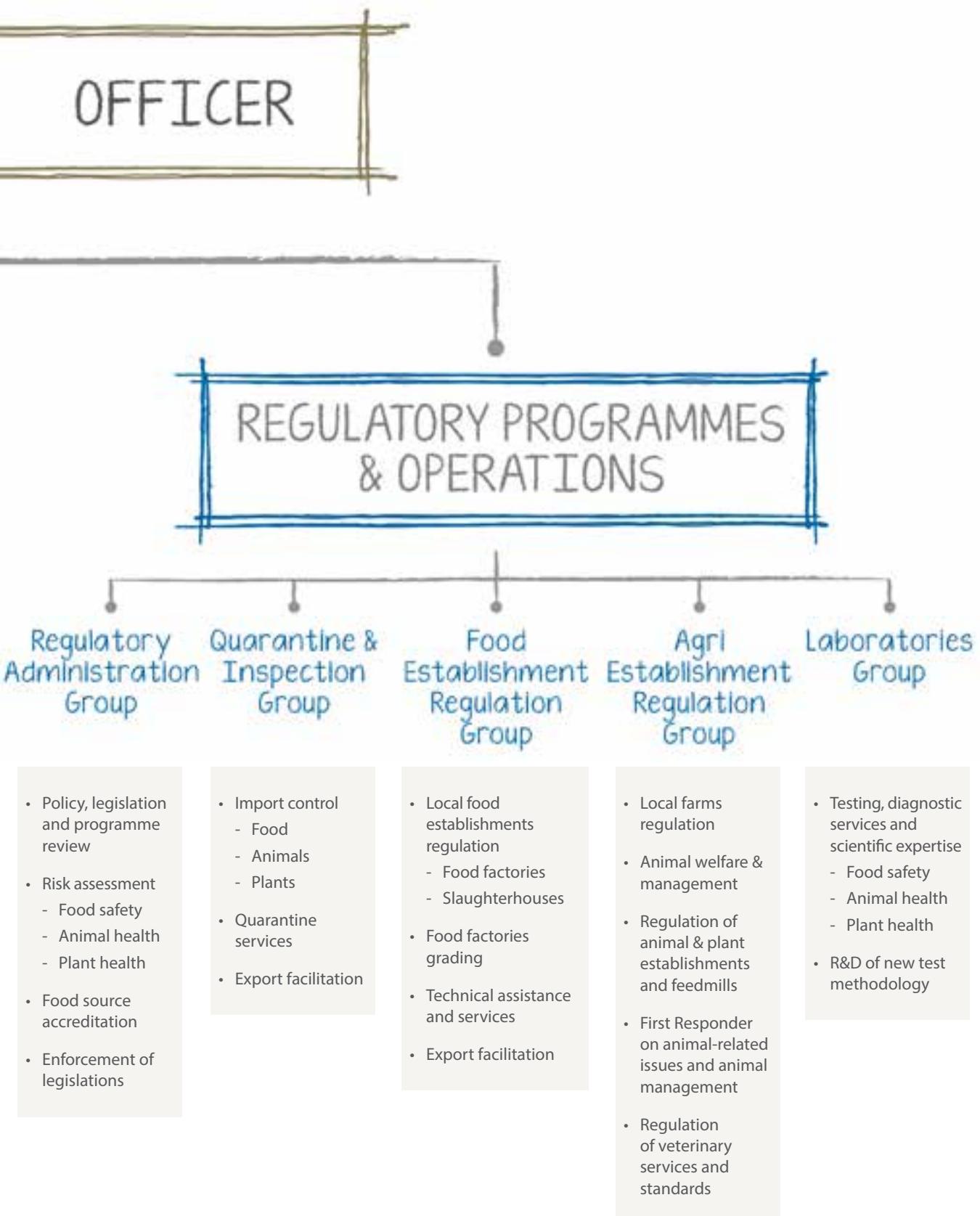
12 / Dr Phillip Chew Hong

Group Director
Technology & Industry Development

ORGANISATIONAL CHART AND



KEY ROLES OF GROUPS



CALENDAR OF EVENTS

APRIL 2013

Following a risk assessment by AVA and assurances from Japan's Ministry of Agriculture, Forestry and Fisheries on the safety and traceability of food from Japan, import suspension of selected products from seven prefectures in Japan were lifted on 8 April 2013.

MAY 2013

AVA partnered Republic Polytechnic in organising a "Heart for Animals" roadshow, held on 18-19 May 2013 at City Square Mall.

To keep abreast of international standards for animal health and the control of major animal diseases worldwide, AVA represented Singapore at the 81st General Session of the World Assembly of Delegates of OIE held in Paris, France, from 26 to 31 May 2013.

The five-day Aquarama was officially opened by Minister of State (MOS) for National Development, Dr Mohamad Maliki Bin Osman, on 29 May 2013. AVA facilitated the import and export of ornamental fishes for exhibition, and showcased our efforts in ensuring the competitiveness of Singapore's ornamental fish industry.

JUNE 2013

AVA's Chief Executive Officer (CEO), Ms Tan Poh Hong, led a delegation on an agri-technology study trip to Israel from 9 to 14 June 2013.

Singapore became a member of the Food and Agriculture Organisation of the United Nations (FAO). MOS for National Development & Defence, Dr Mohamad Maliki Bin Osman, together with AVA's CEO Ms Tan Poh Hong, led officials from AVA and the Ministry of National Development to attend the 38th Food and Agriculture Organisation of the United Nations (FAO) Conference on 15-22 June 2013 in Rome, Italy.

JULY 2013

AVA successfully conducted its seventh bird flu simulation drill, Exercise Gallus VII. Table-top and field exercises were carried out on 15 July and 17 July 2013, respectively.

On 19 July 2013, Senior MOS for Trade and Industry & National Development, Mr Lee Yi Shyan, graced the Food Safety Awards Night as Guest-of-Honour and presented four Gold, seven Silver, and 12 Bronze awards to winners of the Food Safety Excellence Scheme.

AUGUST 2013

The Food (Amendment) Regulations 2013 were gazetted on 1 August 2013, covering changes in the provision for, as well as new limit, maximum limit, and addition of various substances in food.

The Animal Welfare Legislation Review Committee received the Minister's (Team) Award 2013 for its efforts in bringing together non-government stakeholders, and enabling the co-creation of solutions to further animal welfare in Singapore.

Eleven National Day Awards were bestowed on AVA staff in recognition of their exemplary performance and dedicated service. These comprised one Gold Public Administration Medal, one Silver Public Administration Medal, two Bronze Public Administration Medals, two Commendation Medals, two Efficiency Medals and three Long Service Medals. AVA CEO received the Gold Public Administration Medal for her significant contributions to AVA and the public service.

SEPTEMBER 2013

On 13-15 September 2013, AVA collaborated with the Society for the Prevention of Cruelty to Animals in organising the "SPCA Celebrates World Animal Day" event at United Square Mall.

Dr Mohamad Maliki Bin Osman, MOS for National Development, together with AVA CEO, led a delegation to attend the 35th Meeting of the AMAF and the 13th Meeting of the AMAF+3 held on 26-27 September 2013 in Kuala Lumpur, Malaysia.

AVA CEO also attended the 3rd ASEAN-India Ministerial Meeting on Agriculture and Forestry on 28 September 2013 in Kuala Lumpur, Malaysia.

AVA collaborated with NTUC FairPrice to promote locally farmed fish. Local farms Rong-Yao and The Fish Farmer came together for a joint marketing promotion under the "SG Fish" brand.

OCTOBER 2013

AVA phased out the Accredited Ornamental Fish Exporter Scheme (AOFES) with effect from 1 October 2013, and replaced it with the AVA Quality Assurance Scheme (AQUAS), which allows members to jointly develop and implement AVA's approved standard operating protocols.

AVA organised the inaugural Food Industry Convention on 10 October 2013 at the Orchard Hotel Singapore. Minister for National Development, Mr Khaw Boon Wan, graced the event as the Guest-of-Honour, and announced the launch of AVA's Food Fund Tranche III with another \$10 million added to it. In addition to a presentation on the Food Security Roadmap by AVA CEO, Mr Hiroyuki Konuma (Assistant Director-General and Regional Representative for Asia and the Pacific, FAO) shared further insights on the global trends and development in food security.

AVA effectively facilitated the import of 2,358 sheep from Australia for religious slaughtering during *Korban*, which was successfully held on 15 October 2013. In addition to the Australian imports, 500 lambs were brought in for the first time from Canada for *Korban*.

To heighten public's familiarity with local produce, AVA participated in a "Made-in-Singapore Fair" that was organised by NTUC FairPrice Cooperative Ltd. Held on 17-21 October 2013, the fair featured over 40 types of local vegetables, eggs, and fish. AVA organised 76 cooking demonstrations across six FairPrice Xtra outlets over the two weekends during the fair.

NOVEMBER 2013

On 9-10 November 2013, MOS for National Development, Mr Desmond Lee opened AVA's third Responsible Pet Ownership Roadshow of the year. Held at Changi City Point on 9-10 November 2013, it carried a thematic concept of a park with several zones of activities. AVA's RPO videos were also launched at this event.

AVA hosted the 8th Singapore-Indonesia Agri-business Working Group Meeting on 22 November 2013 in Singapore to review the progress of the sub-working groups and propose action plans to further improve the export volume of agri-products from Indonesia to Singapore.

To further facilitate the re-homing of dogs by our animal welfare partners, AVA in November 2013 waived the first year of the annual licence fee for dogs released from AVA's pound to these groups for re-homing.

DECEMBER 2013

On 11-13 December 2013, AVA and the Intellectual Property Office of Singapore co-hosted the 2nd Technical Working Group meeting on Orchid Plant Variety Protection. The meeting with Malaysia was attended by senior officials from Malaysia's Department of Agriculture and two orchid experts from the Malaysia Agricultural Research & Development Institute. The meeting agreed on the revision of important characteristics in the *Dendrobium* Test Guidelines.

AVA and the World Bank co-organised the 2nd GFSP Conference Roundtable meeting that was held on 12 December 2013 in Singapore. The opening was graced by MOS for National Development, Mr Desmond Lee.

AVA launched the Quarantine Management System, which allows users to submit online reservations of quarantine space for dogs, cats, and small mammals arriving in Singapore.

JANUARY 2014

In a pilot programme to enhance food safety at source, AVA reviewed the import requirements for six categories of high-risk processed food products from Malaysia. The enhanced import requirements came into effect on 1 January 2014.

With effect from 1 January 2014, two new pet retail licensing conditions were implemented to restrict individuals who are under 16 years old from buying dogs, cats, and rabbits, and to require pet retailers to conduct pre-sale screening.

A public e-consultation was conducted on the REACH portal from 28 January to 28 February 2014 to gather feedback on the formulation of the Codes of Animal Welfare for pet owners and the pet industry.

FEBRUARY 2014

With effect from 1 February 2014, licence fees for unsterilised dogs increased from \$70 to \$90, while licence fees for sterilised dogs went up from \$14 to \$15. Licence fees for fourth and subsequent dogs (sterilised/non-sterilised) rose from \$175 to \$180.

On 15 February 2014, AVA launched a series of free pet health checks in partnership with private veterinarians, with aims to educate pet owners on preventive pet care and inculcate the importance of routine veterinary care for pets.

MARCH 2014

On 8-9 March 2014, AVA organised the "Animals & Our Community" roadshow, which was held at Northpoint Shopping Centre.

FOOD SUPPLY RESILIENCE



To enhance resilience in Singapore's food supply, AVA encourages the industry to seek alternative overseas sources. AVA officers also facilitate product showcases, where local traders can network with potential suppliers and explore new import sources.



WE

* THINK * STRATEGICALLY

In feeding a nation, food supply and variety is always on our minds. With a multi-pronged strategy, we are constantly diversifying our sources and finding innovative ways to increase the production of food locally.





FOOD SUPPLY RESILIENCE

ENHANCING RESILIENCE IN SINGAPORE'S FOOD SUPPLY

To ensure a resilient supply of safe food for Singapore, AVA has in place strategies and programmes to maintain an adequate and stable supply of food, while mitigating food safety risks. AVA adopts a diversification strategy to facilitate a steady flow of a wide variety of safe food at stable prices into Singapore. While diversifying our overseas food supply, we also seek to enhance the productivity of local farms through R&D and capability development. Additionally, AVA continues to educate consumers on the use of liquid eggs, egg powder, and frozen meat as viable alternatives to shell eggs and chilled meat. To complement the efforts of local farms in increasing productivity, we also encourage consumers to choose local produce and support our farmers.



SOURCE DIVERSIFICATION

Singapore imports more than 90 percent of her food. To enhance supply resilience, AVA partners the private sector in food sourcing and encourages the industry to explore alternative overseas supplies through sourcing trips. By buying from many different sources, Singapore is better buffered against potential food shortages and price volatility. AVA continues to engage key stakeholders to enhance source diversification. As part of this engagement, business cluster meetings, as well as CEO's dialogues with associations, supermarket retailers, and importers are held throughout the year. Issues on food supply challenges, potential new sources, consumer trends, and the plans in place to mitigate any supply disruption are discussed at these industry engagements.

Food Sourcing Missions

In FY 2013, AVA continued to scout for new sources of safe and quality food for Singapore. AVA conducted food sourcing missions and study trips to explore new sources and strengthen existing trading ties.

On 15-19 April 2013, AVA co-organised a visit cum seafood sourcing trip to Semarang, Rembang, and Makasar cities in Indonesia to gain a better understanding of the seafood

industry there as well as to facilitate agri-trade. The visit is also part of AVA's ongoing efforts to help increase the export of Indonesian agriculture and fishery products to Singapore. The delegation comprised participants from the Seafood Industries Association Singapore, Singapore Fish Merchants' General Association, Dairy Farm International, Sheng Siong Group, Prime Group International, and AVA.



Highlights of the sourcing trip included business matching sessions, as well as visits to seafood landing sites, supermarkets, and seafood processing establishments. The trip resulted in fruitful engagements among businessmen and officials from both countries. Upon return, AVA shared the insights obtained during the trip with other industry members. The trip also resulted in about 30 metric tonnes of fish imports from new suppliers.

A delegation comprising representatives from AVA and the local meat industry visited Poland and Denmark from 9 to 17 May 2013 on a meat sourcing mission. The itinerary included visits to chicken and pork slaughterhouses, processing and canning plants, and business matching sessions. In addition, the delegation paid a courtesy call to Poland's Ministry of Agriculture and Rural Development. At the Danish Agriculture and Food Council, we gained better understanding of the traceability and disease monitoring system in Denmark. Subsequent to the sourcing mission, two new Polish pork establishments have been approved to supply pork products to Singapore.

Poland



AVA delegation with officials from the Ministry of Agriculture and Rural Development.

Denmark



Singapore's traders learning more about Danish meat exports.

The Philippines has traditionally been one of Singapore's important sources of fruits. To explore the import of vegetables and new varieties of fruits, a sourcing mission to the Philippines was conducted from 13 to 18 May 2013. The mission was jointly organised by AVA, the Philippines Embassy and Department of Agriculture. Singapore importers and AVA officers visited fruits and vegetables farms in Baguio and Davao cities, met with local agriculture and trade departments, and networked with the

exporters during a business matching session. From the visit, Singapore importers identified some varieties of vegetables as potential items to import from the Philippines.

Philippines



Local fruit and vegetable importers with officials from the Philippines Department of Agriculture.

AVA's Chief Executive Officer (CEO) led a delegation of local agriculture and aquaculture farmers, and a research institute on an agri-technology study trip to Israel from 9 to 14 June 2013. The delegation visited government agencies, research institutes, universities, the Fresh AgroMashov exhibition, as well as Israeli farms and establishments to study how Israel achieved intensified production through the adoption of technology. AVA identified several relevant Israeli technologies that can potentially be adopted by local farmers.

Israel



At Teshuva Greenhouse, where AVA CEO and delegates learned about hydroponic farming.

From 25 to 28 November 2013, a 27-member delegation comprising major vegetables and fruit importers, a supermarket retailer, an agriculture machinery supplier, IE Singapore officers, and representatives from the Singapore Representative Office of Yunnan Commerce embarked on a sourcing trip to Kunming city in China. The delegation met with the city and provincial officials, and arranged for networking sessions at each of the official meetings. Visits to farms and exporting companies were also arranged. Importers found the trip enriching and gained useful contacts through it.

Kunming, Yunnan



Local farmer, Mr Wong Kok Fah, shows a Chinese farm worker how to trim the vegetables to further minimise wastage.



→ The Indonesia-Singapore Agri-business Working Group works on improving the export volume of agri-trade products from Indonesia to Singapore.

Promoting Supply from Indonesia

The Indonesia-Singapore Agri-business Working Group (AWG) was formed in June 2010 to increase bilateral trade of vegetables, fruits, seafood, and ornamental fish. AVA hosted the 8th Indonesia-Singapore AWG Meeting on 22 November 2013 in Singapore which reviewed the progress of the sub-working groups and action plans to further improve the export volume of agri-products from Indonesia to Singapore.

Some key achievements in 2013 included the identification of major fruit and vegetable production sites in Indonesia, as well as facilitation of importer-exporter business matching sessions, farm visits, and sharing of trade information and regulations. Three promotion fairs were also organised in May, September, and October 2013 at the Pasir Panjang Wholesale Centre, as well as NTUC FairPrice and Giant supermarkets. In addition, a seafood sourcing mission to Central Java and South Sulawesi was conducted for Singapore importers.

Furthermore, AVA and the Agriculture Agency of Riau Province conducted a capability building workshop on good agriculture practice and post-harvest handling of lowland vegetables for farmers in the Dumai-Riau Province. Indonesia's Fish Quarantine Inspection Agency also visited AVA to learn more about our regulatory control systems for aquatic animals as well as laboratory practices.



→ A farm in Dumai celebrates its first harvest of leafy green vegetables for export.

AVA Food Fund

Besides diversifying our overseas food sources to ensure our food supply resilience, AVA also promotes local food production to minimise the impact of supply disruptions. In December 2009, AVA introduced the first tranche of Food Fund to support food diversification efforts and local farm capability development to enhance productivity.

The second tranche launched in August 2011, closed with some \$19.37 million committed to 141 approved projects.

Third Tranche of Food Fund

The third tranche of the Food Fund was launched on 10 October 2013 and closed on 31 March 2014. A total of about 130 applications were received under the following categories:

- Farm Capability Upgrading (Basic and Advanced)
- Technical Boosters
- R&D Challenge Call and Open Call
- Food Diversification

Several improvements were made to provide greater support for farmers:

- Under the revised eligibility and evaluation criteria, farms no longer needed to submit their latest income statement and farm productivity plans when applying for "Basic Farm Capability Upgrading" (FCU) and "Technical Boosters". The only supporting document required is the updated ACRA records of the company. When evaluating the applications, AVA will take into consideration the applicants' past performance and productivity.
- The percentage of funding under the "Technical Boosters" category was extended from 30 percent to 50 percent. Farms can buy vaccines, feeds, fertilisers, and pesticides to boost capability and productivity.
- The pre-approved list of farm equipment for purchase using the Food Fund under "Basic FCU" category was broadened, with the addition of some new equipment, such as water treatment systems and seed-sowing machines for fish and vegetable production.

By the end of the FY, close to 40 percent of Singapore's farms had benefited from the Food Fund. For example, Kok Fah Technology Farm received support from the Food Fund to purchase machinery and upgrade its growing houses. The farm was thus able to enjoy a 60-percent reduction in manpower for one of its processes and increase annual yield by 20 percent.

Assistance to Coastal Fish Farms Affected by Mass Fish Mortalities

In the second week of February 2014, many fish farmers at the East and West Johor Straits saw large fish stocks perish due to bad weather and water conditions. It resulted in a total loss of more than 500 metric tonnes of fish.

To help farmers recover from the loss and resume their operations, Minister of State for National Development & Defence, Dr Mohamad Maliki Bin Osman, announced on 18 February 2014 that the Government will help fund 70 percent of the cost for restocking of fish fry, with a total budget of \$1 million set aside. This assistance was extended to all the 60 affected farms.



Dr Mohamad Maliki Bin Osman and AVA CEO visiting coastal fish farms to better understand the concerns and needs of farmers affected by mass fish deaths.

In addition, AVA extended the use of AVA Food Fund (Basic Farm Capability Upgrading category) to help farms purchase aeration and related equipment to minimise recurrences of fish kills due to low levels of dissolved oxygen. In order to encourage farmers to install adequate equipment as a preventive measure against similar incidences, AVA increased the co-funding rate from 50 percent to 70 percent. This assistance was extended to all coastal fish farms.



↙ The site in the Singapore-Jilin Food Zone, where the pig abattoir and meat processing facilities will be built up.

FACILITATING FOOD IMPORTS

AVA adopts a risk-based approach in managing the delicate balance between ensuring a stable supply of safe food on one hand, while mitigating food safety risks on the other. This enables us to facilitate food imports without compromising food safety.

Establishment of Disease-Free-Zone

On 21 May 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 within the Jilin Province of China. The establishment of DFZs is part of AVA's regionalisation approach, to allow imports from DFZs within countries that are unable to declare freedom from disease, subject to meeting AVA's conditions for disease control and surveillance.

With the establishment of this DFZ, Jilin will become a potential source of pork for Singapore. The DFZ supports Singapore's commercial companies' joint venture to develop an integrated pig farm to supply pork to Singapore. AVA and Jilin City formed a working group to provide technical advice, as well as to monitor and review the progress of the DFZ development.

China's Ministry of Agriculture (MOA) officially recognised the DFZ status on 2 August 2012, with subsequent endorsement by AVA. An AVA delegation also participated in a subsequent audit of the Jilin DFZ with MOA in November 2013. AVA and the Chinese authorities will continue to collaborate in the maintenance of the DFZ.

Import Risk Assessments

Through sound risk management, AVA has enabled resumption of food imports from suspended sources due to certain hazards.

Review on Import Bans of Food from Japan

Following a risk assessment by AVA and assurances from Japan's Ministry of Agriculture, Forestry and Fisheries (MAFF) on the safety and traceability of food from Japan, AVA lifted its suspension on food imports from seven prefectures in Japan (except for Fukushima) on 8 April 2013 as follows:

- Ibaraki, Tochigi and Gunma prefectures – Milk, milk products, eggs, meat, seafood, fruits and vegetables.
- Chiba, Kanagawa, Tokyo and Saitama prefectures – Fruits and vegetables.

All food consignments originating from prefectures listed above have to be accompanied by pre-export testing certificates and Certificates of Origin. The pre-export testing certificates have to certify that the food has been tested for radioactivity and no radionuclide is detected. Fresh produce, meat, milk and milk products from Fukushima prefecture remain suspended.

An AVA delegation also visited Japan on 16-23 March 2014 to learn about the food safety system in Japan and to verify the measures put in place to control the radioactive contamination in food following the Fukushima Nuclear Power Plant accident. AVA will continue to monitor the situation and review the import ban when appropriate.



Officers from AVA and the Thai Department of Livestock Development visit an establishment where frozen chickens are processed in Thailand for export to Singapore.

Review of Antimicrobial Agents on Meat & Poultry Products

Following an application from the competent authority of the US, AVA reviewed and approved several chemical compounds that may be used as antimicrobial washes, sprays, rinses, and dips on meat and poultry carcasses. The approval for the use of these antimicrobial agents is given based on the following conditions:

- The chemicals used in the antimicrobial treatment have been evaluated by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) and found to be safe for the prescribed use, and have been allocated an Acceptable Daily Intake (ADI) of "not specified".
- The dosage levels of chemicals used in the antimicrobial treatment do not exceed maximum permitted levels.
- There are no residues of the antimicrobial treatment, or any by-products, on the final meat product.

In FY 2013, we extended the approval for the use of some of these chemical compounds to meat and poultry products from Australia and Canada.

Resumption of Export of Frozen Poultry from Thailand

AVA suspended the import of fresh frozen poultry from Thailand in 2004, due to widespread outbreaks of Highly Pathogenic Avian Influenza (HPAI) H5N1 in Thailand from 2004 to 2008.

AVA and the Thai Department of Livestock Development (DLD) have been working together to resume the export of fresh frozen poultry to Singapore. In June 2013, AVA approved the import of frozen chicken from two establishments in Thailand after finalising health certification details.

To ensure public safety, AVA adopted a phased-in approach and implemented a series of risk mitigation measures as follows:

- DLD is required to certify that there has been no outbreak of Avian Influenza (AI) within a 10km radius of the slaughterhouses and farms within the past six months.
- DLD is required to have official veterinary supervision of the approved slaughterhouses and export farms.
- All consignments have to be tested negative for AI. A summary of these test results has to accompany each consignment.

AVA continues to monitor consignments from Thailand to ensure that all measures are properly implemented. AVA is also working with DLD to extend the approval to other slaughterhouses and farms.



→ Senior Minister of State for Trade & Industry and National Development, Mr Lee Yi Shyan, at the Made-in-Singapore Fair, with AVA CEO and the management of NTUC FairPrice Cooperative Ltd.

STAYING ALERT AGAINST EMERGING THREATS & ISSUES

AVA's horizon scanning function scans and analyses the global food supply situation on a regular basis to help AVA discover opportunities and anticipate potential threats that could impact our food supply. Emphasis is placed on global food supply and price changes, as well as possible production limitations. Key factors that drive global food supply and demand are analysed to assess their impact on Singapore's food supply situation. This process is complemented with feedback from the industry.

In addition, we identify and monitor global food supply and demand trends that could unfold in the longer term. These global perspectives are fed into AVA's strategic planning so as to enhance AVA's preparedness for and awareness of potential future challenges as we develop our programmes and policies.

RAISING CONSUMER AWARENESS OF ALTERNATIVE FOOD PRODUCTS AND LOCAL PRODUCE

Singapore has limited sources for chilled meat and shell eggs. To enhance food supply resilience, AVA continues to educate consumers on food alternatives such as frozen meat, egg powder, and liquid egg, which can help to buffer against potential supply disruptions. In addition, we continue our public education on local produce by highlighting these foods' quality and freshness.

Alternative Food Products

In FY 2013, AVA continued to educate the public on the uses of frozen meat, liquid egg, and egg powder through various events, such as the Singapore Food Expo. During the event in May and November 2013, a total of 68 sessions of cooking demonstrations were conducted using frozen meat.

Local Produce

Besides helping our farms to increase their productivity, our support for local farms also includes encouraging consumers to buy local produce by raising public awareness of the latter's quality and freshness.

On 17-21 October 2013, AVA participated in a "Made in Singapore Fair" that was organised by NTUC FairPrice Cooperative Ltd and featured over 40 types of local vegetables, eggs, and fish. To encourage consumers to choose local produce, AVA organised 76 cooking demonstrations across six FairPrice Xtra outlets over the two weekends during the fair. At these sessions, local fish, egg, and vegetable dishes were cooked using fresh ingredients sponsored by seven local suppliers. Besides cooking demonstrations, we also put up educational signs containing food safety tips and useful information on local produce in all 46 FairPrice outlets.



→ Signs containing food safety tips and useful information on local produce are created to help encourage shoppers to support local farmers.



→ Tours to local vegetable farms.

In November 2013, AVA participated in the Asia Food Expo, where a total of 36 cooking demonstrations were conducted using local produce as main ingredients. The event reached out to more than 15,000 people.



→ Celebrity Chef Pung Lu Tin demonstrates ways to prepare tasty dishes using local produce during Asia Food Expo.

In addition, AVA collaborated with the Civil Service Club to organise five cooking classes using local produce as ingredients. About 200 people participated in these classes held from August to September 2013.

Local Eggs and the Singapore Quality Egg Scheme

The quality of eggs produced by local chicken layer farms is assured under AVA's Singapore Quality Egg Scheme (SQES). All three local chicken layer farms are currently registered under this Scheme, which requires them to ensure that their facilities are hygienic and quality control monitoring systems are well maintained at all times. The eggs produced undergo monthly inspection and freshness tests by AVA to verify their quality.

The date of production and farm code are also stamped on every egg to ensure traceability.

To increase consumer awareness of the SQES logo, informative point-of-sale materials were installed in NTUC FairPrice outlets to provide information on the SQES, and drive home the message that local eggs are the freshest that consumers can find in markets here.

Local Vegetables

AVA's Good Agricultural Practice for Vegetable Farming (GAP-VF) Certification Scheme assures the quality of vegetables produced by local farms. Currently, seven farms have come on board this voluntary quality assurance scheme.

To educate the public on GAP-VF and increase public awareness on local vegetable industry, AVA collaborated with People's Association to organise seven farm tours to Kok Fah Technology Farm and Oh Chin Huat Hydroponic Farms. Participants learned about Singapore's food supply resilience strategies and were introduced to local vegetable farms, which are important secondary sources of food for our country.

Local Fish

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

In September 2013, AVA collaborated with NTUC FairPrice to promote locally farmed fish. Local farms Rong-Yao and The Fish Farmer came together for a joint marketing promotion under the "SG Fish" brand. To complement the joint effort, AVA organised 24 cooking demonstrations using these fishes in selected supermarkets. Educational materials were also distributed to shoppers during these demonstrations.

FOOD SAFETY



Every consignment of meat and meat products must be accompanied by the health certificate issued by a veterinary authority of the exporting country, certifying that Singapore's animal health and food safety requirements have been complied with. An AVA inspector checks these certificates, visually inspects the product, and collects a sample for laboratory testing. Only those that pass AVA's requirements and tests are allowed for sale.



WE

* THINK * THOROUGHLY

We have a comprehensive outlook when it comes to food safety. This ranges from accreditation of food sources to inspection of imports and local products, from laboratory testing to outreach programmes. No stones are left unturned in ensuring the safety and quality of the food we eat.





FOOD SAFETY

KEEPING FOOD SAFE FOR CONSUMPTION

Singapore imports more than 90 percent of the food it consumes. To ensure all locally produced and imported food products are safe for consumption, AVA adopts a science-based risk analysis approach that is based on international standards. AVA sets and enforces food safety standards for all food entering the Singapore market, from production to just before retail. As food safety is a shared responsibility, AVA also engages the industry and public to do their part in keeping food safe for consumption.

To safeguard public health, AVA has in place high food safety standards, and robust monitoring and inspection programmes to ensure that these standards are maintained. We closely monitor each stage of the food production chain – from the conditions at farms, slaughterhouses, and food processing establishments (both local and overseas), to testing of food samples at the point of import or at local establishments. Only those that pass our tests and inspections are permitted for sale.



REGULATING FOOD IMPORTS

Accreditation of Sources

Product and Country Approval

Within the FY, AVA approved the import of new products from three countries, namely meat products from Poland (pig offal); Japan (bone-in beef); and Austria (frozen pork). The approval process was based on the assessment of the exporting countries' veterinary services, legislation, animal disease status and control measures, national residue and microbiological monitoring programmes, as well as the regulatory system for the production of the export products to Singapore.

As at March 2014, 36 countries were approved by AVA to export meat, processed meat, processed egg, canned meat, and table hen eggs to Singapore.

Meat and Egg Processing Establishments

Inspection visits to Malaysia, China, Indonesia, the UK, East Malaysia (Sarawak), and Thailand were conducted to inspect and accredit their establishments for the export of meat and processed meat products to Singapore. During the FY, AVA accredited 66 new establishments from 18 new and existing AVA-approved countries for the export of frozen pork, chicken, and beef, as well as processed chicken and pork products.

Poultry and Pig Farms

By the end of the FY, AVA accredited 245 overseas poultry and pig farms for the export of live poultry, shell eggs, and pigs to Singapore. The accredited farms comprised 137 chicken broiler farms and 58 duck broiler farms in Malaysia; a pig farm in Indonesia; and 50 layer farms from seven countries.

Enhancements In Import Requirements

In a pilot programme to enhance food safety at source, AVA reviewed the import requirements for the following six categories of high-risk processed food products imported from Malaysia:

- Infant formula
- Infant cereals
- Traditional cakes/kueh
- Cooked rice products (e.g. *nasi lemak*, *lontong*) and other perishable cooked food (e.g. *roti prata*, *puttu mayam*)
- Mooncakes
- Dried bean curd products



Ready-to-eat cooked rice products and other perishable cooked food, such as Nasi Lemak, imported from Malaysia must now also be registered with Malaysia's Ministry of Health and be accompanied by AVA's Establishment Codes.

Previously, manufacturers of these products were only required to complete a one-time submission of export documents. Importers took on the shared responsibility to ensure that the products were sourced from establishments that were legally registered businesses.

Under the pilot programme, these six categories of food may only be imported from manufacturers that are regulated by Ministry of Health (MOH) Malaysia. MOH-regulated establishments undergo regular food safety inspections and checks by the Malaysian authorities. Products within these categories that are not sourced from MOH-regulated establishments were disallowed for import with effect from 1 January 2014.

Suspension and Resumption of Supply Sources

AVA suspends food sources that pose significant hazards, and reinstates them after they have rectified the hazards. In FY 2013, a total of 16 overseas poultry farms were suspended for failing to meet our food safety standards. Reasons for

suspension included the detection of *Salmonella Enteritidis* (SE) and drug residues, as well as major non-compliance with export conditions.

AVA lifted the suspension on imports of deboned beef derived from cattle under 30 months of age from the UK. Import of frozen chicken from Thailand was also resumed. In addition, following the World Organisation of Animal Health (OIE)'s official recognition of Japan's Negligible Bovine Spongiform Encephalopathy (BSE) Risk status, AVA approved Japan for export of beef cuts derived from cattle of all ages to Singapore.



CP Foods Co Ltd is one of the two AVA-approved establishments in Thailand to export frozen raw chickens to Singapore. The first consignment arrived on 7 November 2013 and successfully cleared AVA's inspection and food safety testing for microbiological hazards and chemical residues and contaminants.

Following a risk assessment by AVA and assurances from Japan's Ministry of Agriculture, Forestry and Fisheries (MAFF) on safety and traceability of food from Japan, import suspension of these selected products from seven prefectures in Japan were lifted on 8 April 2013:

- Milk, milk products, eggs, meat, seafood, fruits and vegetables (Ibaraki, Tochigi and Gunma prefectures).
- Fruits and vegetables (Chiba, Kanagawa, Tokyo and Saitama prefectures).

However, the import suspension for food from Fukushima prefecture remained.

Issuance of Licences and Permits Meat and Seafood

As at the end of FY 2013, there were a total of 2,921 licensed traders for meat and seafood, to whom 21,628 meat permits and 194,937 seafood permits were issued.

Fruits, Vegetables, and Processed Food

There were a total of 1,141 licensed importers for fresh fruits and vegetables to whom 228,913 permits were issued in FY 2013. In addition, there were a total of 9,380 registered importers for processed food to whom 386,893 permits were issued.

Surveillance and Monitoring

AVA has comprehensive surveillance programmes in place to monitor food safety hazards in primary produce and processed food. Import consignments are subjected to systematic inspections and laboratory testing for pathogens, and chemical contaminants and residues.

Meat and Meat Products

During the FY, AVA inspected 70,845 meat consignments with a total weight of 267,447 metric tonnes valued at \$1.15 billion. We continued with the surveillance of *Listeria monocytogenes* in ready-to-eat products, and *Escherichia coli* (*E. coli*) O157 in processed beef products and manufacturing cuts (such as beef trimmings). A total of 3,050 samples were tested for *Listeria monocytogenes*, and 2,563 samples were tested for *E. coli* O157. Three meat consignments were rejected due to contamination with *Listeria monocytogenes*. One consignment was rejected due to contamination with *E. coli* O157. A total of 120 consignments (0.17 percent) were rejected, mainly for *Salmonella*.

Seafood and Seafood Products

AVA inspected 2,510 consignments of seafood with a total weight of 3,107 metric tonnes valued at \$38.7 million. A total of 22 consignments (0.88 percent) were rejected due to microbial and chemical contamination.

For the inspection of seafood, the focus continues to be on high-risk products, i.e. cooked and pasteurised crabmeat, cooked prawns, oysters, and smoked seafood. These consignments are detained upon arrival for inspection and laboratory testing. Their respective accompanying health certificates from the countries of origin are also checked.

During the FY, we continued to monitor imported fresh seafood at our fishery ports for adulteration with chemical preservatives (i.e. formaldehyde and boric acid). A total of 656 samples were tested and one sample (0.15 percent) was found to contain high levels of formaldehyde. The importer of this consignment was fined for the violation and his subsequent consignments were monitored under hold-and-test inspection.

Egg Products

A total of 791 consignments of processed egg products, comprising liquid egg, egg powder, as well as preserved and salted duck eggs, were inspected. Three consignments of salted duck eggs were rejected for presence of amphenicol (antibiotic residues) and three consignments of egg powder were rejected for presence of nitroimidazole (an antibiotic residue).

Fruits and Vegetables

AVA continued its inspection of imported fresh fruits and vegetables throughout the FY. In total, 8,533 consignments of fresh fruits and vegetables from 34 countries were inspected and screened, as part of hold-and-test and routine inspection programmes for pesticide residues, radioactivity, preservatives, toxic chemicals, and microbial contaminations. The overall violation rate from samples of hold-and-test and routine inspections was 7.75 percent. Of these, 315 consignments under the hold-and-test programme were rejected. We worked closely with our counterparts in other countries to provide effective remedial actions on pesticide residue violations.



Inspection and sampling of vegetables at the Pasir Panjang Wholesale Centre.

Processed Products

In FY 2013, a total of 6,064 consignments of imported processed food were inspected and sampled for laboratory analyses. Of these, 135 consignments were rejected due to the presence of non-permitted food additives, excessive additives, and contaminants. In addition, 3,395 inspections were conducted on 54,850 food items from retail outlets, and 5,781 food samples were taken for chemical, microbiological, and physical analyses.

A total of 115 summonses/compound fines, 382 written warnings, and four advisories were issued for non-compliances with the Food Regulations during the FY. We investigated 187 complaints on food importers and took appropriate enforcement actions where irregularities were detected. Some of these cases involved labelling infringements and food contamination with foreign matter.

Products from Japan

During the FY, AVA continued its surveillance on Japanese food products for radioactive contaminant, and tested 4,517 samples of food products including seafood, vegetables, fruits, meat, and eggs from Japan.



An AVA scientist tests imported food products for radioactive contaminants.

REGULATING LOCAL FOOD PRODUCTION

Farms

As at end of FY 2013, there were 117 licensed coastal fish culture farms, five poultry farms, 50 vegetable farms, and 10 land-based food fish farms.

Local poultry farms continue to be monitored monthly for drug residues and SE in chicken and quail eggs in FY 2013. Three local poultry farms were detected with SE, and issued isolation orders. Eggs from these flocks were sent to an AVA-approved liquid-egg processing plant, before being released for human consumption. Isolation orders were subsequently lifted after negative detections of SE were achieved in tests.

Market-sized food fish from local coastal farms are tested regularly for drug residues, heavy metals, chemical contaminants, and microbiological pathogens. During the FY, the sale of fish from five local coastal fish farms was suspended following detections of drug residues. Suspension orders were lifted after two consecutive negative detections of drug residues were achieved in the tests.

Local oyster farms continue to be monitored weekly for Norovirus, Hepatitis A, as well as monthly for heavy metals, toxins, and microbiological pathogens. Monthly inspections of the farms' depuration units are also conducted to ensure that the units were operational.

Animal feed used by all food-producing farm animals are regularly tested for antibiotic residues, chemical contaminants, melamine, and microbiological pathogens. During the FY, trace amounts of antibiotics were detected in feed samples collected from coastal fish farms and one of the quail farms. Our investigations showed that these feed were imported and the overseas manufacturer was the source of the contamination. End-product testing of fish and eggs were carried out and antibiotic residues were not found in the food produced by the farms.

Local vegetable farms are encouraged to adopt the Good Agricultural Practice standard, under the voluntary Good Agricultural Practice for Vegetable Farming (GAP-VF) Certification Scheme. In FY 2013, AVA audited and approved seven vegetable farms for GAP-VF certification renewal.

Local Food Establishments

At the end of FY 2013, there were 1,519 local food processing establishments licensed by AVA. These establishments included slaughterhouses and cold stores for meat and fish products.

During FY 2013, AVA received 207 licence applications and issued 161 licences. A total of 1,434 site inspections were carried out at food processing establishments to evaluate the new licence applications; changes in layout for existing premises; and suitability of the location for setting up food establishments.



An AVA officer (left) inspects the site of a food processing establishment to evaluate changes in layout and provide advisory at the same time.

AVA conducts annual on-site audit assessments on AVA-licensed local food establishments to determine their grading status, and provides on-site advice to help them improve and upgrade their premises. In FY 2013, a total of 1,761 audit inspections were carried out on these local food establishments. As at 31 March 2013, there were 172 local food processing establishments that were awarded with the A grade, 646 with the B grade, 478 with the C grade, and 55 with the D grade, under AVA's Food Factory Grading Scheme. The remaining 168 new food establishments were not due for grading. A total of 515 (33.9 percent) of all these establishments obtained Hazard Analysis and Critical Control Points (HACCP) certification.



On-site audit assessments are conducted at licensed local food establishments to determine their grading status. The AVA inspector (left) will also provide on-site advice to help proprietors improve and upgrade their premises.



Inspection and sampling are conducted at duck slaughterhouses to ensure compliance with AVA's licensing conditions.

Abattoir and Slaughterhouses

As at 31 March 2014, there were one pig abattoir, and 10 chicken and four duck slaughterhouses in Singapore. A total of 333,065 pigs, 46.4 million chickens, and six million ducks were slaughtered at these premises. All pigs slaughtered at the abattoir were inspected by AVA, of which 472 pigs (0.14 percent of total pigs slaughtered) and 202,416 partial organs (3.3 percent of the estimated total number of organs) were condemned as unfit for human consumption.

Enforcement actions are taken against poultry slaughterhouse operators and pork cutting establishments who fail to comply with AVA's licensing conditions. In FY 2013, a total of 19 warning letters were issued, and 40 composition fines were imposed for hygiene infringements and cold chain violations.

Special Permits for Religious Institutions

In FY 2013, a total of 45 permits were issued to religious bodies and institutions to slaughter 25 goats and 2,858 sheep for religious purposes. Inspections were carried out during arrival of the animals, in animal holding pens, as well as in slaughtering and skinning/meat processing areas, to ensure animal welfare and food hygiene standards were maintained.

In the lead up to *Korban* 2013, AVA conducted technical seminars on good animal handling techniques for key personnel. Briefings were also conducted for AVA inspectors, as well as importers and inspectors from the Islamic Religious Council of Singapore (Majlis Ugama Islam Singapura or MUIS). AVA actively collaborated with MUIS, Malay-Muslim organisations, and importers to ensure that *Korban* preparations were on track.

To ensure continued compliance with animal welfare standards and Australia's Export Supply Chain Assurance System (ESCAS) requirements, all 23 AVA-approved venues for religious slaughtering were assessed during the FY. Of these, 18 conducted *Korban* rites using Australian sheep in 2013, and were assessed to have met Australia's ESCAS requirements. Independent auditors also found these premises to be compliant with ESCAS standards.

The remaining five AVA-approved venues undertook the ritual slaughtering of Canadian lambs. Although these five venues were not subjected to ESCAS audit, *Korban* operations and inspections at all venues adopted the same standard operating procedures. This ensured that all the animals used in *Korban* were treated in accordance with the OIE's animal welfare standards, and that food hygiene standards were fully observed.



AVA facilitates the import of animals for religious slaughtering, as well as ensures that international standards of animal welfare and food hygiene standards are maintained during the entire process.

Food Processing Establishments

AVA regularly inspects local food establishments to ensure that proper food hygiene practices are maintained. In FY 2013, AVA made 5,933 inspection visits to food establishments that were involved in manufacturing meat, fish, egg, and other processed foods, as well as cold stores.



An AVA inspector (left) checks that all food hygiene practices are observed in food processing establishments.

A total of 994 processed food samples were taken for laboratory analysis. Of these, 27 were found to be unsatisfactory and two were found to be unfit for human consumption. We issued 54 summonses/compound fines and 539 written warnings for non-compliance with the Sale of Food Act and the Wholesome Meat and Fish Act.

A total of 258 complaint cases of unwholesome and improperly labelled pre-packed processed food were investigated, and appropriate enforcement actions were taken for contraventions in hygiene practices and other offences.

Registration of Food Storage Warehouses

AVA commenced the registration of food storage warehouses on 1 November 2011. This move helps to enhance food traceability and enables AVA to promptly notify warehouses should there be a need for immediate recall of affected products. As at 31 March 2014, a total of 1,038 food storage warehouse applications were received and registration for 963 warehouses was completed. In addition, we carried out 90 site assessments on new warehouses to assess the suitability of the warehouses to be used for storage of food.

All registered food storage warehouses are subjected to inspections by AVA. We conducted 695 inspections on the warehouses and advised operators on Good Warehousing Practices for the maintenance and improvement of warehouse hygiene and operations.

Technical Reference for Food Storage Warehouse

The Technical Reference (TR35:2013) for Food Storage Warehouse – Food Products Stored under Ambient Conditions, was launched on 5 July 2013, to encourage the industry to adopt higher standards in food storage, handling, and distribution. The TR was jointly developed by experts from government regulatory bodies including AVA, industry practitioners, and the academia. The launch event – organised by the Singapore Manufacturing Federation Standards Development Organisation (SMF-SDO), and supported by AVA and SPRING Singapore – was attended by 190 participants, including warehouse operators and food processors/importers who found the TR a useful guide in the implementation of food safety procedures in their food storage warehouses.

LABORATORY CAPABILITIES

Up-to-date and efficient laboratory testing capabilities are the cornerstone of AVA's food safety monitoring and surveillance programme. AVA's Veterinary Public Health Laboratory (VPHL), with its ability to quickly detect a wide range of known risks as well as unanticipated food-borne hazards, plays a key role in enforcing our stringent food safety standards.

In FY 2013, VPHL carried out approximately 1.71 million analyses on 52,768 samples of imported and locally-produced food products. VPHL analyses included pathogens, antibiotics, growth promotants, hormones, pesticide residues, chemical additives, and contaminants, which are detrimental to public health if consumed.

The VPHL not only serves the local food industry but also other government agencies and statutory boards. In addition, VPHL extends its commercial testing service upon request to Brunei, Indonesia, Malaysia, and Pakistan.

As an import/export testing and certification laboratory, VPHL ensures that its tests are accredited according to international standards. The laboratory maintained its accreditation by the Singapore Accreditation Council-Singapore Laboratory Accreditation Scheme (SAC-SINGLAS) and has been ISO/IEC 17025 certified since year 2000. With 11 new methods accredited by SAC-SINGLAS in FY 2013, the total number of accredited methods is now 226. VPHL will continue to develop and accredit new test methods to enhance food safety testing.

To test our laboratory quality system, VPHL took part in relevant inter-laboratory Proficiency Testing Schemes organised by various countries, including the UK, EU, Sweden, Canada, New Zealand, and Australia, and continued to maintain an excellent standing in these programmes. In FY 2013, VPHL also participated in an international collaborative ring trial organised by the European Commission-Joint Research Centre.

Detection of Phosphine Residues

Methyl bromide has been used as a fumigant to control pests across a wide range of agri-food commodities. However, its use has rapidly declined worldwide in recent years, as a result of international obligations committed under the Montreal and Copenhagen Amendment to Montreal Protocol on Substances that Deplete the Ozone Layer. In replacement of methyl bromide, phosphine gas has been proposed as an alternative fumigant in many countries.



A new analytical method has been developed to determine phosphine residues in food products.

As part of AVA's efforts to stay ahead of international developments and potential changes in regulatory requirements, a new analytical method for the determination of phosphine residues in food products was developed during the FY. Surveillance for phosphine residues was conducted on imported cereal products using the new method. Results were in accordance with international standards and they proved that even very low levels of phosphine residues were detectable.

Detection of Nano-materials

In FY2013, VPHL initiated preparations to establish new laboratory facilities that can detect nano-materials in food.

In addition, two seminars on nano-technology and nano-materials were jointly organised in November 2013 by AVA, National University of Singapore, Economic Development Board, Health Sciences Authority, Ministry of Manpower, and Public Utilities Board.

Food Traceability Techniques

VPHL is building up its capability to trace the origin of food by leveraging on nuclear techniques, such as the Isotope Ratio Mass Spectrometry, Inductively-coupled Plasma Mass Spectrometry, and the Inductively-coupled Plasma Atomic Emission Spectrometry. This capability can be used as a verification tool to determine food supply chain integrity and food traceability systems, which serve to protect public health.



→ VPHL leverages on nuclear techniques to trace the origins of food.

During the FY, VPHL participated in a project supported by the International Atomic Energy Agency's (IAEA) to further enable us to implement traceability systems based on nuclear techniques.

VPHL is part of the IAEA Coordinated Research Project (CRP) entitled "Accessible Technologies for the Verification of Origin of Dairy Products as an Example Control System to Enhance Global Trade and Food Safety", which is expected to end in 2018. Together with HSA, the CRP provides an opportunity for participants around the world to work with and learn from each other on a common isotopic research topic.

Under this project, we will be developing a robust workflow with methods and databases available to Singapore and its neighbouring countries for the traceability and authentication of milk and milk products. In the event of a fraud alert and suspicion of compromised product, this established workflow would be very important for recall of milk and milk products and control on future imports to protect public health.

Enhancing Testing Capabilities

The VPHL embarks on relevant R&D to stay competent and vigilant against an ever-increasing list of contaminants and emerging pathogens. In FY 2013, a total of 27 methods for food safety testing were developed or enhanced in the areas of chemical contaminants, drug residues, pesticide residues, food components, food additives, microbiology, food quality and authentication, food borne toxins, and genetically modified materials.

STAYING ALERT AGAINST EMERGING THREATS & ISSUES

AVA scans open information sources to detect overseas reports on food safety incidents, food recalls, as well as industry practices or new food technology, which can lead to unsafe food.

Horizon scanning supports AVA's food safety surveillance programmes by providing early alerts on incidents that impact the safety of food in Singapore, so that mitigation measures can be promptly implemented. During the FY, our scanning

efforts alerted us to the use of maleic acid in food products and the case of chemical-tainted soy sauce products, both from Chinese Taipei. As a result, AVA was able to take the appropriate actions to mitigate such risks.

Codex Alimentarius Commission

To stay abreast of food safety developments in the international arena, AVA participated in Codex Alimentarius Commission (Codex) meetings during the FY, where topics such as food additives, food contaminants, pesticide residues, food labelling, nutrition and foods for special dietary uses, animal feeding and food, and import and export certification system were discussed.

At the 36th Codex Alimentarius Commission, 25 new and revised Codex standards or related texts, as well as many new or revised provisions for additives and Maximum Residue Limits for pesticides and veterinary drugs, were adopted for country reference. A new Codex Committee on Spices and Culinary Herbs was also established.

RISK AND SAFETY ASSESSMENTS

AVA has in place a system to assess the risks posed by various food items and to manage food safety incidents. AVA will implement appropriate risk-mitigating measures, in accordance to the risk that the food items pose. As part of risk assessment, AVA also conducts surveillance of food products and food contact materials that are available in Singapore.

Food Chemicals and Food Contact Materials

AVA conducts risk assessments on the dietary exposures of food chemicals in our daily food intake. Our assessment of Polybrominated Diphenyl Ethers showed that the current levels of the chemical in food do not pose a health risk to the general population in Singapore.

AVA also conducts safety assessments on food-contact materials and articles to ensure that they are safe for food contact applications. During the FY, AVA assessed the safety of wooden food contact articles, melamine cutlery, stainless steel cutlery, and glassware that are available in Singapore's market. Based on the migration levels of chemicals from these food contact articles, they were found to be safe for use.

In addition, the safety and suitability of four new food ingredients and seven new food additives were assessed and permitted for use in food.

Food (Amendment) Regulations

The Food (Amendment) Regulations 2013 were gazetted on 1 August 2013, with the following changes:

- Adoption of provisions for nine new food additives, and a clearer definition of usage of an existing food additive – dimethyl dicarbonate.
- Adoption of new limits for aflatoxin B1, aflatoxin M1, and patulin for foods for infants and young children.
- Adoption of maximum limits for melamine in infant formula and other foods.
- Inclusion of provision for the addition of polydextrose in infant formula.

FOOD INCIDENTS MANAGEMENT

In the event of unexpected food safety incidents, AVA has in place a crisis management structure to enable quick response to the threats. Through swift response, AVA has been able to deal with past incidents effectively and maintain public confidence in the food available in Singapore.

Pesticide Residues in Bottled Mineral Water (France)

Following media reports of minuscule levels of drugs and pesticides being detected in bottled mineral water sold in France, AVA surveyed imported bottle water from a wide range of origins and tested the levels of drugs and pesticides present in the samples collected. Several herbicides at trace levels well below the regulatory limits stipulated by the World Health Organisation and EU Drinking Water Directive were detected in a few samples. In addition, none of the samples had any detectable levels of drug residues or other hazardous chemical contaminants. These results showed that bottled water products sold in Singapore are safe for consumption.

Adulteration of Sesame Oil (Chinese Taipei)

Ministry of Health and Welfare, Chinese Taipei, reported in October 2013 that a number of cooking oil samples had failed its tests for fatty acids. In addition, products sold as pure sesame oil were found to be adulterated with cotton seed oil.

AVA sampled and tested sesame oil products from one of the implicated brands from Chinese Taipei, and found the levels of fatty acids present to be within the expected range for sesame oil. Results also confirmed that the particular brand of sesame oil available in Singapore was not adulterated with cotton seed oil.



AVA CEO's dialogue with members from the Singapore Food Manufacturers' Association in August 2013.

Suspected *Clostridium botulinum* contamination in Milk Formula Products (New Zealand)

AVA maintains vigilance against outbreaks of food poisoning reported overseas and conducts heightened testing in the event of an outbreak to ensure that food safety in Singapore is not compromised.

During the FY, suspected cases of *Clostridium botulinum* contamination in milk formula products manufactured in New Zealand were reported. As part of precautionary measures, AVA tested the affected products and confirmed the absence of such pathogen in the samples collected.

Maleic Acid Adulteration in Food Products (Chinese Taipei)

AVA prohibits the use of maleic acid, an industrial raw material, as a food additive.

Following the detection of maleic acid in some starch-based food products by authorities in Chinese Taipei in May 2013, AVA tested 552 samples of Taiwanese products and detected maleic acid in 22 affected products. To ensure that only safe food is imported into Singapore, AVA required each consignment of food products that had been found to contain maleic acid to be accompanied by a pre-export test certification. This requirement was expanded to all starch-based food consignments with effect from 3 February 2014. Importers were given a grace period until 14 March 2014 to comply with these requirements, after which AVA rejected all applications of import permits that were unaccompanied by pre-export test certificates.

Food-borne Disease Outbreaks (Singapore)

Under the One Health Platform, AVA works in synergy with the Ministry of Health (MOH) and National Environment Agency (NEA) for better coordination in the event of a food-borne disease outbreak in Singapore. Reports of food poisoning cases related to a local restaurant and food establishment in August and December 2013, respectively, were alerted to AVA and food samples were submitted for microbiological and viral (Norovirus and Rotavirus) testing. Results confirmed the samples to be free from contamination.

As part of One Health collaboration, in October 2013, AVA was also notified of two food poisoning outbreaks in local restaurants. Samples were collected for microbiological and Norovirus testing. Results confirmed the presence of Norovirus in a sample of cockles. These results were shared with our One Health partners for follow-up.

STAKEHOLDER ENGAGEMENT AND COLLABORATION

AVA engages the local food industry through regular meetings, workshops, and dialogue sessions to share information, and foster collaboration and mutual understanding.

Dialogue Sessions and Taskforces

AVA holds annual dialogue sessions with local food associations, namely the Singapore Fruits and Vegetables Importers and Exporters Association (SFVIEA), Singapore Food Manufacturers' Association (SFMA), Singapore Manufacturers' Federation (SMF), Seafood Industries Association Singapore (SIAS), Meat Traders' Association (MTA), Poultry Merchants' Association (PMA), and Eggs' Import/Export Trading Association (EIETA).

These dialogue sessions provide an effective platform for AVA and the industry to discuss matters that are beneficial to trade and the public. Two joint taskforces, which worked on matters related to consumer education on food safety and exports of locally produced food, were dissolved in August 2013 to make way for the new Food Manufacturers Business Cluster (FMBC).

The FMBC provides a platform for members from AVA, the industry, and other government agencies to discuss industry-related issues, as well as co-create solutions that will continue to ensure safe food and help upgrade the standards of the local food industry. Following the inaugural meeting on 30 October 2013, the FMBC formed taskforces to look into work areas that cover food safety, food handlers' competency, and food establishment licence application processes.



An AVA officer (left) engages participants at an AVA Food Safety Roadshow.

The FMBC is currently made up of members from SFMA, SMF, PMA, SIAS, Singapore Bakery and Confectionary Trade Association (SBCTA), International Enterprise Singapore, National Environment Agency, SPRING Singapore, Singapore Workforce Development Agency, and A*STAR.

Industry Trainings and Roadshows

AVA conducts regular industry technical seminars to provide insights into the areas of food safety management, food hygiene practices, HACCP system, good warehousing practices, and food defence. During FY 2013, AVA conducted 12 sessions of industry seminars and reached out to 761 participants from 363 companies. One of these was a seminar to raise the industry's awareness on food defence in food establishments.

During the FY, AVA also conducted four food safety roadshows for both AVA and NEA-licensed food establishments. Through the deployment of the AVA Food Safety Bus and informative static displays set up on-site, the roadshow brought the "classroom" closer to the food handlers and raised their awareness on Good Manufacturing Practice (GMP), HACCP, and food safety. In FY 2013, 656 participants from 137 companies attended the roadshows conducted at four locations.

Collaborations with Other Agencies

The Advisory Committee on the Evaluation of Health Claims, comprising reputable experts from government bodies, tertiary institutions, and the industry, was formed in August 2009.

In 2013, the Committee proactively reviewed the use of health claims that were allowed in two or more major developed countries, including those in the EU, Canada, Australia, New Zealand, and Japan. As a result, AVA evaluated and adopted three new health claims for vitamin A, magnesium, and phosphorus. The details were published in the Guide to Food Labelling and Advertisement in October 2013.

SPRING Singapore partnered AVA in four out of 12 sessions of industry seminars on Average Quantity System, in addition to the food safety management topics.

In FY 2013, AVA also collaborated with NEA and SPRING Singapore to deliver a more holistic learning experience for food operators and food handlers, by bringing in related educational materials during the AVA food safety roadshows. These materials included publications on good storage, pest management, and sanitation practices.

To adopt a more concerted approach in raising awareness and educating the local food industry on the best practices, AVA collaborated with NEA to produce a series of three food safety publications, i.e. Good Pest Management Practices, Good Cleaning & Sanitation Practices, and Good Storage Practices. These publications, written for food operators and handlers in mind, are available in English and Chinese.



Publications jointly produced by AVA and NEA are distributed to food operators and handlers to enhance their learning experience at AVA's food safety roadshows.



Senior Minister of State for Trade & Industry and National Development, Mr Lee Yi Shyan; AVA Chairman, Mr Koh Soo Keong; and AVA CEO, with AVA's Food Safety Partners.

SHARED RESPONSIBILITY IN FOOD SAFETY

Through the Food Safety Awards Night and public education programmes, AVA continues to emphasise the importance of the industry's and consumers' roles in ensuring food safety.

Food Safety Awards Night

The Food Safety Awards Night was held on 19 July 2013. Senior Minister of State, Ministry of National Development, Mr Lee Yi Shyan, graced the event as Guest-of-Honour and presented four Gold, seven Silver, and 12 Bronze awards to winners of the Food Safety Excellence Scheme.

Food Safety Partners, who have worked hand-in-hand with AVA to educate consumers on food safety, and also maintained good food safety practices in their factory premises, were also recognised. AVA renewed the partnership status of nine companies:

- Abbot Manufacturing Singapore Pte Ltd
- Acelink Logistics Pte Ltd
- Chop Hup Chong Food Industries Pte Ltd
- Cold Storage Singapore (1983) Pte Ltd
- KSB Distribution Pte Ltd
- NTUC FairPrice Co-operative Ltd
- Seo Eng Joo Frozen Food Pte Ltd
- Thong Siek Food Industry Pte Ltd
- Wyeth Nutrition (Singapore) Pte Ltd

Food Safety Public Education

To ensure food safety from farm to fork, all parties in the food chain from the government to food industries to consumers must play a role. 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 ensure consumers are equipped with good food safety knowledge so that food is safe at the point of consumption.

In FY 2013, 28 food safety talks and 13 learning journeys were conducted to educate students and adults on the importance of practising food safety tips at home. A total of 54 food safety mascot tours were carried out in 37 supermarket outlets over six weeks.



Oscar the otter, AVA's food safety mascot, can be seen engaging shoppers in various supermarkets during the annual Food Safety month of July.

AVA also participated in community events, such as the Nee Soon Active Ageing Carnival 2013, Tampines North Emergency Preparedness Day, and Chingay in the heartlands at Kampong Chai Chee.

In addition, interactive modular displays were developed and roved to schools and community events to educate public on food safety.

AVA collaborated with students pursuing the Early Childhood education diploma in Ngee Ann Polytechnic to develop storybooks that were used during school talks and community events. These giant storybooks, together with educational puppet shows, arts and crafts activities, as well as games, were also featured in library exhibitions conducted in July and December 2013 at the Geylang East Public Library, Tampines Regional Library, and Choa Chu Kang Public Library.

In conjunction with the Food Safety month of July 2013, print and outdoor advertisements were put up to educate the public on Food Safety tips to observe on all occasions. Food Safety tips were also posted on AVA's Facebook and Twitter to reach out to consumers online.

AVA reached out to travellers to inform them of the restrictions on animal, plant, and food items that could be brought into Singapore through a targeted mass media campaign that

included print advertisements and outdoor advertising, such as bus hangers and lamp post banners at the Tuas and Woodlands checkpoints during key travel periods. At the NATAS Travel Fair in August 2013 and February 2014, AVA also distributed 60,000 folders that carried our key messages. To further reach out to travellers, AVA utilised light box panels at the Changi Airport Mass Rapid Transit station to spread AVA's messages, as part of our mass media campaign.

VPHL - New and Enhanced Test Capabilities FY 2013

Contaminants

- Enhancement of method for polycyclic aromatic hydrocarbons in food using liquid chromatograph-mass spectrometer/mass spectrometer and/or gas chromatograph-mass spectrometer*

Drug Residues

- Enhancement of Multi-residues method - Validation of LCMSMS method for coccidiostats
- Determination of chloramphenicol in dry enzyme powder
- Enhancement of Multi-residues method – Addition of new internal standards for hormones and stilbenes

Pesticide Residues

- Determination of inorganic bromide residues in cereals and other products of plant origins by gas chromatograph-electron capture detector*
- Enhanced sample preparation for testing of organic contaminants in water with sample enrichment using solid phase extraction

Food Quality and Authentication

- Detection of Gluten Content by Enzyme-Linked Immunosorbent Assay*
- Established organoleptic test for shark fins
- Authentication of Honey by Isotope Ratio Mass Spectrometry (adulteration with C4 sugars)
- Determination of Hydroxymethylfurfural in Honey by UV Spectroscopy*
- Completed validation of method for the analysis of Hydroxymethylfurfural in Honey using High Performance Liquid Chromatography
- Detection of Bovine using Real time Polymerase Chain Reaction (Qualitative & Quantitative)*
- Detection of Ovine using Real Time Polymerase Chain Reaction (Qualitative & Quantitative)*

Food & Nutrition Chemistry

- Determination of maleic acid determination in flour and flour products
- Determination of hydrochloric acid residue in hydrochloric acid-treated longans
- Acidity titratable in food
- Determination of sulphur dioxide in garlic and related products
- Improvement of trans fat analysis by using relative retention time*

Non-targeted Testing

- Determination of gossypol in cooking oil

Microbiology

- Evaluation of a chromogenic agar for the detection and isolation of *Vibrio cholerae* and *Vibrio parahaemolyticus* in cooked and raw seafood samples*
- Detection of Shiga Toxin-Producing *E coli* by Real-time Polymerase Chain Reaction
- Detection of *Salmonella* spp by Real-time Polymerase Chain Reaction
- Enumeration of *Bacillus cereus* by a new chromogenic agar
- Verification of the suitability of use of the method from FDA-BAM Chapter 29 for the detection and isolation of *Cronobacter sakazakii* in infant milk formula*

Molecular Biology

- Screening of Multiple GM Soya Events by Real-Time Polymerase Chain Reaction*
- Screening of Multiple GM Maize Events by Real-Time Polymerase Chain Reaction*
- Qualitative Detection of Roundup Ready Soya DNA by Real-Time Polymerase Chain Reaction*

*SAC-SINGLAS accredited tests

VPHL PERFORMANCE OUTPUT FY 2013

HEALTH CERTIFICATES

2,913



Samples tested

QUALITY TESTS

4,019



Samples tested

IMPORT CONTROL

33,275



Samples tested

17,471



Lab tests performed

84,117



Lab tests performed

1,206,566



Lab tests performed

SERVICE & SURVEILLANCE

11,808



Samples tested

399,838



Lab tests performed

R&D AND QUALITY ASSURANCE

753



Samples tested

1,428



Lab tests performed

TOTAL

52,768



SAMPLES
TESTED

1,709,420



LAB TESTS
PERFORMED

ONGOING SURVEILLANCE OF FOOD PRODUCTS FY 2013

MEAT & MEAT PRODUCTS



Heavy metals, preservatives & additives (sulphur dioxide, boric acid, sorbic acid, colouring matter), poly-chlorinated biphenyls, dioxins, radioactivity, beta-agonist, nitrofuran, chloramphenicol, other antibiotics, hormones and growth promotants, staphylococcal enterotoxins, *E. coli* O157:H7, *Salmonella* spp., *Listeria monocytogenes*, Vancomycin-resistant Enterococci, *Campylobacter* spp., parasites, anthrax contamination, physical quality, freeze-thaw, species ID

SEAFOOD & SEAFOOD PRODUCTS



Heavy metals, preservatives & additives (sulphur dioxide, boric acid, sorbic acid, colouring matter), formaldehyde, radioactivity, nitrofurans, chloramphenicol, malachite green and its metabolites, other antibiotics, marine toxins, *Salmonella* spp., *Vibrio* spp., noroviruses, Hepatitis A and other viruses, parasites, histamine, anthrax contamination

FRESH FRUITS & VEGETABLES



Pesticide residues, sulphur dioxide, *E. coli*O157:H7, *Salmonella* spp., *Listeria monocytogenes*, anthrax contamination, parasites, heavy metals, nitrates and nitrites

PROCESSED FOOD



Microorganisms, bacterial toxins, synthetic organic colours, suds dyes, paraffin, non-permitted colours, chemical preservatives, artificial sweetening agents, mycotoxins, heavy metals, migration of metals, antioxidants, 3-monochloro-propane-1,2-diol, 1,3-dichloropropanol, polychlorinated biphenyls, dioxins, nonpermitted flavouring agents, acrylamide, formaldehyde, residual chemicals in food-contact articles, migration of chemicals from food-contact articles, ethyl carbamate, N-nitrosamines, mineral hydrocarbons, bromate, pesticide residues, drug residues, radionuclide contaminants, trihalomethanes, screening of irradiated food, adulterants, food authentication, semicarbazide, benzene and histamine

ENSURING THE SAFETY OF IMPORTED FOOD

Surveillance, Monitoring, Inspection & Sampling were conducted on:

MEAT



70,845

Consignments inspected

5,613

Samples tested

SEAFOOD



2,510

Consignments inspected

656

Samples tested

PROCESSED

FOOD



6,064

Consignments inspected & sampled

54,850

items from retail outlets inspected

5,781

Samples from retail outlets tested

EGG

PRODUCTS



791

Consignments inspected

FRESH FRUITS &

VEGETABLES



8,533

Consignments inspected

TOTAL

1,709,420



LAB TESTS
performed on

ENSURING THE SAFETY OF LOCALLY PRODUCED FOOD

Surveillance, Monitoring, Inspection & Sampling were conducted on:

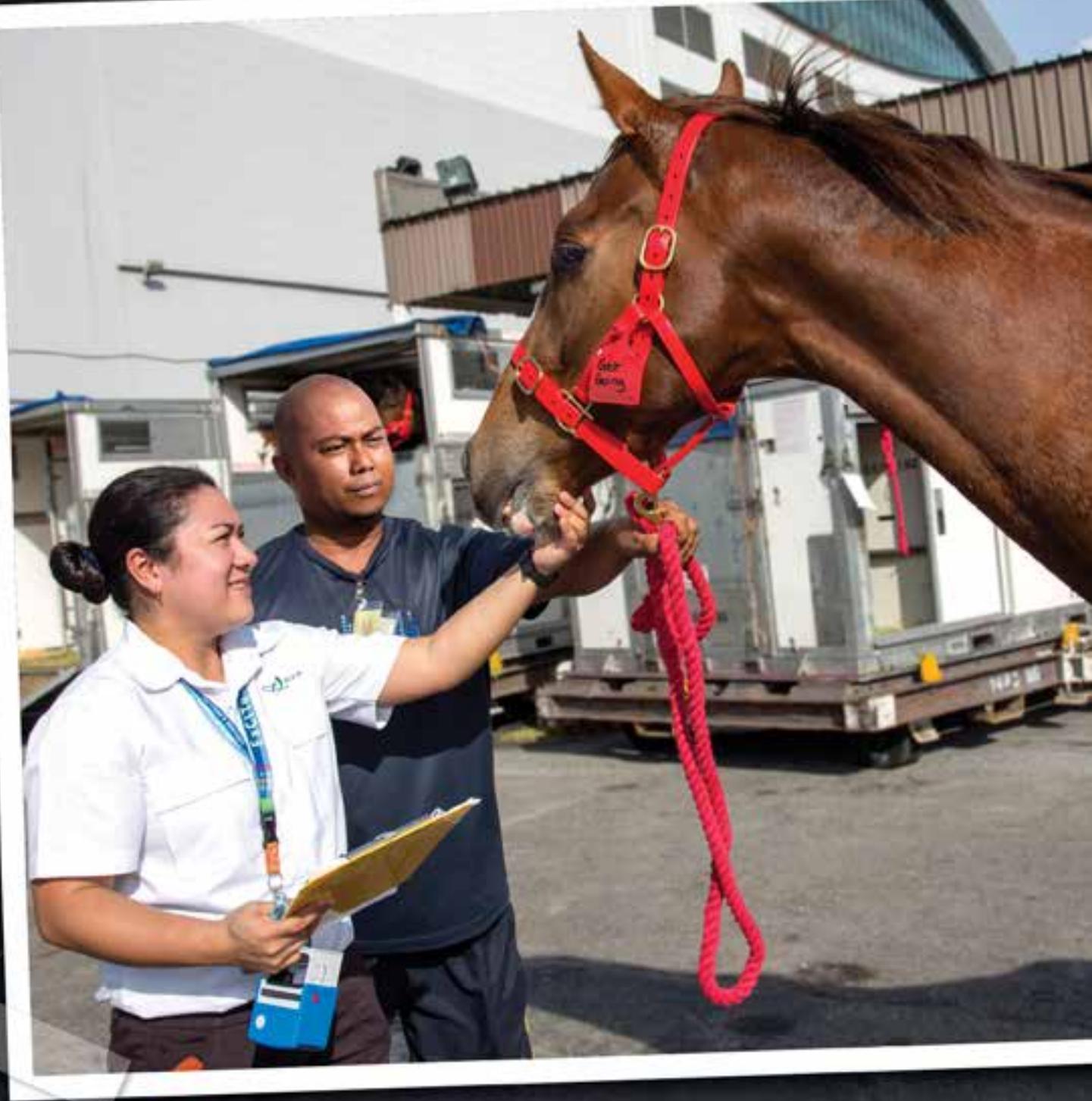


- 56,628** inspections conducted at food processing establishments, cold stores, and food storage warehouses to ensure proper hygiene practices are observed
- 1,761** audit inspections under AVA's food factory grading scheme
- 944** processed food samples tested
- 190** on-site inspections to evaluate new license applications, changes in layout and suitability of location for food usage

52,768 SAMPLES

OF IMPORTED & LOCALLY PRODUCED FOOD

ANIMAL HEALTH & WELFARE



Inspection on horse consignments is conducted upon arrival at the Changi Airfreight Centre. An AVO officer inspects the horses along with their transport carriers to ensure that the animals were housed in good condition. She also checks the accompanying health certificates, laboratory test reports, vaccination reports, and various import documents, to verify that our animal health requirements have been complied with.

WE

★ THINK ★ PROACTIVELY

Animal health and welfare are amongst our key areas of focus. Through border control measures, we prevent major animal diseases from entering Singapore, while our local surveillance and inspection programme protects the health and welfare of our pets and animals.





ANIMAL HEALTH AND WELFARE

SAFEGUARDING ANIMAL HEALTH AND WELFARE

AVA continues to keep the nation free from major exotic and zoonotic diseases, such as Foot and Mouth Disease (FMD), rabies, Nipah virus, Highly Pathogenic Avian Influenza, Low Pathogenicity Avian Influenza, Bovine Spongiform Encephalopathy (BSE), anthrax, and brucellosis. We do so via comprehensive and integrated programmes that ensure both animals and humans in Singapore stay healthy and safe from such threats.



DISEASE-FREE RECOGNITIONS

The World Organisation for Animal Health (OIE) recognised Singapore as free from African Horse Sickness during the 81st General Session of the World Assembly of Delegates of OIE held in Paris, France, from 26 to 31 May 2013.



Dr Chew Siang Thai, Director-General of AVA (far right), receives the Animal Health Status Certificate for freedom from African Horse Sickness from Dr Karin Schwabenbauer and Dr Bernard Vallat from OIE.

Additionally, in February 2014, Singapore fulfilled OIE's requirements in order to be recognised as a country free from Contagious Bovine Pleuropneumonia and Peste Des Petits Ruminants. The official recognition is expected to be awarded during the 82nd General Session of the World Assembly of Delegates of OIE in May 2014.

The Bureau of Animal and Plant Health Inspection and Quarantine, Chinese Taipei, also recognised Singapore as free from Glanders with effect from 23 August 2013. This recognition facilitates the export of horses to Chinese Taipei as well as transhipment via Singapore.

PREVENTING THE INTRODUCTION OF ANIMAL DISEASES

AVA exercises a range of strategies to guard against the introduction and spread of animal diseases in Singapore. The regulation of animal imports into Singapore is a key strategy. In addition, AVA maintains a comprehensive animal disease surveillance programme, which includes the surveillance of local and imported animal populations for harmful pathogens.

AVA also closely monitors the animal disease situation in countries of our trading partners and the region. In the event of an outbreak of a disease of concern, AVA may suspend imports from affected countries to prevent the introduction of the disease to Singapore. When the disease outbreak is resolved, or when AVA assesses that the necessary risk mitigation measures have been implemented, AVA will consider lifting the suspension from such countries to minimise trade disruption.

Review of Import and Quarantine Conditions

Veterinary conditions for the importation of dogs and cats, horses, as well as sheep and goats for slaughter were reviewed in FY 2013.

Import Conditions for Dogs and Cats

AVA imposes quarantine and vaccination requirements on imported dogs and cats, after assessing each exporting country's rabies status and disease control measures. This risk-based system, which categorises countries according to their rabies status, has been instrumental in keeping Singapore rabies free.



Inspection of imported pet dogs at AVA's Changi Animal & Quarantine Station.

In FY 2013, an outbreak of rabies in Chinese Taipei led to a review and reclassification of the country from the status of negligible to controlled risk, thus requiring more stringent quarantine precautions. In addition, AVA also assessed the rabies risk of Iceland and classified it under category B.

Import Conditions for Horses

In June 2013, AVA strengthened the veterinary conditions for the import of horses by requiring all imported horses to be vaccinated against Equine Influenza (EI). This provides an additional safeguard to protect the local horse industry against a potential EI outbreak. Also, in view of new scientific information, AVA removed the requirement for pre-export treatment of horses for internal worms and accepted the import of horses that vaccinated against Hendra virus.

Import Conditions for Sheep and Goats for Slaughter

Following AVA's assessments, Canada, the US, France and Ireland were added to the list of approved countries for the import of *Korban* livestock for religious slaughtering in 2013. This further diversified the sources of animals for religious slaughter. AVA effectively facilitated the import of 2,358 sheep from Australia for *Korban*, which was successfully held on 15 October 2013. In addition to the Australian imports, 500 lambs were brought in for the first time from Canada.

Source Declaration for Import of Ornamental Fish

With effect from 1 June 2013, all ornamental fish importers were required to declare their sources or supplier names when applying for an import permit. Source declaration would enable prompt trace-back during disease outbreaks or detections. It would also facilitate the issuance of advisories to help importers decide whether to cease importing susceptible species from the implicated source. These details

would assist AVA in our surveillance programme to identify sources with repeated disease detection so that the industry can be notified accordingly.

Issuance of Licences and Permits

In FY 2013, AVA issued 47,986 import licences/permits for animals, birds, ornamental fish, eggs, veterinary biologics, and animal products.

Category	No. of Permits Issued
Pigs, poultry, and eggs	34,365
Animals (dogs, cats, small mammals, livestock, zoo animals)	3,052
Biologics	188
Birds	119
Ornamental fishes	9,696
Eggs (Specific Pathogen-Free eggs, specimens for laboratory tests)	26
Products (blood, sera, urine, clinical specimens)	540
Total	47,986

Imported Animal Surveillance Imported Live Poultry

Imports of poultry (chickens and ducks) and eggs are regularly sampled to test for Avian Influenza (AI), *Salmonella* spp., and other contaminants. Two duck broiler farms, three chicken broiler farms, and one layer farm were suspended following detection of *Salmonella Enteritidis* (SE). In addition, five chicken broiler farms were suspended after detection of drug residues. Another two chicken broiler farms were suspended after detection of AI. Separately, three consignments of chickens and two consignments of hen eggs were rejected due to labelling infringements.

Imported Live Pigs

AVA continued to monitor imported pigs for swine influenza, as part of our animal health surveillance programme. The A/H1N1 (2009) strain of swine influenza was detected in imported pigs in June and July 2013. AVA worked closely with the source farm to ensure only healthy pigs are exported to Singapore. The affected areas within the farm were closely monitored and bio-security measures were put in place to minimise the spread of the disease. Tests carried out on pork sold in Singapore showed that the swine influenza virus was not detected, and the meat was safe for consumption.

Imported Ornamental Aquatic Animals

Under AVA's regulatory surveillance for imported ornamental aquatic animals, we tested 314 samples and detected Koi Herpesvirus (KHV) Disease in a batch of koi imported from Malaysia. This batch of koi was culled.

Enforcement against Illegal Imports

On 6 March 2014, AVA intercepted the smuggling of 43 puppies from Malaysia into Singapore. The offender was prosecuted for illegal import of animals and animal cruelty, and sentenced to six months of imprisonment.

Local Disease Surveillance

Domestic Poultry and Ornamental Birds

All local poultry farms were monitored for SE and AI in FY 2013. Two local quail farms were also monitored for the Newcastle Disease. Three local poultry farms were detected with SE and the infected flocks were treated with pro-biotics and organic acids. Eggs from these flocks were sent to an AVA-approved liquid-egg processing plant. An isolation order issued for all infected flocks was subsequently lifted after flocks were tested negative for SE in two consecutive rounds.

In addition, all ornamental bird farms were monitored in FY 2013 for AI and the Newcastle Disease. AVA inspected these farms to ensure vigilance in bio-security and upkeep of good farm management practices.

Livestock Farms

During FY 2013, our local ruminant farms continued to be free from BSE, Bovine Tuberculosis, FMD, *Listeria* and Brucella. Four local ruminant farms that had been tested positive for *Escherichia coli* (*E. coli*) O157:H7 remained under isolation order. The farms were advised to treat livestock with pro-biotics, and the pasteurised milk produced by the farms were tested to ensure it was safe for human consumption.

Fish Farms

AVA continued to monitor for notifiable and emerging diseases of economic importance to the aquatic animal industry during the FY. Surveillance was conducted on both coastal and land-based fish farms, and results showed that Singapore remained free from Spring Viraemia of Carp Virus and Epizootic Ulcerative Syndrome in FY 2013.

Passive surveillance, which involves the testing of susceptible species only, was carried out for the following freshwater diseases in local fish farms: Viral Haemorrhagic Septicaemia (VHSV), Infectious Haematopoietic Necrosis Virus (IHNV), Epizootic Haematopoietic Necrosis Virus (EHNV) and Infectious Spleen and Kidney Necrosis Virus (ISKNV).

During FY 2013, ISKNV and KHV were detected in imported gourami and koi, respectively, which were brought in by two separate local land-based ornamental fish farms. Isolation orders barring all re-exports from these premises were imposed. The remaining gouramis and kois from the affected batches were culled and the orders were lifted after all tanks had completed disinfection and treatment.

White Spot Syndrome Virus (WSSV) was detected in prawns from a local land-based shrimp farm. AVA immediately imposed isolation orders to prevent spread of this notifiable disease. All the prawns on the farm died from WSSV. Following the isolation order, AVA imposed quarantine measures, which were subsequently lifted after proper disinfection and treatment of affected ponds and equipment had been completed. WSSV was also detected in a batch of diseased crayfish submitted by a research institute. The entire batch of crayfish was culled so as to prevent spread of this notifiable disease.



Routine inspection of a local coastal fish farm.

In FY 2013, AVA initiated surveillance on Chytrid fungus (caused by *Batrachochytrium dendrobatidis*) in food and ornamental frogs held in local farms. *Aeromonas salmonicida* was not detected in the 34 batches of goldfish we tested from a local land-based farm.

Marine fish diseases, such as Red Sea Bream Iridovirus (RSIV), ISKNV, Viral Nervous Necrosis Virus (VNNV), Singapore Grouper Iridovirus (SGIV), and Big Belly disease, were detected in local coastal food fish farms in FY 2013. In June 2013 and January 2014, two cases of RSIV were reported from a land-based seabass nursery. As RSIV is an OIE notifiable virus, AVA imposed movement restrictions on the affected farms, ensured the farm culled the sick fish, and monitored the health of the remaining fish stocks. The nursery was given the option of vaccinating the clinically healthy fish against RSIV.

Under the voluntary Imported Fingerling Surveillance Programme, AVA continued to assist participating local farms to screen imported fry and fingerlings for diseases of



AVA's Animal and Plant Health Centre (APHC)

concern prior to stocking, with the aim to help farms increase production through reduced mortality. A wide range of tests were carried out by AVA, including virology, bacteriology, parasitology, and post mortem analyses.

A total of 17 samples were received in 2013. Diseases detected included VNNV, SGIV, ISKNV, and Big Belly Disease. AVA advised affected farmers on the management of these diseases, such as culling of sick fish to minimise the spread of diseases.

LABORATORY CAPABILITIES

The Animal Health Laboratories (AHL) located at AVA's Animal and Plant Health Centre (APHC) is the national reference laboratory for animal diseases. AHL also carries out the testing of animal vaccines.

In FY 2013, AHL conducted a total of 147,890 laboratory tests to detect and identify diseases in animals, birds, and fish.

During the FY, AHL expanded its diagnostic repertoire to include testing capabilities for the serological diagnosis of African Horse Sickness Virus, and the molecular detection of novel H7N9 AIV, EHV-1, EHV-4, IBD, ILTV, MDV, SGIV, *Batrachochytrium dendrobatis* and *Burkholderia pseudomallei*.

AHL established the Necrotising Hepatopancreatitis Bacteria real-time Polymerase Chain Reaction (PCR) method to facilitate the export of shrimps, as well as the Equine paratyphoid (*Salmonella Abortusequi*) Tube Agglutination test for the export of horses to Japan.

AHL continued to attain accreditation of its quality assurance (QA) system to ISO/IEC 17025 under the Singapore Accreditation Council – Singapore Laboratory Accreditation Scheme (SAC-SINGLAS), reflecting its commitment to high laboratory testing standards in the field of chemical and biological testing. As part of efforts to improve our QA system, four Quality System Procedure Manuals were revised and updated in the FY.

SAFEGUARDING AGAINST BIRD FLU

During the FY, AVA inspected all local poultry farms to ensure that bio-security and bio-segregation measures were strictly adhered to, and that all poultry houses were bird-proofed. Samples were also collected fortnightly for AI testing. We collaborated with the National Parks Board (NParks) on the surveillance of Notifiable Avian Influenza (NAI), including H7N9/2013 in migratory and wild birds in the Sungei Buloh Wetland Reserves, Pulau Ubin, and Singapore Botanic Gardens. The 494 samples collected tested negative for NAI. The swans in the Singapore Botanic Gardens were given AI booster vaccination shots. Cloacae swabs sampled from the swans were tested negative for NAI H7N9.

In collaboration with the National Environment Agency (NEA), 1,423 urban birds (crows, pigeons, mynahs and others) were also tested and found to be free of AI virus.

ANIMAL WELFARE

AVA safeguards the welfare of animals and prevents animal cruelty through regulation and education. In this role, AVA has to deal with a spectrum of attitudes towards animals, which range from people who find animals a nuisance to those who champion their welfare.

Animal Welfare Legislation Review Committee

In April 2012, the Animal Welfare Legislation Review Committee (AWLRC) was formed to review existing legislation on animal welfare matters. Chaired by Mr Yeo Guat Kwang, a member of the Ministry of National Development's (MND) Government Parliamentary Committee and Member of Parliament (MP) for Ang Mo Kio Group Representation Constituency (GRC), AWLRC brought together members from the veterinary profession, animal welfare groups, the pet industry association, and grassroots leaders. The members worked together towards the shared objective of strengthening and raising standards of animal welfare in Singapore, while balancing the very diverse interests of the community at large.



Animal Welfare Legislation Review Committee (AWLRC) Chairman, Mr Yeo Guat Kwang, together with other AWLRC members and AVA officers, receives the Minister's (Team) Award from Minister for National Development, Mr Khaw Boon Wan.

Following a year of consultation, including inputs sought through an online feedback portal and several stakeholder focus group discussions, the AWLRC proposed 24 legislative and non-legislative recommendations, grouped under four thrusts:

- Ensuring reasonable care and welfare of animals.
- Increasing deterrence and stepping up action against wrongdoers.
- Fostering greater responsibility in industry to ensure animal welfare.
- Fostering greater responsibility amongst pet owners and greater community awareness of animal welfare.

All 24 recommendations were accepted by MND in April 2013. Efforts by the AWLRC team were recognised when it won the Minister's (Team) Award in August 2013. The award served to commend the committee's efforts in bringing together non-government stakeholders, and enabling the co-creation of solutions to further animal welfare in Singapore.

Following the acceptance of the recommendations, work was initiated to table a Private Member's Bill to amend the animal welfare legislation, to give effect to some of the recommendations made by AWLRC.

On 1 October 2013, a Multi-Stakeholder Collaboration Committee (MSCC) for Animal Welfare chaired by Mr Alex Yam, MP for Chua Chu Kang GRC, was established to serve as a platform for stakeholders to share their views, build up mutual understanding on animal welfare, and to collaborate in promoting animal welfare in Singapore. MSCC embarked on formulating the Codes of Animal Welfare to help set clear guidelines for owners and pet businesses on how to meet the needs of their pets and/or animals under their charge to ensure their well-being. A public e-consultation was conducted from 28 January to 28 February 2014 to gather feedback from the public. The formulation of these Codes is also one of the 24 recommendations made by the AWLRC.

In addition, with effect from 1 January 2014, AVA added two new licensing conditions for pet retailers selling cats, dogs and rabbits:

- Pet retailers are not allowed to sell a pet dog, cat or rabbit to any individual below 16 years old. Children below the age of 16 must be accompanied by their parents or legal guardian to buy a pet cat, dog or rabbit.
- Pet retailers are required to assess the suitability of their customers as pet owners prior to sale of the pet animal. As part of the pre-sale screening process, both potential pet buyers and pet retailers have to complete the Pet Purchase Declaration.

Regulating Pet Retailers and Dog Farms

In FY 2013, there were 245 licensed pet shops, as compared to 258 in the preceding year. Regular inspections were carried out in pet shops to ensure compliance with licensing conditions and that shop standards were maintained. Compound penalties were issued to 13 pet shops that failed to comply with licensing conditions, as compared to 15 in the last FY.

AVA grades pet shops to enhance their competencies and standards, and to inform the public of the standard of the pet shop that they patronise. The shops are graded according to their compliance with licensing conditions and adoption of best practices. The grades are displayed in the shop and also on AVA's website. In FY 2013, 69 percent of the shops graded attained either an A or B grade. None of the shops was given the lowest D grade.

Enforcement Against Animal Cruelty

AVA investigated 443 complaints of alleged animal cruelty during the FY. Of these, three offenders were prosecuted and eight others were issued composition fines. No actions were taken in a few cases due to insufficient evidence. For the majority of cases, counselling was provided as appropriate.



Minister of State for National Development Mr Desmond Lee, AVA Chairman Mr Koh Soo Keong, and AVA CEO, with participating animal welfare groups, other government agencies, and schools at the RPO roadshow (Changi City Point).

Regulating Research Institutions

AVA licenses animal research facilities that use animals for scientific purposes. Research facilities are required to comply with guidelines set by the National Advisory Committee for Laboratory Animal Research (NACLR) on the care and use of animals in research. As at 31 March 2014, there were 26 research facilities with 72 licensed premises. Animal holding facilities are inspected annually, while procedural rooms are inspected every other year. Moving forward, AVA plans to work with the NACLR to update current guidelines.

PUBLIC EDUCATION PROGRAMME ON RESPONSIBLE PET OWNERSHIP

Doing all we can, as best as we could, is not enough to ensure total well-being for Singapore. Besides regulatory control, it is also important to raise Singaporeans' awareness of their shared responsibility towards animal welfare.

In championing animal welfare, AVA proactively works with the community and educates them on animal welfare and responsible pet ownership (RPO). Through our public education programme on RPO, we aim to foster a humane and gracious society for all, where pet owners, non-pet owners, and animals co-exist in greater harmony. Emphasis is also placed on reducing pet abandonment, which can add to the problem of stray animals.

In FY 2013, we continued to do so and adopted the theme "Animals & Our Community", as well as the following sub-messages, for our RPO public education programme:

- Be a considerate pet owner.
- Sterilise your pet to prevent unwanted litters (targeting potential pet owners).
- Resolve pet issues amicably (targeting existing pet owners and non-pet owners).

RPO Roadshow and Community Events

During the FY, AVA organised a total of four RPO roadshows at City Square Mall, United Square Mall, Changi City Point, and Northpoint Shopping Centre. Engaging activities such as interactive games, colouring, and paper model-making were available during the events to help spread RPO messages to more than 11,000 visitors in all. In addition, participating animal welfare groups put up pet adoption drives and shared pet care tips with visitors.

Minister of State for National Development, Mr Desmond Lee, was the Guest-of-Honour for the roadshow at Changi City Point, where AVA's RPO animations were also launched. As at 31 March 2014, these animations have garnered over 120,000 views on YouTube.

AVA promoted RPO education and pet adoption during the inaugural Pet Expo 2014 event organised by the International Exhibitions Group, which attracted approximately 20,000 visitors from 28 February to 2 March 2014 at the Singapore Expo. Our outreach was also extended to community events organised by schools, community clubs, and the Singapore Kennel Club during the FY.



Minister of State for National Development Mr Desmond Lee engaging animal welfare groups at Pet Expo 2014.

Other Outreach Efforts

Educational talks on pet-related matters form another significant component of AVA's public education programme on RPO. A total of 32 school talks and 38 learning journeys for 19,608 students and teachers were conducted throughout FY 2013.



→ Educational talks are conducted for students as part of AVA's RPO public education programme.

AVA also tapped on the use of a puppet show, in collaboration with Ngee Ann Polytechnic, to spread RPO messages at Geylang East Public Library and Serangoon Public Library.

A taskforce between AVA and animal welfare groups continued to collaborate in reinforcing RPO education and finding ways to reach out to a wider audience. One initiative was to produce collaterals to educate pet shop patrons on the two new licensing conditions.

The Pet Central blog (www.petsforlife.com.sg) continued with its regular series: "Beat the Monday Blues" videos, "Pet Care Tips", and "Pet Adoption Fridays" (featuring adoptable animals from animal welfare groups). A new theme "New Beginnings" was launched on the blog during this FY.

ANIMAL MANAGEMENT

Licensing of Dogs

Dog licensing is an integral part of AVA's responsible pet ownership regime, as well as our animal and public health framework. It establishes accountability for the care and management of dogs by pet owners, and facilitates contact tracing in the event of a rabies outbreak. Rabies is a fatal viral disease that can be transmitted to humans by the bite of a rabid animal. Dogs are considered to be highly significant vectors for the spread of rabies.

All dogs above three months of age have to be licensed by AVA for rabies control. In the FY, AVA issued 61,528 dog licences. Enforcement was carried out on errant dog owners who did not comply with the dog licensing rules and conditions.

As part of ongoing efforts to promote responsible pet ownership, AVA encourages dog owners to sterilise their dogs to prevent unwanted breeding, which could contribute to abandonment and public safety issues. With effect from

1 February 2014, licence fees for unsterilised dogs increased from \$70 to \$90, while licence fees for sterilised dogs went up from \$14 to \$15. Licence fees for fourth and subsequent dogs (sterilised/non-sterilised) rose from \$175 to \$180.

First Responder Protocol

Animal-related issues are usually complex and the effective resolution of such issues often requires the efforts and cooperation of various public agencies.

To achieve better inter-agency collaboration on animal-related issues, AVA took on the role of First Responder for animal-related feedback with effect from 1 March 2012. As First Responder, AVA acts as the lead in coordinating relevant agencies to ensure swift and effective actions are taken by respective agencies. AVA also coordinates joint replies to feedback providers. The establishment of AVA as First Responder on animal-related issues has improved collaboration and response time between public agencies in attending to animal-related feedback. During the FY, AVA received and handled a total of 16,305 cases of public feedback on animal and bird nuisance.



→ An AVA officer interviews a feedback provider to understand more about the animal-related issue at hand.

Management of Strays

AVA continues to conduct control operations to manage the stray population and ensure public health and safety. Stray dogs, especially when in a pack, could threaten public safety. Keeping the stray dog population in check also helps to mitigate the spread of rabies should there be an incursion of the disease.

In FY 2013, and impounded 1,323 stray dogs, of which 196 were successfully re-homed.

Project ADORE was launched in April 2012 to re-home suitable mid-sized mongrel dogs in HDB flats. This multi-agency project, involving MND, AVA, HDB, SPCA, and ASD, had successfully placed 62 dogs in homes as at 31 March 2014. Adopters paid for licensing, micro-chipping, and boarding fees for these dogs. They were also required to sterilise the dogs and ensure that the dogs are not released back into the environment again.

To further facilitate the re-homing of dogs by our animal welfare partners, AVA in November 2013 waived the first year of the annual licence fee for dogs released from AVA's pound to these groups for re-homing.

Besides the re-homing pilot for dogs, Project Love Cats debuted in Chong Pang in October 2012, and is led by CWS, with the support of MND, AVA, HDB and Sembawang-Nee Soon Town Council. Residents from a total of 123 blocks in Chong Pang are currently allowed to own one pet cat per flat, while those who have cats currently staying under their roofs can appeal to keep these cats on a case-by-case basis. New adopters can adopt a cat from CWS or SPCA.

All pilot participants are required to comply with ownership conditions and a Code of Responsible Behaviour. Other conditions will include mandatory sterilisation and microchipping of the pet cats, and the requirement for pet owners to keep their cat indoors at all times. In 2013, a total of 125 households owning a total of 276 cats were registered under the Project Love Cats.

Besides advising the management of industrial and commercial sites on ways to control the population of stray dogs and cats on their premises, AVA also educates the public on ways to reduce problems caused by stray dogs and cats in their neighbourhood. In addition, AVA works with NParks to advise residents on ways to avoid unpleasant encounters with stray monkeys.

Animal Management FY 2013	
Category	No. of Cases
LICENSING OF DOGS	
New dog licenses issued	11,679
Dog licenses renewed	49,849
Total	61,528
FEEDBACK ON ANIMAL AND BIRD NUISANCE	
Dogs	6,099
Cats	3,227
Pigeons	2,163
Monkeys	1,855
Others	2,961
Total	16,305

VETERINARY PROFESSION

AVA regulates the veterinary profession in Singapore and licenses veterinarians and veterinary centres. As at 31 March 2014, there were 312 veterinarians and 66 veterinary centres licensed by the AVA.

AVA also organised a communications workshop in December 2013 to help improve customer service provided by the veterinary profession. The workshop, which was conducted by an external trainer and included a talk by AVA officers, provided veterinarians and clinic staff with tips on how to prevent and handle complaints that stemmed from communication issues.



Minister of State for National Development, Mr Desmond Lee scans a dog for its microchip number during the free pet health check event organised by AVA.

Currently, AVA is collaborating with private veterinarians to conduct a series of free pet health checks that provide basic clinical examination and veterinary advice at no cost. The first free pet health check was launched on 15 February 2014 at the Jurong Spring Community Club in Jurong GRC by Minister of State for National Development, Mr Desmond Lee. The series is expected to continue into 2015.



Personnel from AVA and external stakeholders suit up in the Personal Protection Equipment as part of AVA's bird flu simulation exercise.

STAYING ALERT AGAINST EMERGING THREATS & ISSUES

AVA's horizon scanning function helps the organisation to pick up reports of animal disease outbreaks, discoveries of unexpected or novel pathogens, and changes in the behaviour of known pathogens from open sources. AVA keeps an eye on animal diseases that can pose a threat to overall animal and public health in Singapore, such as BSE, AI, rabies, Hendra Virus, as well as FMD outbreaks. Our daily scanning helps enhance AVA's operational readiness by providing lead time for AVA to take immediate measures to safeguard the health of our animals, as well as public health in Singapore.

OIE Meetings and Trainings

The OIE, an intergovernmental organisation responsible for improving animal health, provides expertise and information on animal diseases, promotes transparency in the status of world animal diseases, and develops international standards for combating animal diseases.

To keep abreast of international standards for animal health and the control of major animal diseases worldwide, AVA represented Singapore at the 81st General Session of the World Assembly of Delegates of OIE held in Paris, France, from 26 to 31 May 2013.

Emergency Preparedness

To refresh and refine our operational preparedness in responding to a potential bird flu outbreak, AVA conducted its seventh bird flu simulation exercise, Exercise Gallus VII. The exercise comprised table-top and field exercises on 15 July and 17 July 2013, respectively.

The table-top exercise tested AVA's crisis management framework, decision making process, and the responsiveness of our contingency plan. The field exercise simulated a detection of bird flu at a local poultry slaughterhouse and involved about 100 personnel from AVA, NEA, Soonly Food Processing Pte Ltd, and Sembwaste. External observers from NEA, Ministry of Health, MND, Singapore Civil Defence Force, Department of Veterinary Services (Malaysia), and the local media were also present at the field exercise.



The field exercise simulates a detection of bird flu at a local poultry slaughterhouse.

STAKEHOLDER ENGAGEMENT AND COLLABORATION

AVA collaborates with the industry, research institutes, local educational institutes, and overseas partners to develop new diagnostic methods for the detection of important animal diseases, as well as to conduct epidemiological studies of significant diseases, and enhance surveillance efforts. Training was also organised for local poultry and fish farms to keep them abreast of best practices.

Vaccine and Test Method Development

AVA continued to partner Temasek Life Sciences Laboratory on the development of a multivalent bird flu vaccine and a universal detection kit for AI. Our collaboration with Veredus Laboratories is also in progress to produce a lab-on-chip that has the ability to concurrently detect multiple avian pathogens in one test. Internal and external validations are ongoing.

In addition, AVA continued to collaborate with Temasek Polytechnic to develop diagnostic tests for *Salmonella* spp antibodies, VNNV, and shrimp viruses.

Controlling Bird Flu In Kepri

In FY 2013, AVA continued to assist Indonesia to control and manage bird flu outbreaks in Kepri. Our officers visited Batam and Bintan regularly to obtain information on bird flu outbreaks. AVA assisted Kepri authorities during the bird flu outbreaks in Batam with deliveries of rapid test kits, disinfectants, and personnel protective equipment (PPE).

A training workshop for Kepri veterinarians was organised to strengthen their capabilities in surveillance and control of bird flu. The workshop included an update on the global bird flu situation, including prevention and control measures for H7N9.

During the FY, AVA also helped to increase public awareness of bird flu in Kepri via media broadcasts of bird flu messages in Batam. These messages were targeted at residents and farmers. In addition, AVA contributed public education materials in support of the Batam veterinary authorities' public education outreach efforts in primary schools.



◆ Kepri veterinarians at a training workshop on the surveillance and control of bird flu organised by AVA.

Workshops, Seminars & Working Groups for Local Poultry Farms

In May 2013, AVA invited two speakers to conduct talks to local poultry farms on (1) pro-biotics and its effects on poultry production, and (2) poultry insurance. Bio-security workshops were also conducted in FY 2013 to educate poultry farm owners and workers on the importance of, and their role in maintaining bio-security.



◆ Dr Linge Pradip from Lallemand Animal speaks on probiotics and its effect on poultry production.

In addition, AVA conducted a training workshop on the donning and doffing of PPE, as well as humane culling of chickens, for workers in a local poultry farm. The aim was to educate the workers on proper self protective measures and procedures of culling chickens in the event of an AI outbreak in the farms.

The local Poultry Farms Working Group, comprising representatives from AVA and the local poultry layer farms, was formed to discuss matters related to the effective and efficient sale of spent hens. The working group collectively identified the root cause of the problem and made plans to explore possible solutions for the issue.

Training for Local Fish Farms

There is growing interest among farmers to use their fishing vessels as a tool to tow pontoons to and fro their fish farms. To address this trend, AVA invited a certified marine surveyor to conduct talks on certification for towing using small vessels in April 2013. The talk helped farmers better understand and comply with the safety requirements for towing.

In September 2013, AVA organised a "Food Fish Aquaculture Seminar", where two invited speakers touched on the use of pro-biotics in aquaculture, as well as bio-security in farms. This seminar educated local farmers on good disease management and the best practices in fish farming.

PLANT HEALTH



Rhinoceros Beetle traps are installed at tree banks in Singapore as part of our plant health surveillance programme. An AVA officer collects the insects trapped and brings them back to AVA's Plant Health Laboratory for diagnosis. This surveillance enables AVA to respond swiftly to any potential outbreaks.

WE

* THINK * PRUDENTLY

Plant pests may occur when we least expect it. We must continue to pre-empt any significant plant pest infestations and nip potential outbreaks in the bud. This allows us to enjoy our greenery and maintain a healthy environment at all times.





PLANT HEALTH

SAFEGUARDING PLANT HEALTH

AVA is committed to protecting our local flora from the negative impact of exotic and emerging indigenous plant pests. Through a robust science-based and internationally recognised plant health regulatory system, we aim to maintain plant bio-security to protect the sustainability and diversity of our landscape. Our comprehensive plant health programme, comprising import regulation and inspection, risk analysis, as well as laboratory testing and surveillance, have successfully kept Singapore free from important quarantine pests. These include the stored product pest Khapra beetle, Mediterranean and Queensland fruit flies, as well as the fungal disease of rubber - the South American Leaf Blight. Our efforts are supported by the close cooperation and partnership with local government agencies and plant industries.



PREVENTING THE ENTRY OF PLANT PESTS AND DISEASES

As Singapore imports several varieties of plants that are not grown locally, AVA works to ensure the smooth import of plants without compromising plant health. With large amounts of plants moving across our borders daily, AVA collaborates with the Immigration and Checkpoints Authority (ICA) and Singapore Post to monitor imports closely, and safeguard our plants against pests that can cause significant economic losses through reduced yields, quality, and cost efficiency.

Import Control and Inspection

AVA regulates the import of plants and plant products through stipulated plant health import requirements. During the FY, 31,335 import permits were issued.

AVA also conducted 3,424 post-entry inspections to ensure compliance with import health requirements. To detect pests, samples were collected for laboratory tests. In cases where injurious pests were detected, importers were given the option of treatment, if feasible, or destruction of the consignment.

Methodology for Phytosanitary Hazard Profiles

The methodology for creating phytosanitary hazard profiles for plants, plant products, and other regulated articles, was introduced to officers during the FY.

The methodology allows officers to arrive at a preliminary indication of a plant's potential in relation to it being a pathway for regulated pests. This allows for necessary precautionary measures to be taken and helps to ensure a consistent assessment and application of precautionary measures.

Imported Living Organisms

Through the administration of the Bio-security Assurance Arrangement (BSAA) Scheme, AVA regulates the import of living organisms, such as live insects and microorganisms, which have an impact on the environment. Importers are required to have proper facilities and management procedures to prevent the escape of these living organisms. AVA conducts audits on their facilities and procedures periodically. There were 32 BSAA members at the end of the FY.

Imported Grass Consignments

Imported grass consignments that are infected with pests could potentially harm local trees and shrubs. To prevent this, AVA monitors imported grass consignments closely. A total of 824 grass samples imported from Malaysia, Thailand, and



Plant samples are collected for laboratory analysis, as part of AVA's plant health surveillance programme.



Sieving soil filtrates for plant parasitic nematodes.

the US were monitored for the presence of plant parasitic nematodes during the FY. In general, the plant parasitic nematodes detected were relatively common in Singapore and their population density was presently low.

In addition, 405 samples of imported grasses were tested for Phytoplasma, a bacteria-like microorganism that causes bleaching symptoms. There was no detection of Phytoplasma in the samples.

Some 402 samples of imported turf samples were also tested for diseases such as the opportunistic fungal pathogen (*Curvularia* species), which continued to be prevalent in imported grass submitted for post-entry monitoring. Based on these findings, AVA recommended appropriate treatments for the affected nurseries to reduce pest incidents, and worked with our counterparts in the source countries to improve the health status of their plants at source.

Plant Health Surveillance

AVA reviews our surveillance programmes annually to target specific pests on different hosts, in order to keep up with the rapid ecological changes in Singapore. This helps AVA to detect pest incursions early and keep our City in the Garden free from them, as well as to identify potential bio-security threats.

During the FY, our surveillance on *Puccinia psidii* (a quarantine-notifiable fungus) and *Pantoea ananatis* (an emerging bacterial pathogen of importance in export trade), was completed. Surveillance results show that Singapore is free of this fungus and bacteria.

An analysis of 10 years' worth of surveillance data on the Diamond Back Moth (DBM)'s population dynamics was completed. The fluctuations in population over the decade can be attributed to the seasonal and cyclical variations recorded.

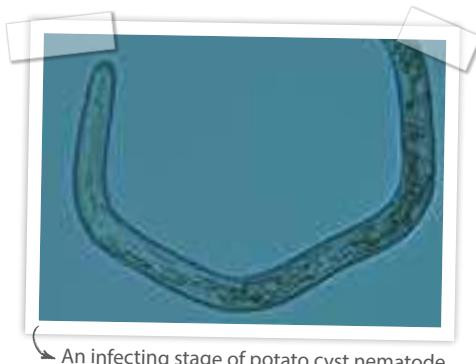
Imported Plants

Imported ornamental plants can potentially introduce invasive plant pests. AVA's plant health surveillance programmes check for the presence of exotic plant pests that could threaten local flora and crops of economic importance.

During the FY, AVA continued our surveillance efforts on four targeted quarantine pests; viz, the Khapra beetle, Mediterranean fruit fly, Queensland fruit fly, and South American Leaf Blight. A total of 161 inspections were conducted on imported plants and plant products, and 997 samples were submitted for identification. No targeted quarantine pests were detected.

Potatoes are imported in large quantities by local companies that re-package and re-export them with health certificates from AVA. To protect our potato re-export industry from the risk of pest incursions brought about by imported potatoes, AVA initiated a surveillance programme in May 2008 to inspect, sample, and test these import consignments and soil for Potato Wart Disease (PWD) and Potato Cyst Nematode (PCN). The surveillance programme concluded this FY and we did not detect any PWD or PCN in Singapore.

AVA also continued to conduct a surveillance programme that monitors the presence of guava fruit flies (*Bactrocera correcta*) on imported rose apples from Thailand. A total of 154 samples were collected this FY and *Bactrocera correcta* was detected in two post-entry samples. The fruit fly traps installed at Pasir Panjang Wholesale Centre as part of the ongoing fruit fly monitoring did not pick up any adult *Bactrocera correcta*. As a result, the interception of *Bactrocera correcta* larvae in the consignments were deemed to pose a negligible risk.



An infecting stage of potato cyst nematode.

Local Plants

AVA closely monitors establishments involved in the production of plants, flowers, and vegetables to keep them free from pests. Singapore continues to be free from the six targeted quarantine pests viz, the Khapra beetle, Mediterranean fruit fly, Queensland fruit fly, South American Leaf Blight, PWD, and PCN.

AVA's post-border control targets high volume nurseries, local farms, and identified high risk sites near ports of entry. In FY 2013, AVA conducted 933 surveillance visits and collected more than 12,000 samples to check for plant health status. There were about 13,000 pest detections from these samples.

Pest control advisories were provided to owners of affected premises. The results helped to update the health status and host-pest association of the diverse range of plant species.

A delimiting survey was also conducted for *Cercospora elaeidis* (a quarantine fungal pest), which was detected on the oil palm species *Elaeis guineensis* at Pasir Ris Park and Pasir Ris Town Park in early 2013. The *Cercospora elaeidis* infected about 20 percent of the oil palms examined, and the infection was mild with leaf spots found on one to five percent of the fronds of the infected palms. We concluded that this particular strain of *Cercospora elaeidis* has a limited capability to spread, and has negligible effect on the growth of oil palms in Singapore.

AVA supports our local farms with our technical expertise, and we continued to provide plant health advisory to Sky Greens Pte Ltd during the FY. In addition, pheromone lures for *Plutella xylostella* (Diamondback moth) were provided to help the farm manage this pest through the trapping method.

In addition to farms, AVA also helps to keep plants in tourist attractions such as The Gardens by the Bay (GBB) healthy. Regular surveillance is conducted by AVA to keep exotic pests at bay. With regular surveys, AVA provides the GBB with plant health advisories to contain outbreaks of plant pests. Cataloging of pests associated with the newly introduced exotic plant species also continued during the FY.

Soil Health

AVA concluded the monitoring survey on *Lagerstroemia* and added the results to a database containing baseline soil and tissue nutrients information. This database would help to determine the healthy levels of nutrients in plants, and enable AVA to make recommendations on fertiliser amendments to the industry. Monitoring surveys on *Canna* continued to be in progress during the FY.

AVA continued to receive soil and tissue samples for testing from varied sources, such as farms, landscaping contractors, and gardeners in FY 2013. Landscape companies providing soil mix and compost to National Parks Board (NParks) also sent such samples to AVA to test for conformance to standards developed by its Centre for Urban Greenery and Research (CUGE). Test results showed that major nutrients (Nitrogen, Phosphorus and Potassium) for both soil and soil mixes were outside the acceptable ranges for plant growth, and AVA provided advisories for amendment to the parties concerned.

New Plant Pest / Host Records

AVA continues to strengthen our diagnostic capability and surveillance efforts. During the FY, AVA detected five new plant pests and the results were confirmed by similar tests conducted by experts from Australia, the UK and US. The affected samples were collected from local and post-entry surveillance sources. Among these five pests, two were pathogens that cause leaf spotting diseases, while the remaining three were invasive insect species. Control measures were provided to manage these pests and monitoring efforts were put in place to ensure minimal impact to the horticultural sector in Singapore.



Advanced molecular plant health diagnostic testing.

New Plant Pests & Hosts Detected In FY 2013

Pest	Host
<i>Pseudocercospora houttuyniae</i> (P)	<i>Houttuynia sp</i>
<i>Pseudocercospora mirandensis</i> (P)	<i>Clidemia hirta</i>
<i>Echinothrips americanus</i> (P)	<i>Metasequoia glyptostroboides</i>
<i>Bactrocera correcta</i> (P)	<i>Syzygium jambos</i>
<i>Liriomyza trifolii</i> (P)	Vegetables

(P) = New Pest

Laboratory Testing for Plant Health

AVA's Plant Health Laboratory (PHL) provides diagnostic services for a wide range of plant pests including insects, mites, fungi, bacteria, phytoplasmas, and viruses. In addition, we provide analytical services for an extensive range of nutrients in soil, plant tissues, and planting media. The tests conducted range from morphological examination, biological indicators, and serological techniques, to advanced molecular and chemical/physical testing.

In 2013, PHL completed about 22,167 diagnostic tests, which included eight samples received from overseas and processed under the BSAA protocol. To facilitate the registration of pesticides with AVA, PHL continued to provide services to local pesticide companies.

AVA is leading an inter-ministry technical committee to conduct a field trial on the use of Phosphine (PH3) gas as a replacement for Methyl Bromide, which is commonly used as a fumigant on rice stockpile. The trial is expected to commence in mid 2014.

Pest Risk Analysis

AVA completed risk assessments of seven applications that sought to import genetically modified (GM) crops. The import of high oleic acid soybean (87705) and tissue selective glyphosate tolerant maize into Singapore were evaluated based on altered pest susceptibility, weediness potential, and gene flow.



As part of efforts to expand PHL's testing capabilities, AVA developed protocols for the molecular identification of vegetable leaf, as well as for the identification of fruit fly species using the DNA barcoding method. Two field diagnostic keys for pests on orchid and aquatic plants, along with illustrations, were also created for field inspectors to facilitate easy identification of pests.

Embracing the call for innovation in the way we work, PHL developed a real-time diagnostic system for the identification of insect pests affecting palm trees in Singapore and Southeast Asia. This interactive tool uses a variety of identification methods and provides ready reference for both field and laboratory use.

PHL's work is underpinned by a commitment to quality systems accredited with ISO/IEC 17025 (2005) since 2006.

During the FY, three new tests were accredited in the fields of chemical and biological testing under the Singapore Accreditation Council – Singapore Laboratory Accreditation Scheme (SAC-SINGLAS) in 2013. The laboratories met all the requirements in the ISO/IEC 17025:2005 standards.

Our laboratories also performed well in the inter-laboratory proficiency quality assurance testing programme, which was administered by the internationally recognised Wageningen Evaluating Programmes for Analytical Laboratories, Wageningen University, the Netherlands.

Research Collaboration

AVA, NParks, and the National Institute of Education continued the collaboration to identify wood decay fungi from pruning wounds of common trees, as well as to identify native strains of *Trichoderma* that could control these fungi.

The effectiveness of *Trichoderma* as a biological control agent of wood decay fungi in pruned tree wounds of *Samanea saman* and *Khaya senegalensis* was evaluated. Results indicated that *Trichoderma* had persisted in the inoculated wounds and will continue to protect them from wood decay fungi.

AVA collaborated with NParks to field-test the use of parasitic wasps (*Asecodes hispinarium* and *Tetrastichus brontispae*) for the control of hispid beetles (*Brontispa longissima*) in palms. The release of these parasitic wasps was able to significantly reduce the population of hispid beetles in adult, larva, and pupa stages, in a sustainable and environment-friendly manner.

In the FY, we continued our collaboration with the Singapore Golf Association to build up a local plant health database for golf courses, develop our expertise in turf grass health, and raise Singapore's profile as a regional leader in golf course turf grass diagnostics. The collaboration sought to benchmark AVA's diagnostic capabilities with established overseas turf diagnostic laboratories. Comparative evaluation of results revealed that AVA's analyses of turf grass have been fairly consistent, and PHL is well positioned to perform diagnostic tests in the fields of turf pathology, nematode analysis, and soil and turf nutrient analysis for golf courses in Singapore and beyond.

Extension Services and Training

During the FY, AVA continued to conduct plant health assessments for commercial and residential establishments, such as Resorts World Sentosa, Changi Airport Group, and condominiums. Detailed recommendations based on laboratory and field analyses were provided for every assessment.

To assist GBB in managing plant pests in a more sustainable manner, PHL developed protocols for the mass rearing of biological control agents such as Green lacewings and *Coryza* species (Rice moth), and transferred these protocols to GBB. Trainings were conducted by AVA and we also helped to rear colonies of control agents before passing them, along with the necessary start-up materials and apparatus, to GBB.

Regulating Pesticide Usage

To ensure food, environmental, and workers' safety, AVA registers and approves all agricultural pesticides for use in vegetable and ornamental plant farms. We conduct monthly pesticide usage inspections in farms to ensure that they comply with use of pesticide requirements under the Control of Plants Act. During inspections, samples of locally produced food crops are collected for pesticide residue and/or microbial testing. In FY 2013, 313 pesticide usage inspections were conducted on local plant farms, 150 samplings were collected for laboratory tests, and 318 pesticide products were approved for agricultural use.

To ensure the safe use of pesticides in farms, AVA also certifies pesticide operators to supervise the application of pesticides in our local farms. The number of AVA-certified pesticide operators totalled 160 at end of FY 2013, as compared to 165 the year before.

In addition, Pesticide Operator Certification (POC) training and proficiency tests were conducted as part of the requirements for certification of competent pesticide operators in local farms. Four training courses (in English and Chinese languages) took place in June and December 2013 for existing and new POC applicants.

STAYING ALERT AGAINST EMERGING THREATS & ISSUES

AVA maintains its readiness to deal with incursions by testing and updating our contingency plans to combat outbreaks of plant diseases. We continue to detect plant pests early before its spread.

In March 2013, we developed a new mobile Geographic Information System (GIS) for our plant health surveillance. GIS was made operational in FY 2013 and is now capturing sample information in the field. Analysis of available data collected will begin in 2014.

ENGAGING AND EDUCATING THE PUBLIC AND INDUSTRY

Our stakeholders play an important role in maintaining an effective bio-security continuum. Responsibility for plant bio-security in Singapore rests with the whole of the community, which includes the industry and public.

During the FY, AVA engaged the community through four library talks arranged this FY under the NParks' Community in Bloom Library Talks Series. The talks provided better understanding on garden pests and their management.

In other community outreach efforts, AVA organised a talk on integrated pest management to residents of Toh Guan Community Garden in March 2014, and promoted the use of cultural, physical, and biological measures to manage pests. At the Green Urbanscape Asia exhibition held from 7 to 9 November 2013, AVA highlighted our efforts in ensuring plant health in Singapore, and showcased common plant pests, soil problems, and agricultural products exported by Singapore.



At the Green Urbanscape Asia exhibition, Ms Yap Mei Lai, Director for Plant Health Laboratories in AVA, explains the role AVA plays in ensuring plant health to Minister of State for National Development, Mr Desmond Lee.

In FY 2013, PHL continued to provide internship for tertiary institutions as part of efforts to develop local expertise in plant health.

Stakeholder engagement in FY 2013 was sustained through the production and dissemination of the monthly bulletin, "Plant Health Brief", to the horticulture industry and members of the surveillance network to keep them updated on the latest pest detections.

AVA continued to work with our public agency partners, such as the ICA, to raise public awareness on the requirements and restrictions for bringing plants from overseas into Singapore.

AGROTECHNOLOGY



Every Asian seabass bred in AVA's Marine Aquaculture Centre is implanted with a Passive Integrated Transponder (PIT) tag. AVA scientists scan the PIT tag to identify each seabass and track its growth. DNA of these fishes were previously collected for analysis and individuals carrying the desired DNA markers would be selected to produce the next generation of superior Asian seabass.

WE

* THINK * INNOVATIVELY

The creative use of agrotechnology is essential for the optimisation of our limited space. AVA promotes the use of innovative and effective farming methods and shares technological expertise with local companies to help them increase output





AGROTECHNOLOGY

HARNESSING TECHNOLOGY TO OPTIMISE SINGAPORE'S LIMITED RESOURCES

With limited space for farming and the aim to increase local production in key food items, as well as to maintain our competitive edge in the global orchid and ornamental fish markets, AVA harnesses life sciences and technology to optimise land use. Our technological developments are also shared with local farmers and overseas contract partners, to help them increase productivity and yield. In addition to working with farmers, AVA collaborates with institutes and manufacturers to develop innovative and value-added food products.

In 2013, our farms produced 12 percent of the leafy vegetables, eight percent of the fish, and 26 percent of the eggs consumed in Singapore.



FARMLAND MANAGEMENT

AVA developed six Agrotechnology Parks, equipped with modern infrastructure and facilities, to promote agrotechnology in Singapore. Comprising a total land area of about 1,465 hectares, these Parks are located at Lim Chu Kang, Murai, Sungei Tengah, Mandai, Nee Soon, and Loyang.

As at March 2014, about 650 hectares of land in the Agrotechnology Parks were allocated to 220 farms. Another 36 hectares of land outside the Parks were allocated to 23 farms. These included layer farms for egg production, fish farms, vegetable farms, goat and cattle farms, orchid and floriculture farms, and ornamental fish farms. In addition, there were 117 coastal fish farms occupying 102 hectares of sea space on Singapore's coastal waters.

AVA continued to inspect farms regularly to ensure their compliance with regulations and conditions of lease agreement. AVA also worked closely with the National Environment Agency (NEA), the Singapore Land Authority (SLA), and other government agencies to investigate tip-offs on irregularities in AVA-licensed farms. Such irregularities include the presence of illegal structures and unauthorised activities at farm premises.

In FY 2013, AVA performed 10,002 surveillance and inspection visits on animal and plant/vegetable farms to check for irregularities. A total of 48 enforcement actions were taken against farms that were found to be non-compliant.

TECHNOLOGY DEVELOPMENT AND TRANSFER

Research And Development (R&D) is vital to our efforts to increase agricultural productivity, local production, and competitiveness. To improve the quality of our produce and achieve higher yields and value, our R&D projects focus on breeding, nutrition, disease control, aquaculture and vegetable production systems, as well as post-harvest technology.

R&D In Aquaculture

R&D in marine aquaculture is carried out at AVA's Marine Aquaculture Centre (MAC), while freshwater aquaculture R&D is done at the Sembawang Research Station (SRS). AVA also provides technical assistance and services to the aquaculture industry to help them increase productivity.

Located on St John's Island, MAC was established to undertake tropical marine food fish aquaculture technology development. During the year, MAC continued to develop fast-growing and good quality fish fry for intensive farming.



↙ Eggs are extracted from a seabass' ovaries through a plastic tube, which is inserted into its genital pore.

Selective Breeding Project

AVA and Temasek Life Sciences Laboratory (TLL) continued to collaborate on the marker-assisted selective breeding programme using genomic tools to generate superior Asian seabass (*Lates calcarifer*) and saline-tolerant Mozambique tilapia (*Oreochromis mossambicus*).

Spawning of the selected seabass brooders was conducted and the top performing individuals were selected for the development of future generations. Besides faster growth, the team initiated the development of breeding lines for other traits, such as disease-resistance and higher nutritional value of meat content. Through genomic analysis, the team identified the associations between DNA (deoxyribonucleic acid) markers and EFAs (essential fatty-acids) and this information was used to enhance the selection of superior brooders.

AVA also evaluated the growth performance of different batches of saline-tolerant tilapia in full-strength seawater culture conditions. The fast growing individuals were identified and selected for development of future brood stock.

Evaluation of Water Disinfectants

Water is the quintessential culturing medium in aquaculture. Thus, it is important to ensure that the level of bacteria in the water stays within healthy culturing limits because this



↙ Superior tilapia strains are reared and selected for fast growth under seawater conditions at AVA's Marine Aquaculture Centre.

impacts fish survival. The level of bacteria can be controlled using commercially available disinfectants. During the FY, AVA sought to ascertain the types of disinfectants that are suitable for use in aquaculture.

Free Active Chlorine (FAC) and Chlorine Dioxide were assessed for their effectiveness in reducing bacteria load to the desired level. AVA will continue to evaluate other disinfectants that can potentially improve fish health and disease management.

Technical Assistance and Advisory Services for Aquaculture Industry

To facilitate the development of Singapore's food fish and ornamental fish industries, AVA's Aquaculture Services Centre at SRS provides technical advice to stakeholders, viz. investors, farmers, and exporters. In FY 2013, AVA made over 500 site visits to food fish and ornamental fish farms. On-site training sessions were also conducted for the farmers.

In addition, AVA continued to provide advisory services to both food fish and ornamental fish farmers on areas such as good farm practices and fish health management. We work closely with local fish hatcheries to optimise existing methods and assist farms to increase their productivity in both live-feed and fish fry productions.

During the FY, AVA worked closely with local farmers to develop individual productivity improvement plans that will help them meet the annual minimum output of 17 metric tonnes of fish per half-hectare of licensed farm area. Workshops on coastal fish farm management were also organised to equip fish farmers with the necessary skills to improve the growth performance of their fish stocks.



A workshop on coastal fish farm management organised by AVA.

Besides assistance for food fish farmers, AVA also supported the Ornamental Fish Business Cluster (OFBC) in the publication of a newsletter during the FY. The newsletter shares essential knowledge for ornamental fish farms, such as good management of bio-security and on-site diagnostic skills.

R&D In Horticulture

Horticulture R&D is carried out at AVA's SRS, as well as in collaboration with the commercial sector and research institutions.

During the FY, AVA embarked on R&D projects with the aim of helping local farmers increase vegetable yield and quality through the use of technology. These projects cover mechanisation, a multi-tier seedling production system, identification of varieties that are tolerant to low-intensity light, indoor farming systems, as well as electronic application to measure growth of vegetables and identify pests.

Multi-Tier Seedling Production System

AVA developed a prototype of an indoor multi-tier seedling production system that works using artificial lighting and less water. The prototype has the potential to increase seedling production by at least four times per unit area and reduce water usage by 90 percent. The age of seedlings ready for transplantation could also be lowered by 30 percent as compared to conventional seedling production. Low-cost fluorescent tubes that last up to four years were used as an economical option. We demonstrated the system to four local companies in February and March 2014.



Mechanical Vegetable Seedling Transplanter

Transplanting is one of the more laborious processes in vegetable farming. AVA has been collaborating with the Nanyang Technological University (NTU)'s School of Mechanical & Aerospace Engineering (MAE) to develop a prototype of a mechanical vegetable seedling transplanter. MAE recommended a prototype design that can potentially reduce man-hours by more than five folds, and operate well in the generally limited land space of local farms.

The prototype was being developed in close consultation with AVA and local farmers, with expected completion by June 2014. A few farmers have indicated interest to purchase the transplanter when it is commercialised.

Exposure of Leafy Vegetables to Low-Intensity Light

Leafy vegetables generally require at least six hours of exposure to sunlight for vigorous growth. However, such light exposure may not be available in some areas in Singapore, where sunlight could be blocked off by tall buildings or structures.

AVA conducted trials to identify common leafy vegetable varieties that have higher tolerance when exposed to low-intensity light. New varieties of *cai xin*, lettuce, bayam, *gai lan*,

and *xiao bai cai* were evaluated under simulated conditions of low-intensity light. Only the *xiao bai cai* variety was able to grow relatively well under 60 percent shading, with a reduction of 28 percent in yield. The other types of vegetables were unable to thrive, with yield reductions ranging from 45 to 60 percent. The identified *xiao bai cai* variety was introduced to a local farm for similar tests under a vertical production system.

Indoor Vegetable Farming

Indoor vegetable farming enables consistent year-round production regardless of weather conditions. It is recognised as a potential solution to food security in the face of climate change.

AVA studied the effect of artificial lightings – LED and fluorescent – on *xiao bai cai*. Vegetables grown under 18 hours of artificial lighting had significantly higher plant weights of about 30 percent as compared to plants grown in greenhouse (control). In addition, *xiao bai cai* plants grown under warm white fluorescent light, a cheaper alternative to LED, produced up to 1.7 times more weight and resulted in increased plant length as compared to plants grown under other treatments.

We also tested different methods of cultivating *xiao bai cai* in conjunction with exposure to artificial lightings. Under warm fluorescent lighting, yields were the highest when the Nutrient Film technique was used, as compared to using soil-cocopeat or compost substrates.

Mobile Application for Rapid Measurement of Vegetables and Identification of Pests

AVA collaborated with the Centre of Social Media Innovations for Communities (COSMIC) in National University of Singapore (NUS) to develop and deploy mobile applications that can easily and efficiently measure the growth performance of vegetables.

Previously, data that determine plant growth, such as plant length, leaf length and leaf width, had to be manually measured. The mobile applications will allow these vegetative parameters to be automatically generated by uploading a photograph of the plant. This new method reduces the time required to assess the growth progress of vegetables during experimental trials, and in turn helps to boost productivity.

In addition, the application under development involves building of a database to help farmers to better manage plant pests. AVA has provided photos of identified pests for the system. Field trips were organised, where more photographs of pests were taken and updated into the application. The application was also put to test on-site during the field trip, where pests found were identified using the application. NUS-COSMIC is working on further refining the project and application.

Technical Assistance and Advisory Services to Horticulture Industry

Besides R&D, AVA also provides industry services to the horticulture sector. The Horticulture Services Centre provides services on orchid tissue culture and seed pod germination. Consultancy services, field evaluation and training are provided to both the orchid and vegetable industries.

The seed pod culture service continues to be popular amongst growers, hobbyists, and schools, as it allows the breeding and selection of unique hybrids. In FY 2013, AVA received a total of 781 orders (comprising 45 different orchid genera) for seed pod germination and 6,000 tissue culture plantlets for various commercial growers.



Seed pod culture service

Agri-Technology Sourcing Trip to Israel

AVA's CEO led a delegation to Israel for an agri-technology sourcing trip from 9 to 14 June 2013. Representatives from AVA, local farms, and TLL visited local government agencies, universities, research institutes, farms, and the Fresh AgroMashov exhibition.

Several relevant Israeli technologies have been identified for potential adoption by local farmers. They include the integrated intensive fish production system; hydroponic farming of leafy vegetables; seed technology for vegetable farming; breeding technique for improved leafy vegetable farming; and integrated environment-controlled poultry layer housing system.



Chicken feed is delivered through pipes into Israel's integrated environment-controlled poultry layer house, and the vehicles need not enter the compound.



Minister for National Development, Mr Khaw Boon Wan, harvesting a newly introduced variety of radish at a community garden.

Technical Seminar

AVA organised a seminar to share potential technologies and vegetable varieties that could help to improve farm productivity. Findings from our research on water-saving irrigation systems, new varieties of *xiao bai cai* and *gai lan*, supplementary lighting, forced ventilated and solar-powered greenhouse, as well as vertical farming systems, were covered during the seminar.

Many participants expressed interest in the technologies presented. Subsequently, AVA organised a visit to Sky Greens Pte Ltd on 18 March 2014, where 21 participants learned more about the vertical farming technology.

Indoor Vegetable Farms

AVA facilitated the set up of indoor vegetable farms for two companies. These indoor farms adapted Japanese technologies to grow vegetables in multitier systems using artificial lighting in an environment where temperature and humidity are regulated. The farms were licensed by AVA in early 2014 to produce vegetables for sale. AVA will continue to work with other companies interested to set up similar indoor farms.

Facilitating Protection of Plant Varieties

AVA, as a technical examination authority for Plant Variety Protection, worked with TLL to develop the necessary technical test guidelines to evaluate new *Jatropha* varieties. As at March 2014, two applications to protect *Jatropha* varieties were received.

AVA also led the development of regional technical meetings on developing test guidelines to evaluate new orchid

varieties. With the consensus of participating countries such as Japan, Malaysia, and Thailand, the test guidelines for the orchid genus, *Mokara*, was completed in 2013 and would be proposed for international adoption at the International Union of Plant Variety Protection.

Enhancing Vegetable Production in Community Gardens

During the FY, AVA continued its collaboration with National Parks Board (NParks) to train Community-in-Bloom (CIB) gardeners to grow a wider variety of vegetables and develop a pool of skilled vegetable growers.

In addition, a new programme was initiated to further reach out to and engage with community gardeners in Sembawang GRC. With the assistance of People's Association, Residents' Committees, and Town Councils, as well as with the support of NParks, five model gardens were selected as demonstration gardens, where AVA conducted weekly lessons on vegetable growing. Gardeners from surrounding gardens also attended. As a result, the model community gardens are now able to grow a wider variety of good quality vegetables. Some of the participants also went on to develop community vegetable gardens in their own neighbourhoods.

AVA also reached out to pre-school children in a pilot "Kinder-Garden" vegetable playground project. Working with the People's Action Party Community Foundation, a "Kinder-Garden" project was piloted in February 2014 to teach kindergarten children the basics of vegetable growing, such as soil preparation, seed sowing, fertilising, and watering. The lessons were well received and the project would end in August 2014.

R&D In Post-harvest

Reduction of food waste is one strategy AVA adopts to ensure a steady supply of safe food at an affordable price for Singapore. This approach helps stakeholders in the food supply chain to maintain cost-effectiveness, enhance competitiveness, and maximise resources in a sustainable manner.

To promote an innovative, integrated, and sustainable food supply chain, AVA's Post-Harvest Technology Centre (PHTC) embraces technological innovations to reduce, recycle, utilise, and recover food waste. Through collaborative applied research and extension services, PHTC focuses on improving the efficiency of the food supply chain; reducing food waste in farm and post-harvest processes; and developing value-added products.

In FY 2013, AVA conducted scientific research with renowned research institutes and key industry stakeholders to develop innovative products, improve product quality and shelf life, minimise food loss and waste, optimise productivity, and introduce best practices to the food industry.

Okara as Food Product and Alternative Animal Feed

By-products generated during the food manufacturing process contain high levels of nutrition but are usually discarded. One of these by-products that AVA continues to research on is okara – a by-product of soy milk manufacturing. A two-year research project, which sought to convert okara into processed food, completed with the successful transference of technology to a local private company, Cecilia Minced & Dried Pork Food Trading. AVA also provided an on-site training to optimise the okara floss manufacturing process. Okara floss was commercially launched in November 2013.

AVA also explored the use of okara as an effective animal feed in collaboration with Wageningen University (WUR), Netherlands and NTU to research on the bio-fermentation of okara into a valuable ingredient for poultry feed. Preliminary results showed potential for increased availability of free amino acids, as well as improved digestibility and absorption of protein.

To help add value to and improve the quality of poultry feed, further research will be carried out in the next two years by AVA and NTU. The research will look into optimising the bio-fermentation process.



Okara Floss is made from the by-product of soy milk manufacturing.

Okara and Fish Trimmings as Alternate Feed for Food Fish

Besides poultry feed, okara and fish trimmings can also be used in combination as materials for fish feed. AVA embarked on a project to develop an optimal processing protocol for the production of cost effective and nutritional fish feed from fish trimmings and okara, in collaboration with Ngee Ann Polytechnic (NP)'s Environmental and Water Technology Centre of Innovation (EWTCOI) and the aquaculture industry. The formulation was jointly developed in AVA's processing facility on a pilot scale.

The effectiveness of the feed formulation was evaluated through trials conducted at three participating farms over nine weeks. By the end of the project, a fish feed was successfully developed for economic production and as an alternative to commercial options. One participating farmer continued to test this fish feed on farm.



Development of an optimal processing protocol for the production of fish feed using fish trimmings.

Separately, AVA also collaborated with an industry stakeholder on a research project to develop a type of semi-moist fish feed that is partially derived from fish trimmings. This semi-moist formulation is an alternative to existing dry pellet fish feeds that are available on the market. The aim of the project is to improve the quality of aquaculture feed for marine food fishes, which in turn can increase fish survival rates and farm productivity, as well as lower production costs.

Results showed that fish fed with the formulated semi-moist fish feed gained weights comparable to those fed with commercial dry pellet feed. In the next phase of the project in the coming FY, the team will look into ways to further optimise the formulation into serving sizes. This will be done using the encasing technique, whereby the semi-moist feed is fitted into small edible cases to minimise loss of nutrients. A seminar will be conducted in FY 2014 to share the findings of this research with the industry.

Other Food Waste

Other food by-products from beverage processing industries and fruit waste are also potential materials for recycling. AVA engaged Massey University, New Zealand (Singapore Campus) for two research projects from April to August 2013 to evaluate the functional properties of brewery spent grains. The recovery of functional ingredients from durian husks using ultrasonication technology was also investigated. Results showed that there is potential for these by-products to be converted into food ingredients and biodegradable packaging. Moving forward, AVA will engage the industry in test-bedding these recycling concepts.

Modified Atmosphere Packaging for Chilled Fillets' Shelf Life Extension

Since 2012, AVA has been collaborating with Institute of Technical Education (ITE) College East to investigate the effects of Modified Atmosphere Packaging (MAP) in maintaining the quality of threadfin fillets, a popular type of fish in Singapore. Laboratory trials were conducted in FY 2013 to determine the optimum gas composition for MAP of threadfin fillets, and positive shelf life extension was achieved, as compared to the industry's commonly used ambient plastic bags. The project will continue in the next FY to explore different packaging materials for MAP and to carry out a commercial trial at the industry collaborator's site.



Quality assessment of chilled fish fillets that are packed using the modified atmosphere packaging technique.

Energy-efficient Drying System for Food By-products

To help local food processors to recycle the by-products generated, AVA is collaborating with a research institution to develop a system that can dry by-products for longer term storage in an energy-efficient manner. AVA encourages the industry to adopt this drying concept to stabilise food by-products and explore ways for these products to be returned to the food chain.

Brochure on Processing and Quality Grading of Fresh-cut Fruits

Fresh fruits, which are commonly processed and sold as fresh-cut fruits, are vulnerable to quality deterioration and spoilage. To help the industry reduce losses arising from the short shelf-life, AVA developed a brochure containing useful technical information on the processing and quality grading of fresh-cut fruits. The brochure will be launched in the second half of 2014.

Preservation Technology for Ready-to-eat Hard-boiled Eggs

In March 2013, AVA initiated a research study to optimise processing conditions that would extend the shelf-life of ready-to-eat hard-boiled eggs. A short shelf-life presents considerable challenges for supply chain management, calling for the need for speedy transportation and distribution, which leads to higher costs. This, coupled with the short length of time for storage, limits the uses and marketability of the product. With a longer shelf-life, these challenges would be eased, and ready-to-eat hard-boiled eggs can be made available to a wider range of end-users in the market. Results from the study will be shared with the industry upon the completion of trials in 2014.

Eco-Friendly Sanitizer for Fresh Sprouts

AVA collaborated with NUS to source for alternative sanitizers that are more effective and environmentally friendly than the conventional chlorine-based sanitizer to be used on fresh sprouts. Upon reaction with organic matter, chlorine may bring about adverse health effects.

The research demonstrated that hot water treatment serves as a potential decontamination method to replace chemical-based sanitizers in minimising the risk of food-borne illness and maintaining better microbiological quality during storage. Hot water treatment reduces twice as much the microbial count of *Escherichia coli*, O157:H7, *Listeria monocytogenes*, *Salmonella* spp. and natural microflora, as compared to the other sanitizers. The scope of this study was further expanded to other fresh produce, such as ready-to-eat turnips, until April 2014.

Light-Emitting Diode for Food Preservation

To develop a less invasive food preservation technique, AVA and NUS embarked on a research collaboration to investigate the effects of light-emitting diode (LED) light treatment on the quality and nutritional values of fresh vegetables. This three-year research project started in May 2012 and is funded by the Agency for Science Technology and Research's (A*STAR) Nutrition and Food Science grant.

In FY 2013, an LED irradiation prototype was commissioned and trials on the effects of LED on the nutritional parameters such as phyto-nutrients (e.g. beta carotene and chlorophylls) of leafy vegetables commenced. More trials will be conducted to verify and validate the effects of LED light on nutrients in harvested leafy vegetables under different intensities of irradiation and storage temperatures.

Nano-technology Application In Food Packaging

Since FY 2012, AVA has been collaborating with A*STAR's Institute of Materials Research and Engineering (IMRE) and one of its consortium members, Piaget Chemicals Manufacturing Pte Ltd, on the development of enhanced food packaging using polymer nano-composites. In FY 2013, IMRE completed the research work in developing the platform technology of nano-composite packaging that possesses barrier properties against oxygen, moisture and UV, which can help to improve the shelf life of food products and reduce food waste due to spoilage. AVA will be testing the efficacy of the nano-composite prototypes for shelf-life extension of meat products in the coming FY.

Stick-On Sensor for Fruit Ripeness

In FY 2012, AVA worked with NP's EWTCOI and a retailer to develop a non-invasive and cost-effective membrane sensor from nano-fibres to easily determine fruit ripeness. The sensor prototype was developed in FY 2013 and underwent laboratory application trials to establish a colour scale that correlates to fruit ripeness indicators. We aim to have the fresh produce industry test-bed the sensor and better monitor fruit ripeness so that timely and well-informed decisions could be made on delivery schedules, thus reducing post-harvest losses.

Optimisation of Vacuum-cooling Process

In conventional practice, farmers vacuum-cool vegetables in bulk before packing them for retail. In a laboratory research project conducted with Massey University in FY 2012, AVA found that the quality of a leafy vegetable (*xiao bai cai*) was better when the process was reversed – first packed then cooled.

In FY 2013, AVA further tested this on other types of leafy vegetables in a commercial farm and found no significant difference in the shelf-life of vegetables from these two processing protocols. This method, where leafy vegetables can be individually packed prior to vacuum cooling, proved to be an effective alternative for local farmers.

Optimal Processing Protocols for Ready-to-eat Vegetables

The supply of minimally processed ready-to-eat (RTE) fresh produce to food service establishments has been increasing. Based on the interest gathered from industry participants at the workshop “Minimally Processed Ready-to-Eat (RTE) and Ready-to-Cook (RTC) Fresh Produce” held at PHTC from 24 to 26 April 2013, AVA embarked on a research project to develop the processing protocols for RTE bell pepper and cucumber. The project seeks to establish the optimum sanitation and packaging conditions for quality products with an enhanced shelf-life, and is targeted for completion in FY 2014.

Eco-friendly Processing Protocol for Surimi-based Products

Traditional production methods of local surimi processing plants use large amounts of water at the gel-setting and cooking stages. In FY 2013, AVA and ITE College East collaborated to develop a modified processing protocol for local surimi processing plants, with the aim to reduce the loss of nutrients or ingredients and minimise water usage. The modified process design was developed and would be evaluated in FY 2014 based on consumers' perception of product quality and industry's receptiveness.



An AVA scientist (left) engages a stakeholder from a surimi-based product company to understand more about the gaps in its processing technology.



With assistance from AVA, an ITE student explores the possibility of reducing water usage in the processing of fish balls.

Good Handling Practices for Live, Chilled, and Frozen Seafood

In FY 2013, AVA initiated research surveys to analyse the gaps in technological and handling practices of the local fish supply chain, starting from fishery ports to supermarkets. Experimental trials were conducted to determine the optimum processing (pre-cooling, icing, glazing, thawing) and storage practices for live, chilled, and frozen forms of seafood.

Results from these trials will be translated into a Good Handling Practices (GHP) handbook containing recommendations on seafood quality indicators and on the advanced technologies and practices for adoption.



AVA officers conduct trials on chilled fish to develop a Quality Index for the seafood industry.

Good Manufacturing and Hygiene Practices for Sushi and Sashimi

As part of an initiative to promote self-regulation in food quality assurance along the food supply chain, AVA collaborated with NEA to develop a reference guide for Good Manufacturing and Hygiene Practices for Sushi and Sashimi. The guide covers the point of manufacturing (central kitchen) to the retail stage. Sampling of the products has been conducted at participating sushi and sashimi manufacturing and retail premises since March 2014.

Technical Assistance and Advisory Services for Post-harvest Industry

To upgrade the agri-food industry's competence in post-harvest processing, AVA provides extension services to key supply chain stakeholders, such as farmers, processors, traders, and retailers. These services include consultancy and training in the areas of product development, post-harvest handling techniques, cold chain management, food quality assessment and preservation, and food safety assurance/management. In addition, tests on the quality of surimi and audits on quality assurance systems are conducted.

Vegetable Industry

SS 585: 2013 - Singapore Standard for Cold Chain Management of Vegetables

AVA, together with SPRING and the food industry, jointly developed a new Singapore Standard (SS) for the cold chain management of vegetables. Named SS 585: 2013 and launched on 27 September 2013, the new standard was a revision of the previous technical reference (TR) for cold chain management of vegetables (TR 24: 2007). Guidelines on the processes of harvesting, pre-cooling, processing, storing, distribution, and retailing were also included. Growers, importers, logistics providers, retailers, and seaport/airport ground handling parties were recommended to adopt this standard, which was approved by the Singapore Standards Council.

Quality Assurance of Ready-to-eat and Ready-to-cook Fresh Produce

AVA organised a three-day training course on minimally processed ready-to-eat (RTE) and ready-to-cook (RTC) fresh produce from 24 to 26 April 2013. Dr Yoon Ki Sun, from Hyung Kee University, Korea, was invited to share his expertise on the topic. The course consisted of a one-day visit to Oh Chin Huat Hydroponics Farm's fresh-cut facility and Sheng Siong Group's distribution centre, as well as a two-day workshop. During the workshop, AVA shared the outcomes of our research on good processing protocol and shelf-life extension techniques for RTE and RTC produce.

A handbook on the processing of fresh-cut iceberg lettuce and two brochures on RTC cut leafy and non-leafy vegetables were shared with the industry. To keep the industry abreast of the latest trends in vegetable processing, AVA also invited five local suppliers to showcase the sanitizers and food processing machineries used in industrial applications.

Controlled Atmosphere (CA) and Modified Atmosphere (MA) Packaging

Packaging, under appropriate treatment conditions, has shown to extend the shelf-life of fresh produce. By coupling CA storage and MA packaging with good refrigeration systems, long distance transportation and long term storage may potentially be achieved to meet consumers' expectation for readily available fruits and vegetables throughout the year. In an expert engagement programme held from 22 to 24 October 2013, AVA engaged Dr Andrew East, a New Zealand expert from Massey University, to conduct a seminar and equip fresh produce stakeholders with the essential knowledge of MA application in storage and distribution, packaging, as well as food safety and consumer perceptions of CA and MA. Visits were also made to the premises of fresh produce importers, distribution centres, retail areas, and a rice warehouse, where the expert could better understand the challenges faced by our industry stakeholders and provide on-site advice on the application of the CA and MA technologies.

Post-harvest Technology and Cold Chain Management Training for Sheng Siong Group

AVA, through its subsidiary, Agrifood Technologies Pte Ltd (ATP), provided a one-day customised training for key personnel handling fresh produce from the Sheng Siong Group. Two sessions were conducted, each in English and Mandarin, on topics such as post-harvest technology and effective cold chain management of vegetables.



A training session on post-harvest technology and management of vegetables, organised by AVA for Sheng Siong Group.

Audit Services

In FY 2013, AVA continued to provide audit services through ATP, to verify the integrity of the organic vegetable supply chain from farms to NTUC FairPrice retail stores. Eu Yan Sang International also received our services to verify its compliance with the Good Agronomic Practices for Herbs (EYSGAP-Herbs).

Fish Industry

Testing on Gel Strength and Whiteness of Surimi

AVA provided testing services on gel strength and whiteness of Surimi to fishball and fishcake manufacturers. Two surimi samples were received from one company during the FY.

Post-harvest Handling Practices and Technologies for Fish and Seafood

On 25-28 March 2014, AVA engaged two Australian experts – Dr Janet Rosalind Howieson from Curtin University, and Dr Tom Madigan from South Australian Research and Development Institute (SARDI) – to share institutional knowledge and industrial experience in post-harvest handling of fish and seafood. During visits to a fish farm, seafood processing plants, a cold store, and a supermarket, these experts provided on-site technical advice on supply chain monitoring, cold chain management, safety control, preservation methods, and packaging technology.

Meat Industry

Advanced Course on Cured and Smoked Meat

AVA, through ATP, supported a training course on Advanced Cured And Smoked Meat, organised by the Food Innovation and Resource Centre (FIRC) on 10 December 2013. Professor Lynn Knipe, a meat processing expert from Ohio State University conducted the course, with a practical module



Minister for National Development, Mr Khaw Boon Wan launches "My Little Kampong" together with Senior Minister of State for Trade and Industry & National Development, Mr Lee Yi Shyan and AVA CEO.

on the operation of smokehouse facility held at AVA's PHTC. Participants from Southeast Asia, including Singapore, attended the course.

MANPOWER DEVELOPMENT

Farmers in Singapore are challenged by the shortage of local and foreign labour from traditional sources. This challenge is further exacerbated by the tightened policies for foreign labour. In consultation with the industry and key stakeholders, AVA is partnering the Ministry of Manpower (MOM) to address labour challenges.

Skills Evaluation Test for Agri-technology Sector

AVA and ITE developed a series of Skills Evaluation Tests (SETs) to upgrade the farming proficiency of foreign workers, and for AVA to assess farm workers and accord certification to those who pass the tests. Foreign workers who pass the SETs could be considered for an extension of employment period. A total of 429 foreign workers who sat and passed the SETs were granted Skilled Status effective 1 October 2013.

COMMUNITY OUTREACH

Besides working with the industry on technology development and transfer, AVA also reaches out to the public through international and community events, as well as learning journeys to showcase our efforts in harnessing technology to optimise Singapore's resources.

Urban Sustainability R&D Congress 2013

On 27-28 June 2013, AVA participated in the Exhibition of Urban Sustainability R&D Congress 2013, to the theme of "Creating a Future-Ready City: Liveable, Sustainable and Resource-Resilient". Through the okara floss, a processed food derived from a soy-milk by product, AVA showcased its extensive research efforts and strong partnership with research institutes and industry partners in minimising food waste from farm to fork, thereby contributing to food supply resilience in Singapore. Nano-clay Composite Packaging materials, which have the potential to extend shelf-life, were also exhibited.

Assistance on Vegetable Growing for MND Community Rooftop Garden

AVA conducted a course on vegetable growing on 11 October 2013 for the volunteers from the Ministry of National Development (MND). The vertical planting of vegetables in veggie pipes and mini-gardens was also demonstrated at MND's community rooftop garden. The garden, "My Little Kampong", was launched by Minister Khaw Boon Wan on 28 January 2014.

Learning Journeys

AVA hosts students and teachers on learning journeys to the MAC and our agrotechnology parks. In the FY, we hosted five learning journeys for 129 students and adults to the MAC, and another seven learning journeys for 495 students to agrotechnology parks.

AGRI-TRADE



All orchids entering Singapore must be accompanied by a permit from the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). An AVA inspector checks that the CITES permits are in order, inspects the plant for any pests, and if necessary, collects a sample for further laboratory tests. AVA also facilitates exports of orchids by issuing phytosanitary certificates to certify plant health requirements of the importing country have been met.

WE

★ THINK ★ GLOBALLY

A global outlook keeps us plugged into agri-trade developments worldwide. By forging international partnerships, we support the smooth movement of agri-food products in and out of Singapore.





AGRI-TRADE

FACILITATING AGRI-TRADE FOR FOOD, PLANTS AND ORNAMENTAL FISHES

As Singapore's representative on agricultural, fisheries, and veterinary matters, AVA continues to facilitate free trade and maintain close ties with the global community in a spirit of exchange and cooperation. Besides facilitating trade, AVA also regulates the import and export of endangered species.

FACILITATING IMPORTS

Jurong and Senoko Fishery Ports

AVA manages the Jurong and Senoko Fishery Ports that serve as wholesale and distribution centres for fresh and chilled seafood. The top five fish exporting countries to Singapore for FY 2013 were Indonesia, Malaysia, Thailand, India, and Vietnam.

Foreign fishing vessels arriving in Singapore berth at the Jurong Fishery Port (JFP), which serves as a port of call for international fishing vessels and as a seafood distribution hub. In FY 2013, a total of 3,035 vessel calls were made at JFP. The 99 AVA-licensed fish merchants at JFP handled about 54,800 tonnes of fish landed by fishing vessels, as well as imports via land and air. Of these, 2,001 tonnes were tuna imports meant for re-export.

Senoko Fishery Port (SFP) is the hub for local fishing vessels. During FY 2013, a total of 2,289 vessel calls were made at SFP, while 25 AVA-licensed fish merchants handled about 7,300 tonnes of fish from local fishing trawlers, sea-based and land-based fish farms, as well as from imports.

FACILITATING EXPORTS

AVA facilitates the export of food, plants, and their products, as well as ornamental fishes, animals, and animal products, by issuing internationally recognised certificates, and permits. In addition, we help further upgrade the export capabilities of our industries by engaging them in collaborations and dialogues.

Food Products

AVA facilitates the export of meat, fish, as well as dairy and processed food products by providing export inspection and certification services to the food industry. In FY 2013, AVA issued 14,940 Export Health Certificates and Free Sale Certificates to local exporters. AVA will also continue to work with stakeholders and overseas counterparts to facilitate the export and transhipment of food products through Singapore to overseas.



To facilitate food export, an AVA officer conducts export inspection and sampling to ensure requirements of the destination country are met.

Ornamental Fish

In FY 2013, Singapore exported approximately \$69.7 million worth of ornamental fishes to over 80 countries. The major countries included the EU member states, the US, Japan, and Canada.

AVA regulates and facilitates the ornamental fish trade by issuing import and export permits, as well as health certificates for all live fish exports. In FY 2013, our certificates continued to be accepted internationally, with a total of 8,339 health certificates issued to accompany live fish consignments exported from Singapore to various parts of the world. AVA continues to work with our trading partners to ensure that their export certification requirements are met.



Ornamental fishes are among Singapore's main agricultural exports.

Phasing out of Accredited Ornamental Fish Exporter Scheme

AVA phased out the Accredited Ornamental Fish Exporter Scheme (AOFES) with effect from 1 October 2013, and replaced it with the AVA Quality Assurance Scheme (AQUAS).

It is necessary to have a quality assurance programme that offers flexibility for exporters and regulatory agencies to react promptly to ever-changing health requirements imposed by importing countries. Under AQUAS, members can jointly develop and implement AVA's approved standard operating protocols, which cover management responsibilities and policies, bio-security measures undertaken against disease incursion and spread, in-house disease monitoring programme, quality management, allocation of staff responsibilities, and record keeping. This is in addition to existing control systems administered by AVA.

Furthermore, exporters can enjoy cost savings under AQUAS. AVA conducts audit inspections on the premises of ornamental fish exporters to verify that the procedures adopted are in accordance to the AVA-approved quality assurance manuals drafted by respective exporters. Under AQUAS, audit fees are charged hourly and based on the number of audit inspections conducted. Highly compliant exporters would require fewer audit inspections by AVA. Conversely, under the previous AOFES, exporters paid a flat fee regardless of the number of audit inspections required. As such, AQUAS further encourages exporters to maintain good standards with financial incentives.

Animals and Animal Products

AVA is the national authority responsible for issuing certificates and permits that meet importing countries' requirements. These documents help to facilitate the export of live animals, animal feed, and animal products. In FY 2013, a total of 4,213 Veterinary Health Certificates, 2,660 export permits, and 1,105 Certificates for Freedom from Disease were issued. A total of 445 Free Sale Certificates were also issued to facilitate the export of animal feed, animal products and vaccines.

AVA worked with the Department of Veterinary Services (DVS), Malaysia, on the necessary export health certification and import requirements for local poultry layer farms to export their spent hens to Malaysia. Approval was obtained on 28 January 2014.

Plant and Plant Products

AVA is the national authority for the phytosanitary certification of plants and plant products for export. We facilitate the export of plant products by ensuring that the plant health requirements of importing countries are met. Singapore is a signatory to the International Plant Protection Convention (IPPC) and we abide by the international standards set by IPPC and align our procedures with those standards.

In FY 2013, AVA facilitated about \$887 million worth of agri-trade through the issuance of 13,919 phytosanitary certificates. Our phytosanitary certificates were recognised by 124 countries and the top export destinations were Indonesia, Japan, Australia, China, Malaysia, the UK, Germany, East Timor, India, and Brunei Darussalam.

We also successfully assisted in the export of two consignments of oil palm seeds to Bolivia.

AVA participated in the GreenUrbanScape Asia 2013, and showcased AVA's efforts in facilitating agri-trade. The event was a platform for visitors to learn the best practices and discuss the latest industry trends.

Assurance Certification Scheme

In FY 2013, a total of 10 companies were accredited under AVA's Assurance Certification Scheme (ACS), of which, four were for aquatic plants, four for cut flowers and cut foliages, one for tobacco, and one for cocoa products. AVA conducts compliance audits on ACS-accredited exporters to ensure that standards were upheld for the export of aquarium plants, cut flowers, foliages, and plants that require phytosanitary certification.



AVA's phytosanitary certificates are recognised in more than 100 countries.

Treatment Provider Scheme

On 1 May 2012, AVA implemented the Treatment Provider Scheme (TPS) in replacement of Accredited Pest Control Agency Scheme (APCA). TPS is a revised scheme to provide standard operational procedures for treatment providers who perform methyl bromide fumigation and heat treatment operation on plant and plants products.

During FY 2013, a total of 49 treatment providers performing heat treatment or methyl bromide fumigation joined the scheme.

Following a trial test that Singapore participated in, the Australian Department of Agriculture, Fisheries, and Forestry revised the Australian Fumigation Standard (AFAS) in July 2013. With this revision our treatment providers will be able to comply with the treatment requirements of importing countries that adopt AFAS standards.

ENGAGING STAKEHOLDERS

AVA works closely with our stakeholders to facilitate agri-trade. We engage and collaborate with our industries through Business Cluster activities and dialogue sessions.

Ornamental Fish Business Cluster

Initiated by AVA in 2003, the Ornamental Fish Business Cluster (OFBC) has been instrumental in addressing the challenges and charting new directions for the industry, as well as in raising the international profile of Singapore's ornamental fish industry. With key representation from industry associations, exporters, breeders and associated companies, the OFBC will continue to reinforce Singapore's position as an ornamental fish hub.

AVA also engaged industry players outside of the OFBC. Three dialogue sessions with the Singapore Aquarium Fishes Exporters' Association (SAFEA) and licensed ornamental fish traders were conducted separately between June and November 2013 to keep the industry abreast of industry developments and regulatory changes, such as the phasing out of AOFES.

Aquarama 2013

Aquarama, a biennial international event for ornamental fish industry and hobbyists, was held from 29 May to 2 June 2013 at Marina Bay Sands Singapore. AVA facilitated the import and export of ornamental fishes for exhibition at the event and worked closely with the organiser to ensure these imports comply with AVA's requirements.

Guest-of-Honour, Minister of State (MOS) for National Development & Defence, Dr Mohamad Maliki Bin Osman, officiated the opening of the event and called on the industry to strive for continued quality improvement and investment in innovation and productivity to sustain growth in the ornamental fish trade. AVA's efforts in ensuring the competitiveness of Singapore's ornamental fish industry were showcased at AVA's booth at Aquarama.

Orchid Business Cluster

The Orchid Business Cluster (OBC) was established in May 2003 to bring together the resources of Singapore's exporters and growers, in order to strengthen Singapore's position as a world-renowned exporter of tropical orchids. It also aims to move the industry forward in today's fast changing business climate. The Cluster comprises representatives from various key floriculture associations and growers, as well as representatives from government agencies such as International Enterprise (IE) Singapore, NParks, and AVA.

The OBC began its new two-year term in January 2014, with updated Terms of Reference that had been revised to re-position the orchid industry for continued growth both globally and domestically. Mr Too Peng San, President Singapore Flower Exporters Association, was appointed as the Chairman of OBC for his third term.

The OBC holds fruitful dialogues, and participates in overseas visits to seek trade opportunities and increase international exposure. During the FY, the OBC members attended study visits to Brunei Darussalam and Vietnam, which were organised by IE Singapore and facilitated by AVA. In addition, the Intellectual Property Office of Singapore was invited to give a briefing on Plant Variety Protection (PVP) and increase industry awareness of PVP's relevance to orchid breeders.

TRADE IN ENDANGERED SPECIES

AVA is the national authority for the implementation and enforcement of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which aims to prevent over-exploitation of endangered animals and plants.

In FY 2013, AVA issued a total of 16,377 CITES permits and certificates to regulate wildlife trade, which comprised mainly of reptile skins and reptile manufactured products, Asian arowanas, pet birds, and agarwood. AVA also facilitated the commercial re-export of wildlife not categorised under CITES, through the issuance of 742 'B' certificates/statements.

During the FY, AVA investigated a total of 34 cases, which included illegal trade of wildlife, possession and sale of illegal wildlife, and wildlife poaching. Of these cases, six were prosecuted in court, 13 cases were issued with composition fines between \$100 and \$3,000, and 11 cases were issued with warnings or advisories.

In May 2013, the Immigration and Checkpoints Authority of Singapore detected two bags containing 31 pieces of live seahorses, 22 pieces of giant clams and 78 pieces of live hard corals in a vessel at sea port in Singapore. The shipment was not accompanied by CITES permits. An Indonesian seaman was arrested and jailed four months for the illegal import.

In June 2013, AVA officers acted on a tip-off involving a residence that housed illegal wildlife. A total of 32 animals were seized from the premises, including a Sunda slow loris, a marmoset, as well as several other reptiles, amphibians, and small mammals. The owner was prosecuted in court and fined \$41,000 for possessing illegally imported wildlife.

In January 2014, aviation screening officers detected and referred two cases of smuggled rhinoceros horns and elephant ivories to AVA. The travellers were in transit via Singapore en route to Vietnam. One traveller had eight pieces of rhinoceros horns in his luggage, while two other travellers were found smuggling 14 pieces of elephant ivory tusks, 16 pieces of ivory bangles, and 109 pieces of ivory cubes. All three travellers were arrested and jailed between 15 and 16 months for attempting to smuggle the rhinoceros horns and elephant ivory products in transit.



Smuggled rhinoceros horns that have been intercepted by AVA in January 2014. (Photo credit: Wildlife Reserves Singapore)

INTERNATIONAL RELATIONS

Bilateral Meetings

AVA hosted the 8th meeting of the Indonesia-Singapore Agri-business Working Group (AWG) on 22 November 2013 in Singapore. The AWG reviewed the action plans to further increase export of agri-products from Indonesia to Singapore. Business partnerships between Indonesia exporters and Singapore importers were also strengthened.

ASEAN & International Collaboration

In FY 2013, AVA continued to participate actively in ASEAN meetings and projects, as well as other international forums. AVA attended the following high level international meetings to discuss cooperation in areas such as food security, food safety, fisheries, livestock, crops, as well as sanitary and phytosanitary measures. We also hosted a series of study visits and trainings under the Ministry of Foreign Affairs' Technical Cooperation Programmes.

35th Meeting of the ASEAN Ministers' Meeting on Agriculture and Forestry (AMAF) and 13th Meeting of the AMAF+3

Dr Mohamad Maliki Bin Osman, Minister of State for National Development & Defence, together with AVA's Chief Executive Officer (CEO) Ms Tan Poh Hong, led a five-member delegation to attend the 35th Meeting of the AMAF and the 13th Meeting of the AMAF+3 held on 26-27 September 2013 in Kuala Lumpur, Malaysia.

The Meetings reaffirmed the good cooperation among ASEAN Member States in food, agriculture, and forestry. AMAF

leaders agreed to the development of the vision, objectives, and goals of ASEAN Cooperation in Food, Agriculture, and Forestry towards 2020, as well as the second phase of the ASEAN Integrated Food Security (AIFS) Framework and Strategic Plan of Action on Food Security (SPA-FS).

There were significant developments at the Meetings, in particular, the signing of the ASEAN-China Memorandum of Understanding (MOU) on Food and Agriculture Cooperation. The finalisation of the MOU would strengthen cooperation between ASEAN and China on capacity building, research and development (R&D), and technology transfer.

Matters concerning intra-ASEAN phytosanitary guidelines, harmonised maximum residue limits for pesticides, standards for horticultural produce and other food crops, regional strategies for epidemiology and laboratory capacity building, as well as guidelines for the use of chemicals in aquaculture, were endorsed.

3rd ASEAN-India Ministerial Meeting on Agriculture and Forestry (AIMMAF)

AVA's CEO Ms Tan Poh Hong also attended the 3rd ASEAN-India Ministerial Meeting on Agriculture and Forestry which was held on 28 September 2013 in Kuala Lumpur, Malaysia.

Ministers and senior officials took stock of the progress of the collaboration between ASEAN and India in Agriculture and Forestry under the Medium-Term Plan of Action (2011-2015). Both ASEAN and India agreed to enhance cooperation in capacity building, agricultural education, as well as R&D, to address the global challenges of food security. On this note, agricultural R&D and innovative technologies were targeted as priority areas for future cooperation.

38th Food and Agriculture Organisation of the United Nations Conference

Singapore became a member of the Food and Agriculture Organisation of the United Nations (FAO). MOS for National Development & Defence, Dr Mohamad Maliki Bin Osman, together with AVA's CEO Ms Tan Poh Hong, led officials from AVA and the Ministry of National Development to attend the 38th FAO Conference on 15-22 June 2013 in Rome, Italy.

8th ASEAN Technical Working Group on Agriculture Research and Development (ATWGARD) Meeting

AVA organised and chaired the 8th ATWGARD meeting in Singapore on 13-14 May 2013. The Meeting was attended by delegates from Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam, as well as representative from the ASEAN Secretariat. Progress of agricultural R&D and initiatives related to the following were reviewed:

- ASEAN Integrated Food Security (AIFS) Framework.
- Strategic Plan of Action on Food Security (SPA-FS).
- ASEAN Cooperation in Agricultural Research & Development (R&D).

2nd Annual Conference of the Global Food Safety Partnership (GFSP)

Co-organised by AVA and the World Bank, the 2nd GFSP Conference Roundtable meeting was held on 12 December 2013 in Singapore. The opening was graced by MOS for National Development, Mr Desmond Lee. In his opening address, Mr Lee highlighted that Singapore will be joining the GFSP, and encouraged the industry and academia to participate in the GFSP endeavour. The GFSP is a tripartite collaboration between public, private, and knowledge sectors. Its funds are overseen by the World Bank for disbursement to worthy projects that improve food safety in anywhere in the world.



AVA CEO with World Bank Director Juergen Voegele (in blue tie) and other World Bank delegates at the 2nd Annual Conference of the Global Food Safety Partnership.

Technical Cooperation with Myanmar and Sri Lanka

In January 2012, Singapore and Myanmar signed a Memorandum of Understanding (MOU) on the Singapore-Myanmar Technical Cooperation Programme (SMTCP), which was established to further strengthen bilateral relations and increase people-to-people exchanges. Under the SMTCP, Singapore will provide targeted technical assistance to support Myanmar's development in three broad areas, namely, economic development, human resource development and public administration. Training in trade facilitation is among the many forms of support to be provided.

As part of the SMTCP, officials from Myanmar's Ministry of Agriculture and Irrigation (MOAI) and Ministry of Livestock and Fisheries (MOLF) carried out three study visits to Singapore.

On 28-29 May 2013, AVA and the Ministry of Foreign Affairs (MFA) hosted five senior officials from MOAI and provided them with an overview of Singapore's vegetable supply chain from farm to retail. AVA also facilitated their visits to a local vegetable farm, the Pasir Panjang Wholesale Centre, NTUC FairPrice Pte Ltd's fresh food distribution centre, as well as the premises of two vegetable and fruit importers.

On 13-15 August 2013, AVA's Marine Aquaculture Centre, Post-harvest Technology Centre, and Jurong Fishery Port received a delegation led by the Director-General of MOLF. Besides providing them with an insight to Singapore's aquaculture industry and how technology is applied in food-fish hatchery and post-harvest processes, we also facilitated their visits to a

local fish farm and supermarket. The delegation highlighted several areas where cooperation would be possible between both countries.

On 11-14 March 2014, AVA conducted a training course on good agricultural practices (GAP) and post-harvest handling of vegetables for MOAI officials. Through lectures, practical sessions, and site visits, participants learned about Singapore's experience in implementing GAP, enhancing the supply chain of vegetables and fruits, and meeting local market expectations.

Separately, in support of MFA's Technical Cooperation Programme, Agrifood Technologies Pte Ltd (a subsidiary of AVA) conducted a five-day training course for officials from Sri Lanka and members from the industry. Held on 2-6 September 2013 at AVA's Aquaculture Services Centre, the course covered topics on ornamental fish culture, good farm management practices, water quality management, and fish packaging technology. Field visits to ornamental fish farms and export centres were also arranged for participants.

Marine Fisheries Research Department (MFRD) Programme / Southeast Asian Fisheries Development Centre (SEAFDEC)

AVA, as a collaborating centre of SEAFDEC, promotes the post-harvest technology development of fisheries in Southeast Asia, by implementing activities under the SEAFDEC's MFRD programme. These activities include the transfer of postharvest technology and best practices to the fish processing industry in the region.

Utilisation of Freshwater Fish for Value-added Products

Under the MFRD programme, AVA conducted an End-of-Project seminar for the utilisation of freshwater fish for value-added products on 11-12 September 2013. Participating countries (Indonesia, Lao PDR, Myanmar, and Vietnam) presented on the product development and processing trials they had conducted. They also had the opportunity to network with industry stakeholders from Singapore, who sampled the products developed. In addition, a handbook on the utilisation of freshwater fish for value-added products was published and will be distributed to member countries.



Participants and their value-added products at the regional processing training course on freshwater fish utilisation.



Participants from 10 ASEAN-SEAFDEC member countries, AVA, MFRD, along with Mr Hajime Kawamura (SEAFDEC Deputy Secretary-General), Mr Hidenao Watanabe (SEAFDEC Assistant Trust Fund Manager), Mr Tadahiro Kawata (SEAFDEC Technical Coordinator), and food traceability expert, Mr Vincent Andre (AETS-consultants).

Traceability Systems for Aquaculture Products

Under the Japanese Trust Fund V of the MFRD programme, AVA's Post-harvest Technology Centre successfully organised the 2nd On-site Regional Training Workshop to promote the use of traceability systems for aquaculture products in ASEAN.

The workshop, held on 5-7 November 2013 in Bangkok, Thailand, provided a platform for ASEAN member countries to share their experience in implementing traceability systems for aquaculture products, and thereby enhance their regional capability in this area. Besides presentations by an expert in this field, visits were also organised to a shrimp aquaculture farm and processing factory, where participants learned how traceability is implemented in an industrial setting. In addition, participants discussed the generic supply chains for shrimp aquaculture in ASEAN, and identified the key points to be shared with relevant supply chain stakeholders, so as to ensure traceability.

Marine Biotoxins Monitoring in ASEAN

Under the Japanese Trust Fund VI of the MFRD programme, the project on biotoxins monitoring commenced in 2013. The five-year project focuses on Amnesic Shellfish Poisoning (ASP), Azaspiracids (AZA) and Brevetoxin (BTX) biotoxins for fish and fisheries products.

A Regional Technical Consultation meeting was successfully conducted from 24 to 25 July 2013 in Singapore, with attendance by all 10 ASEAN member countries, as well as representatives from the SEAFDEC Secretariat, and Dr Toshiyuki Suzuki from the National Research Institute of Fisheries Science, Japan. The meeting decided on the activities, schedule, venue, content, and trainers for the project. Key project leaders for all member countries were also identified.

Distinguished Visitors

AVA is trusted and respected globally as a competent authority that ensures safe food, healthy animals and plants. Over the FY, AVA received several foreign dignitaries and overseas officials for exchanges and collaborative work. Many came to learn about our regulatory control, functions, as well as tour our facilities and centres.

April 2013

Minister of State for Agriculture and Food Processing Industries of India, Honourable Dr Charan Das Mahant, visited AVA to learn about Singapore's experience in agricultural R&D development.

AVA hosted His Excellency Mr José Pacheco Tejeira, Deputy Minister of Foreign Trade in the Ministry of Trade and Industry of Panama, to a meeting that sought to enhance bilateral trade in agriculture.

May 2013

Deputy Minister of Economic Development of Sri Lanka, Honourable Mr Susantha Punchinilame, met AVA to discuss potential collaboration between Singapore and Sri Lanka in the ornamental fish sector.

August 2013

AVA hosted His Excellency Dr Sultan Al Jaber, Minister of State; Chief Executive Officer of Masdar; and Special Envoy for Energy and Climate Change of the United Arab Emirates to a briefing on Singapore's food security strategies and policies.

September 2013

The Mexican Ambassador to Singapore, His Excellency Rogelio Granguillhome, made an introductory visit to AVA, and discussed the potential of increasing Mexican meat exports to Singapore.

November 2013

Permanent Secretary (Food) from Hong Kong's Food and Health Bureau, Mrs Lai Chan Chi Kuen, led a delegation to AVA to learn about the planning and management of Singapore's agro-technology parks.

Deputy Minister for Economic Development of Russia, His Excellency Mr Saveliev Oleg, visited AVA to learn about Singapore's food safety regulations and shed light on the investment opportunities in Russia's agriculture sector.

December 2013

AVA hosted the Vice Minister of China Food and Drug Administration, His Excellency Mr Teng Jiaci, to an exchange of views in the area on food safety, as part of efforts to strengthen the collaboration between both agencies.

February 2014

AVA hosted Singapore's Ambassador to Russia, Her Excellency Ms Lim Kheng Hua, to a meeting and discussed matters related to agri-trade and food supply between Singapore and Russia.

March 2014

Ambassador of the Republic of Korea to Singapore, His Excellency Mr Suh Chung-ha, made an introductory visit to AVA, where he learned about the roles and functions of AVA that would aid future cooperation.

ORGANISATIONAL EXCELLENCE



AVA's multidisciplinary team of professionals, scientists, and veterinarians, work hand in hand towards our shared vision – Safe food, healthy animals and plants for Singapore; trusted and respected globally.

WE

THINK COLLECTIVELY

Excellence, Care, Integrity, and Teamwork are core values we embrace at AVA. Coming together, we advance in step as one to achieve AVA's vision and mission.





ORGANISATIONAL EXCELLENCE

EXCELLENCE IN OUR PEOPLE AND ORGANISATION

At AVA, we aspire to be a people-centric organisation where staff may find personal fulfilment in what they do. We believe that this in turn will motivate them to contribute whole-heartedly to AVA and our society at large. Complementing this belief, we empower our people with technology so that they are equipped to find innovative ways of improving and streamlining their work processes. These set us on the path towards being a progressive and professional organisation.



DEVELOPING AND RECOGNISING OUR STAFF

AVA firmly believes in developing all staff to reach their fullest potential so that they are not only equipped to fulfil their job duties, but also contribute to the society.

Nurturing and Valuing Our Staff

During the FY, we continued to engage the hearts and minds of our staff to develop them on both professional and personal fronts. We achieved an average of 21.8 learning days per staff, an increase of five full days from the previous FY. Officers were trained through a variety of platforms such as formal courses, as well as local and overseas conferences.

In addition, in-house workshops were organised to educate our officers in areas such as building service excellence, as well as to share learning points from overseas conferences and seminars. AVA has identified a set of core generic competencies that staff should possess to enable them to do their job better, and appropriate training programmes have been rolled out for our officers.

Talent Attraction and Development

AVA continued to build up our pool of talents through scholarship programmes. In FY 2013, three undergraduate scholarships were awarded for disciplines in Chemistry, Food Science, and Zoology - Animal Behaviour. Undergraduate scholars pursuing their studies were also sponsored for exchange programmes and summer schools to broaden and enrich their overall learning experiences.



AVA officers attending an in-house workshop on animal health surveillance and diagnostics tests.

AVA also continued to strive for excellence in our professional capabilities. In order to enhance the competency of our staff, officers were sent for professional development courses, seminars, and overseas study trips. As part of AVA's Postgraduate Scholarship and Training Sponsorship Scheme, a postgraduate scholarship was awarded to one officer to pursue a Masters of Public Health with specialisation in Veterinary Public Health.



AVA's National Day Awards recipients, including AVA CEO, together with AVA Chairman, Mr Koh Soo Keong; Senior Minister of State for Trade and Industry & National Development, Mr Lee Yi Shyan; and Minister of State for National Development, Mr Desmond Lee.

PERFORMANCE MANAGEMENT

In FY 2011, AVA successfully introduced the AIM (Analytical and intellectual capacity, Influence and collaboration, and Motivation for excellence) Model as AVA's performance management system, as well as the open appraisal methodology for our officers in the management executive scheme. AVA continued to extend these to officers in other schemes of services in FY 2013.

Comprehensive training was provided to staff to continue to help staff familiarise themselves with the new performance appraisal system. This new performance management framework is structured to clearly bring out and tie in with our shared ethos, values, and desired behaviours. Both staff and the organisation will thus be better empowered to take on future challenges.

People Management

In the FY, we continued to review work-life benefits for our staff. Several enhancements were made, such as the increase of medical and dental benefits. We have also revised our re-employment policy to be in tune with market practice of providing better re-employment terms for our older workers.

Awards and Recognition

A total of 75 officers were promoted in FY 2013 in recognition of their excellent performance and potential to contribute at higher levels.

Eleven National Day Awards were bestowed on AVA staff in recognition of their exemplary performance and dedicated service. These comprised one Gold Public Administration

Medal, one Silver Public Administration Medal, two Bronze Public Administration Medals, two Commendation Medals, two Efficiency Medals and three Long Service Medals. Ms Tan Poh Hong, AVA CEO, received the Gold Public Administration Medal for her significant contributions to AVA and the public service.

In addition, 109 officers reached the various service milestones and were awarded the AVA Long Service Awards in recognition of their contribution and dedication to the organisation.

Staff Well-being

In support of the Government's effort to encourage active parenthood and family bonding, AVA extended the coverage of selected types of leave to benefit single parents, with effect from 1 May 2013. The scope of the parent-care leave was also expanded to allow officers to use it to care for their grandparents.

Further enhancements were made to work-life harmony initiatives during the FY. Effective from 1 April 2013, officers who are suffering from mild illnesses may be granted medical leave without the need to consult a doctor for a medical certificate, if home rest and off-the-shelf medication is sufficient for recovery.

To allow officers greater flexibility to manage their work and personal needs, we further enhanced the staggered working hour scheme, which was expanded to six options of timings for the staff to start work at. Staggered lunch hour was also introduced. Officers were granted two hours time-off in the month of their birthday.

LABOUR-MANAGEMENT RELATIONS

AVA continued to partner the Amalgamated Union Of Statutory Board Employees (AUSBE) in improving the welfare of our staff. In addition to contributing an annual grant of \$6,000 to AUSBE, AVA and AUSBE jointly administered the AVA Bursary Award for a second year running in FY 2013. This award provides financial support for the education of children of eligible AVA staff. Three AVA staff members were recipients of the award in the FY.

AVA's Management also regularly engages AUSBE on staff matters through various platforms, such as quarterly meetings and social events. In recognition of our sustained efforts in strengthening understanding and cooperation between the AVA Management and AUSBE, AVA was presented the Ong Teng Cheong Institute Workplace Partnership Award in November 2013 for the third time.

Staff Engagement and Feedback

To develop a collaborative and interactive culture anchored on strong teamwork, it is important to engage our staff. AVA held its inaugural Town Hall session in September 2013 in addition to other communication platforms such as tea sessions, chitchats, walkabouts, and conversations with senior management. News blitzes disseminated periodically in the form of the NewsREAL e-Newsletter kept staff updated on organisational events and officers' achievements.



AVA CEO shares the progress and future of the organisation through the inaugural Town Hall session.

ORGANISATIONAL AND SERVICE EXCELLENCE

AVA strives for excellence by encouraging its staff to continuously innovate and look for ways to improve current processes and systems.

This pursuit of excellence also emphasises how we can improve and better serve our stakeholders through strong service values and capabilities, as well as efficient processes and systems.

Innovation and Teamwork

To increase the validity and usefulness of our projects, AVA encourages staff to work in teams, recognising the effectiveness of having diverse members, including key stakeholders.

Innovation Challenge

In July 2013, AVA launched an Innovation Challenge to further promote a culture of creativity in AVA. Teams submitted proposals to seek funding of up to \$10,000 for each prototype development. Projects ranged from modifying existing equipment and improving processing efficiency, to prototyping new methods that boost productivity. A total of close to \$30,000 was awarded to six teams for the development of their prototypes.

Staff Ideas and Projects

In AVA, we value and encourage innovative ideas and solutions through the AVA STAR (Striving and Aiming for Excellence through Teamwork) and TWINKLE (Tapping Wild and Innovative Ideas for Knowledge, Learning and Exchange) Schemes. A total of 1,747 ideas were contributed by staff and 44 STAR projects were completed. On average, each staff contributed 2.12 TWINKLE ideas in FY 2013.

Two AVA teams won the Gold Award at the Singapore Productivity Association's Team Excellence Symposium 2013, and three won the Silver Award.

Organisational Excellence

To promote and inculcate a culture of excellence, AVA organised an Organisational Excellence (OE) Festival from 22 May to 5 June 2013. About 520 staff participated in the two-week festival.

In line with the theme "BE (Business Excellence) Engaged", officers were involved in several activities such as a mural painting session, learning journey, and lunchtime talks as part of staff engagement. Activities were also organised in support of the Public Service Week 2013, to encourage a sense of recognition to and appreciation for being part of the Singapore Public Service.



As part of the Organisational Excellence Festival, the leadership team joins staff in painting a mural art on a wall at AVA's Centre for Animal Welfare and Control.



→ AVA's leadership team shows appreciation for the hard work of all staff, by serving up refreshments during the Organisational Excellence Festival.

Initiatives to Enhance Customer Service

During the FY, various initiatives to enhance our service delivery and inculcate a customer-oriented culture in AVA were implemented. A total of 112 officers were awarded Monthly Service Awards to recognise their contribution towards service excellence. Additionally, eight received the Quarterly Service Awards, and two received AVA's Annual Distinguished Service Awards.

Over 100 officers attended three Quality Service Manager (QSM) tea sessions, which were conducted as a platform for frontline officers to share and discuss areas for improvements and to recognise our Quarterly Service Awards recipients in the FY.

AVA also launched a series of organisational-wide service training workshops for all officers to build a customer-oriented mindset. During the senior management's session, AVA's service values were enhanced to better align officers to meet the needs of our customers. Apart from these service training workshops, the service training framework was also enhanced to better map staff competencies to the nature and level of their work. More than 700 officers underwent other service-related training in FY 2013.



→ AVA's contact centre ensures the timely and effective management of feedback received.

To further extend the breadth of a customer-oriented culture in AVA, the Reward and Recognition programme was also reviewed to acknowledge good internal customer service.

AVA's Contact Centre continues to ensure the timely and effective management of feedback received. Other ongoing efforts to improve the service experience for our customers include the revamp of AVA's corporate internet website, as well as the development of a Customer Relationship Management System and a customer service portal. These initiatives are expected to help us streamline our processes in managing enquiries, feedback, and responses.



→ Quality Service Manager tea session.



→ Tapping on mobile technology to support the inspection of food imports and grading of food factories.

Public Sector Transformation

AVA is an agency committed towards excellence and is constantly seeking to improve itself. The next phase of AVA's growth is in line with the Public Sector Transformation (PST), which is led by the Public Service Division (PSD) with a theme to create "one trusted public service with citizens at the centre".

In February 2014, an action plan was drawn up with initiatives that would strengthen the agency's response to the PST theme. These initiatives focus on key areas including enhancing service capabilities, embarking on more inter-agency projects, adopting a whole-of-government perspective, as well as embodying the spirit behind No Wrong Door and First Responder Protocols.

Leveraging on Info-communications Technology

Info-communications Technology (ICT) plays an important role in supporting our organisation's mission and goals. By harnessing state-of-the-art technology, we are able to deliver seamless services to our customers and improve organisational performance.

Improving Public eServices

In December 2013, AVA launched the Quarantine Management System, which allows users to reserve quarantine space for dogs, cats, and small mammals arriving in Singapore. Previously, customers were required to submit reservation forms and documents via email and fax as part of the application process. The applications could only be processed one month before the animal's arrival date, when the availability of quarantine spaces was more certain.

The new system allows customers to confirm quarantine space as early as six months in advance, and pay the deposit online. Supporting documents can be uploaded electronically and customers can perform self-check on application status and outstanding quarantine bills. This greatly reduced the turnaround time for the confirmation of quarantine space and provides flexibility for our customers to amend their booking details when the need arises.

Improving Operational Efficiency

The sampling and inspection of imported high-risk foods, such as those from new sources, were previously scheduled according to product category. AVA inspectors had to cover warehouses island-wide to sample and inspect a particular type of product. Each warehouse operator was also required to prepare for multiple inspection and sampling visits on separate days and by different inspectors.

To reduce the time required for both the industry and AVA, we streamlined the inspection and sampling process to be scheduled and conducted based on geographical zone instead. All relevant products in a warehouse within one particular zone are now inspected and sampled during a single inspection visit.

In June 2013, AVA tapped on mobile technology to support the inspection of food imports and grading of food factories. Previously, inspectors needed to carry along hardcopies of reference materials to conduct inspections. Upon their return to the office, reports would be entered into their computers.

Now, inspectors are equipped with tablets that enable them to have the necessary materials on hand without pages of printouts and they can also enter the inspection reports on-site during their field trips. The details will be immediately sent to the backend system.



Staff enjoying a friendly competition of bowling.

Tightening ICT Security

AVA organised an ICT Security Awareness briefing on 21 October 2013 for our officers. An Information Security consultant from the Infocomm Development Authority (IDA) was invited to share insights on ICT security threats and IDA's counter measures.

PROMOTING HEALTHY LIFESTYLE AND BUILDING ESPRIT DE CORPS

At AVA, we continuously strive to cultivate a work environment that inspires and motivates staff. We value our staff, who make up the heart of AVA. We help our staff to build esprit de corps, to achieve cohesiveness, as well as to stay attuned to their environment and physical well-being. The AVA Staff Recreation Committee (ASRC) organised a wide range of recreational, health, and family oriented activities throughout the FY. Besides providing an opportunity for networking, these activities also promote a sense of camaraderie and belonging to AVA.

Sports

We aim to build rapport and cohesiveness within AVA through sportsmanship and group recreational activities that bring various groups together. A wide variety of sports activities, from games for leisure to competitive tournaments, are regularly organised to promote staff interaction.

Sports Trainings and Participation

Inter-Group sports events were organised by ASRC during the FY, as part of our AVA Inter-Group Sports Championship Challenge.

The Championship received tremendous support from all staff, including the leadership team. It began with a badminton tournament held over a period of six weeks from October 2013 to November 2013, which attracted participation from all AVA Groups. On 30 November 2013, a bowling competition was organised with active participation from 64 officers.

Besides the Championship games, AVA staff also continued to actively participate in badminton practices every Wednesday, and dragon boat trainings every Saturday. AVA rowers, including participants from the leadership team, achieved good results at the Club Housing Development Board (HDB)/Ministry of National Development Recreation Committee (MNDRC) Dragon Boat Race Competition held on 21 September 2013. AVA bagged first place in the Inter-Agency (mixed) category; 1st Runner-up in the Inter-Agency Sprint (Open) category; and 2nd Runner-up in the Inter-Agency Senior Management category.

During the FY, our officers also took part in events such as MNDRC Cross-Country Championship 2013, Public Service Sports and Family Day, Public Service 9-Pin Tap Bowling Competition, REDAS Bowling Competition, Standard Chartered Marathon 2013, Real Run 2013, Sundown Marathon 2013, as well as Civil Service Club's Walk at Macritchie Reservoir and Changi Point.



→ AVA Chairman, Mr Koh Soo Keong, presents staff with prizes during the annual Dinner and Dance event.

Social

AVA participated in the MND Family Day at the Singapore Zoological Gardens and the River Safari on 22 November 2013. The event attracted a good turnout of 533 AVA staff and family members.

Our Annual Dinner & Dance FY 2013 was held at Marina Mandarin Hotel on 10 January 2014, to the theme of "A Sporty Night". Our staff gamely dressed up in sports attire or costumes in-line with the theme. Officers from various groups were also featured in an AVA music video that was specially created to celebrate teamwork, as well as to showcase the energy and passion of our staff. Staff, guests, AVA board members, and AUSBE representatives who attended the dinner were greatly entertained by performances and colleagues who gamely participated in the games and lucky draws. ASRC also worked closely with AUSBE to provide additional subsidies for union members.

During the FY, an exclusive movie screening was organised for AVA staff on 21 June 2013. About 90 staff attended the event and all enjoyed a blockbuster movie as well as snacks and beverages that were bundled in a subsidised package deal for them.

Healthy Lifestyle

AVA understands that a healthy workforce is a productive one. In FY 2013, we rolled out a series of programmes to generate greater awareness of health and wellness. These programmes focus on aspects such as healthy eating, cancer awareness, ergonomics, and mental well-being. Talks on ergonomics and relaxation were also organised. In addition, gyms in various AVA centres provided staff with the facilities to exercise at their convenience.

Good eating habits are fundamental to healthy living. To encourage healthy eating habits, a particular type of fruit or healthy snacks was given to each AVA staff bi-monthly. A food bazaar was also organised to showcase "Healthier Choice" products.

CARING FOR OUR COMMUNITY AND ENVIRONMENT

Charity

As part of our social outreach programme, a Charity Bazaar was held in October 2013 to raise funds for AVA's adopted charity. A variety of food and non-food items were sold and staff came together to raise a total of \$20,000 for Kampung Senang Charity and Education Foundation.

In September 2013, AVA also raised \$1,766 for the Singapore Children's Society to contribute towards looking after the welfare of children from disadvantaged families.

Environment and Conservation

The annual International Coastal Cleanup (ICC) was held on 21 September 2013 at various beaches in Singapore. The ICC is an international event conducted in over 100 countries, and is coordinated by an US-based agency. AVA supported this global event, as part of our conservation awareness efforts. This FY, AVA organised a clean-up of Pulau Ubin's Jeletong Beach, which covers 200 metres. A total of 165 kilograms of trash were collected during the three-hour beach clean-up. The event not only helped improve our marine environment, it also served to enhance the bond between staff.

In addition, AVA supported Earth Hour 2014, by switching off our office building's facade and non-essential lights for the one hour on 29 March 2014. The gesture demonstrated AVA's commitment to do more for our planet in its combat against global warming.

STAFF STRENGTH FOR FY 2013

Categories of Staff	Corporate & Technology	Regulatory Programmes & Operations	Sub-total
Management/Professional	134	239	373
Technical Support	64	193	257
Non-technical Support	59	46	105
Operations Support	48	58	106
Total	305	536	841

DISTRIBUTION OF STAFF BY QUALIFICATION

Qualifications Classification	Sub-total
Management/Professional	373
Technical Support	257
Non-technical Support	105
Operations Support	106
Total	841

DISTRIBUTION OF STAFF BY AGE GROUP

Age Classification	Sub-total
51 and above	312
41-50	127
31-40	207
30 and below	195
Total	841

PERFORMANCE IN STAR FOR FY 2013

No. of STARs	No. of Completed Projects
55	44

PERFORMANCE IN SPARKS FOR FY 2013

No. of Staff with at least One Suggestion	No. of Suggestions	Participation Rate	Suggestion Ratio
704	1747	85.4%	2.12

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	<p>There were no reported cases of food borne illnesses linked to AVA-licensed establishments.</p> <p>Projected target for FY 2013 was not more than 3.6 cases per 100,000 population.</p>
	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, except for hen eggs and leafy vegetables (for which imports from Malaysia were about 74% and 57%, respectively).

Output Indicators

Activity	Volume
To hold business cluster meetings/trade association meetings	13 business clusters were held
To conduct food sourcing missions	5 food sourcing missions were conducted
To monitor the compliance status of locally manufactured/processed food with Food Regulations	<p>69.3% of food inspected (including those who received advisory letters from AVA) was compliant with the Sale of Food Act and the Wholesome Meat and Fish Act.</p> <p>90% of food inspected (excluding those who received advisory letters from AVA) was compliant with the Sale of Food Act and the Wholesome Meat and Fish Act.</p> <p>97.3% of samples collected were compliant with the Sale of Food Act and the Wholesome Meat and Fish Act.</p>
To conduct inspection and sampling of export consignments within 3 working days	100% achieved for all consignments
To process application for food establishments' licenses within 5 working days from the date of receipt of application	100% achieved for all applications

PERFORMANCE INDICATORS

ANIMAL & PLANT HEALTH

Outcome Indicators/Objectives

Objective	Outcome Indicators	Performance
Safeguard animal and plant health	Percentage of freedom from important animal and plant disease outbreaks	98.3% freedom or free from outbreaks of at least 114 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	170,057

FOOD SUPPLY AND TECHNOLOGY

Outcome Indicators/Objectives

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	Levels of productivity for hen and quail eggs are at 16.8 million pieces per hectare, leafy vegetables at 107.3 tonnes per hectare, and fin-fishes at 35.16 tonnes per hectare.

Output Indicators

Activity	Volume
Accreditation of overseas food sources	42 inspection trips
To test food samples	52,768
To conduct laboratory tests	1,709,420
To manage farms in agrotechnology parks and fish farming zones	243 land farms and 117 coastal fish farms

PERFORMANCE INDICATORS

AGRI-TRADE FACILITATION SERVICES

Outcome Indicators/Objectives

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	Fulfilled, with 0.028% of certified export consignments that are rejected by importing countries.

Output Indicators

Activity	Volume
To issue export and import documents for animal, plant, and food products	75,913 export documents were issued 905,159 import documents were issued

INTERNATIONAL AND REGIONAL COMMITMENTS

Outcome Indicators/Objectives

Objective	Outcome Indicators	Performance
Represent the government internationally on matters related to or connected with the agri-food and veterinary sectors	Fulfil Singapore's international obligations in SEAFDEC, ASEAN, APEC, and CITES	Fulfilled
	Singapore's interests in agri-food and veterinary services are not compromised	Achieved

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	Implemented successfully and in a timely manner all regional projects and activities under the MFRD/SEAFDEC programmes, i.e. 3 regional projects and the SEAFDEC information programme.
To participate in relevant meetings and activities of AMAF, OIE, SEAFDEC, CITES, CODEX Alimentarius, Bilateral, WTO FTA , APEC, FAO and IPPC	85

MAJOR SOURCES OF SUPPLY



United States

Beef
Chicken
Duck
Fruits
Milk
Pork
Rice
Vegetables

Brazil

Beef
Chicken
Pork

South Africa

Fruits

Pakistan

Rice
Sugar

India

Fish
Milk
Rice
Sugar
Vegetables

China

Cooking Oil
Fish
Fruits
Vegetables

Thailand

Fish
Fruits
Milk
Rice
Sugar
Vegetables

Vietnam

Fish
Fruits
Rice
Vegetables

Malaysia

Chicken
Cooking Oil
Duck
Eggs
Fish
Fruits
Milk
Sugar
Vegetables

Indonesia

Cooking Oil
Fish
Milk
Pork
Vegetables

Australia

Beef
Cooking Oil
Fruits
Milk
Mutton
Pork
Sugar
Vegetables

New Zealand

Beef
Fruits
Milk
Mutton

STATISTICS

CONSUMPTION, IMPORT & LOCAL FARM PRODUCTION (JAN TO DEC 2013)

Tonnes	Beef ^t	Chicken ^t	Cooking Oil	Duck ^t	Fish ^t	Fruits ^a	Hen Eggs (Mln Pcs)	Mutton ^t	Pork ^t	Rice	Sugar	Vegetables ^b
Consumption	13,122	172,054	260,688	13,611	83,988	377,906	1,684	12,120	93,811	294,886	245,667	500,199
Import	26,212	182,123	517,410	13,657	99,464	414,774	1,248	12,331	104,554	432,336	377,087	514,574
Local Farm Production	-	- ^Δ	-	-	5,864*	-	438	-	-	-	-	21,785

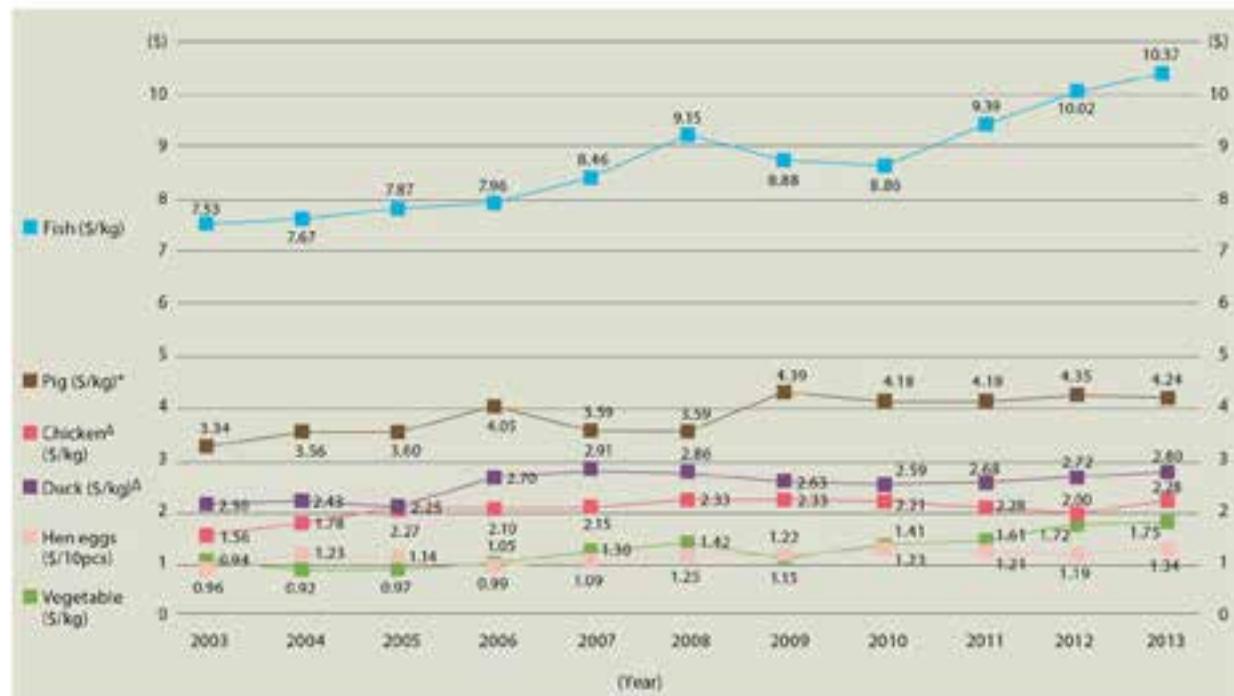
*Figure includes coastal fish farm production, land-based fish farm production, and fish landings.

^t Figures are aggregated based on live, chilled, and frozen forms.

^a Figures are aggregated based on fresh and chilled forms.

^Δ There is no broiler farm in Singapore.

EX-FARM/AUCTIONED/WHOLESALE PRICE FOR PRIMARY PRODUCE (FROM JAN TO DEC EACH YEAR)



TRADE DOCUMENTATION AND IMPORT INSPECTION FIGURES (FY 2013)

	Meat and Meat Products	Fish and Fish Products	Fruits and Vegetables	Processed Food
No. of Traders Registered	2,921		1,141	9,380
No. of Import Permits Issued	21,628	194,937	228,913	386,893
Quantity and Value of Products Approved for Import	278,600 tonnes and \$1,200.6 million	204,829 tonnes and \$1,325.2 million	941,557 tonnes and \$1,179.3 million	3,897,977 tonnes and \$10,863.7 million

STATISTICS

PER CAPITA CONSUMPTION (FROM JAN TO DEC EACH YEAR)

Item	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Chicken (kg)†	33	27	30	27	31	32	31	32	33	33	32
Pork (kg)†	20	21	19	20	21	20	19	20	19	20	17
Seafood (kg)†	27	27	27	26	25	24	24	22	23	22	22
- Fish (kg)	18	17	18	17	16	16	16	15	16	15	16
- Other seafood (kg)	9	10	9	9	8	8	7	7	7	7	7
Vegetables (kg)^\wedge	96	92	93	93	93	91	91	93	93	94	93
- Leafy vegetables (kg)	18	19	18	18	17	16	17	16	15	16	16
- Other vegetables (kg)	78	72	74	76	76	75	74	77	78	78	77
Hen eggs (pcs)	306	268	286	291	302	302	300	311	307	308	312
Fruits (kg)^\wedge	88	87	85	80	74	71	71	68	67	67	70
Beef (kg)†	3	3	4	3	4	4	4	4	4	3	2
Duck (kg)†	4	3	3	3	3	3	3	3	3	3	3
Mutton (kg)†	2	2	2	2	2	2	2	2	2	2	2

Note: All calculations are based on total population. Total population comprises Singapore residents (citizens & PRs) and foreigners staying in Singapore for at least one year. For breakdown of seafood and vegetable, figures may not add up to the total due to rounding.

† Figures are aggregated based on live, chilled, and frozen forms.

^\wedge Figures are aggregated based on fresh and chilled forms.

ACCREDITATIONS, SUSPENSIONS AND RE-INSTATEMENT OF PIG AND POULTRY FARMS (FY 2013)

	Farm Type					
	Pig	Chicken Broiler	Duck Broiler	Chicken Layer	Chicken Breeder	Total
No. of New Farms Accredited	0	2	1	1	0	4
No. of Farms Suspended / Delisted	0	13	3	1	0	17
No. of Farms Reinstated	0	12	3	0	0	15
No. of Inspection Visits	12	16	6	0	0	34

Note: Some of the broiler farms reinstated based on documentary evaluation without on farm inspection.

Farms suspended due to SE, drug residues and major non-compliance with export conditions.

STATISTICS

ILLEGAL IMPORTS INTERCEPTED (FY 2013)

	Meat and Seafood	Fruits & Vegetables	Poultry Eggs	Animals and Birds	CITES	Processed Food
Total no. of Cases	12	66	0	16	16	592
No. Prosecuted In Court	1	0	0	8	6	1
No. Compounded	3	57	0	5	6	16
No. Warned	8	9	0	3	1	565
Others (relevant particulars not available, no action required)	0	0	0	0	3	10

FARMING ACTIVITIES IN SINGAPORE (FY 2013)

Farm Type	No. of Farms	Net Area (Hectares)
FISH		
Aquarium fish (breeding/export)	69	150.1
Marine/Freshwater Food-fish And Shrimp (land-based)	10	39.3
ANIMALS AND BIRDS		
Layer (hen eggs)	3	48.2
SPF eggs	0	0
Quail and other game birds	2	4.7
Exotic birds	4	8.3
Dairy cattle and goats	4	9.4
Frogs and crocodiles	3	11.7
Dogs (breeding/ boarding/ training) / Commercial pet boarding	10	9.5
PLANTS		
Vegetables	50	109.3
Food Crops	2	9.5
Bean Sprouts	6	6.4
Mushroom	2	3.4
Orchid and ornamental plants	75	246.6
Aquatic plants	1	11.7
Fodder crops	1	4.7
Jatropha cultivation for bio-fuel research	1	1.7
Total (land-based)	243	674.5
Total (Sea-based food-fish/crustaceans/molluscs)	117	102



ACKNOWLEDGEMENTS

Special thanks to the following for the use of their products and premises for photography

Kendo Trading Pte Ltd
Lee Say Poultry Industrial
Mandai Link Logistics Pte Ltd
Masterdon Swiftlets Resources Pte Ltd
Prima Food Pte Ltd
Song Orchids
Sport Singapore
Sungei Tengah Tree Bank (managed by National Parks Board)

Also to the following staff members for their participation in the photo shoot:

Dr Charmaine Chng (Agri Establishment Regulation Group)
Noor Azliza Binte Azlan (Communications & Corporate Relations Group)
Alex Chua Yong How (Corporate Resource Management Group)
Bryan Liew (Food Establishment Regulation Group)
Chong Wenda (Food Establishment Regulation Group)
Jannie Wan (Food Establishment Regulation Group)
Lee Jia Vei (Food Establishment Regulation Group)
Ng Chuan Seng (Food Establishment Regulation Group)
Oh Hao Zhi (Food Establishment Regulation Group)
Patrick Bay Chuan Kiat (Food Establishment Regulation Group)
Sherilyn Tan Siao Lin (Food Establishment Regulation Group)
Jocelyn Lim (Food Supply Resilience Group)
Chua Yiting (Laboratories Group)
Muhammad Izaan Bin Istijab (Laboratories Group)
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