Development, Establishment and Current Achievement of Animal Traceability System in Malaysia

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Abstract

The animal traceability system works as a complement to animal disease control program. Malaysia has been serious in developing the animal traceability system in order to control diseases, to get disease free declaration from The World Organisation of Animal Health (OIE) and to meet the importation regulations of other countries. This action will also help in increasing the competitiveness of Malaysia's livestock industry. Three main components in animal traceability system are animal identification, premise and owner registration and animal movement control. Malaysia has developed the system modularly and the implementation was conducted in stages involving state and federal territory. The data were obtained from various modular databases including the ePermit1, eQuarantine, ePermit2, Pet Passport, eBreed, BurungWalit, TAC Online, ADIC and ipVEINs database which consists of premise, animal and pet registration, import/export, inter- and intra-state animal movement, quarantine management and disease index management. After five years of implementation, the Department of Veterinary Services Malaysia (DVS) is able to locate more than forty thousand premises, trace back and forward more than three hundred thousand animals and pets, identify more than fifteen thousand transports used for animal and animal product movement and monitor more than 700,000 movement consignments between and within the countries. The implementation of the Malaysia's animal traceability system is being carried out in accordance with acts, regulations, state enactments, veterinary and import protocols, and standard operating procedures in force. This well-designed traceability system has advanced Malaysia's performance veterinary services to a higher level and will continue doing so till the near future.

Keywords: Animal identification, premise registration, animal movement control, animal traceability system

Introduction

Animal identification and traceability system are important and effective tools to manage the animal health and welfare, public health, food safety and livestock industry. During an outbreak, a well-designed traceability system will help in reducing response time and minimizing the economic, environmental and social impact of emergency situations. The World Organisation of Animal Health (OIE) has introduced the OIE Tool for the Evaluation of Performance of Veterinary Services (OIE PVS Tool) to assist the veterinary services to evaluate level of performance, achievement and weaknesses. In this program, the identification and traceability are parts of the competency requirements of OIE on the veterinary authority (OIE PVS Tool, 2013).

The world has recognized the advancement of bovine identification and traceability system. The established

traceability system in the world showed the importance of animal identification, origin or premise registration and animal movement tracing as a main component in the animal traceability system (Schroeder and Tonsor, 2012). Recently, the USDA has finalized and is implementing the Animal Traceability Rules for improving the traceability of U.S. interstate livestock movement.

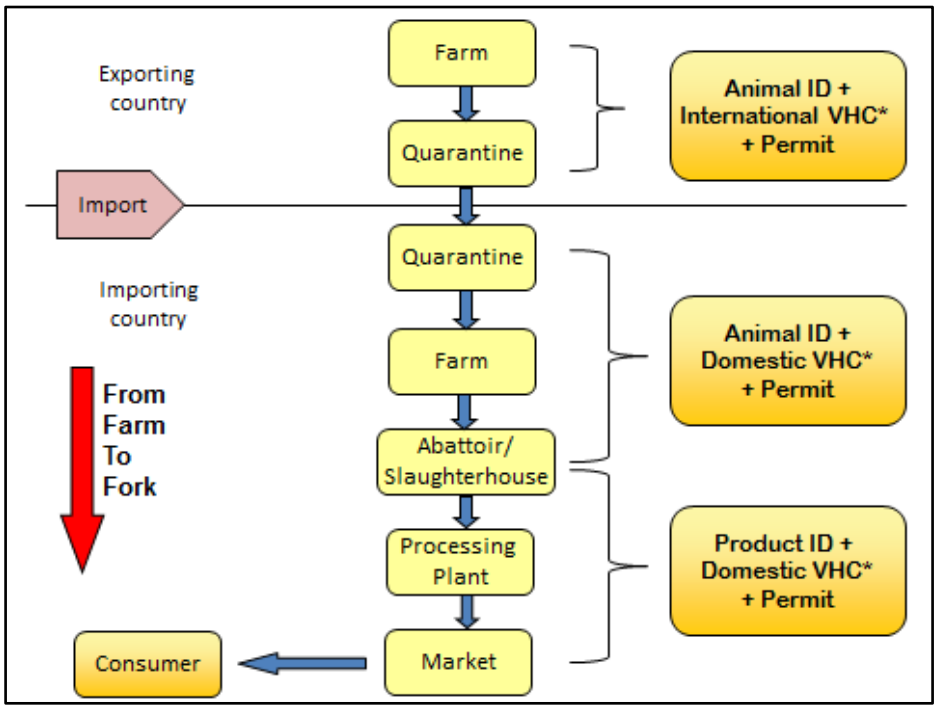
There are many reasons to develop a national traceability system. Other than to develop a customer confidence from the product information or to penetrate the international market, the greatest aim of a safe and wholesome meat supply is behind the implementation of traceability system across the world (Pendergrass, 2007). The European Union (EU) has established the identification and registration system as a database to minimize possibilities of false declaration during distribution of subsidies to the livestock farmers (Wismans, 1999).

In Malaysia, Department of Veterinary Services (DVS) under the Ministry of Agriculture and Agro-based Industry is the sole veterinary authority. Since its formation in 1888, traceability is a part of the veterinary services. Traceability regulation through the dog licensing, livestock identification, farm registration, livestock movement and slaughter permit and issuing of the veterinary health certificate has long been implemented.

In 2009, DVS developed a new traceability system with the launching of the livestock tracking program using the Radio Frequency Identification (RFID) technology by the Director General of DVS. The program was initiated to control disease outbreak, trace back the source of infection and identify the animals at risk. Malaysia imports most of the livestock especially cattle, buffalo, goat and sheep from various countries such as Australia, Indonesia, Myanmar, Thailand, South Africa and India. The selected animals are quarantined in the exporting country's quarantine stations. These animals are required to have identification, International Veterinary Health Certificate (iVHC) and Exportation Permit before entering Malaysia. Upon arrival at the entry point, the documents are verified and the animals are further quarantined for a certain period in the government or government-approved quarantine stations. In order for the animals to move from the quarantine station to the farms or slaughter houses, the necessary documents required are the Domestic Veterinary Health Certificate (dVHC) and Animal Movement Permit. The animals' identification is again verified. Movement of the carcasses and products from the slaughter houses or processing plants to the markets requires product identification, dVHC as well as movement permit. The complete traceability flow is explained in Figure 1.

The Malaysia Animal Traceability System (MATs) was developed modularly. Several dedicated teams were appointed to design and develop a comprehensive database system named ePermit1, ePermit2, ePremise, eQuarantine, eBreed, Pet Passport and other systems as illustrated in Figure 2. All the modular systems work separately under the Internet Portal Veterinary Information System (ipVEINs).

Various types of animal identification such as ear tag, ear notch, tattoo, brand and RFID tag can be used for livestock identification. The farmers are encouraged to give identification to their animals in the farm and for any movement purposes the animal identification is mandatory. The procedure is explained in the Malaysia Veterinary Standard Operating Procedure: Identification and Traceability for Animals, Animal Produces and Products and its Premises (Azmie *et al*., 2010).



*VHC – Veterinary Health Certificate

Figure 1: Traceability flow from an exporting country to Malaysia

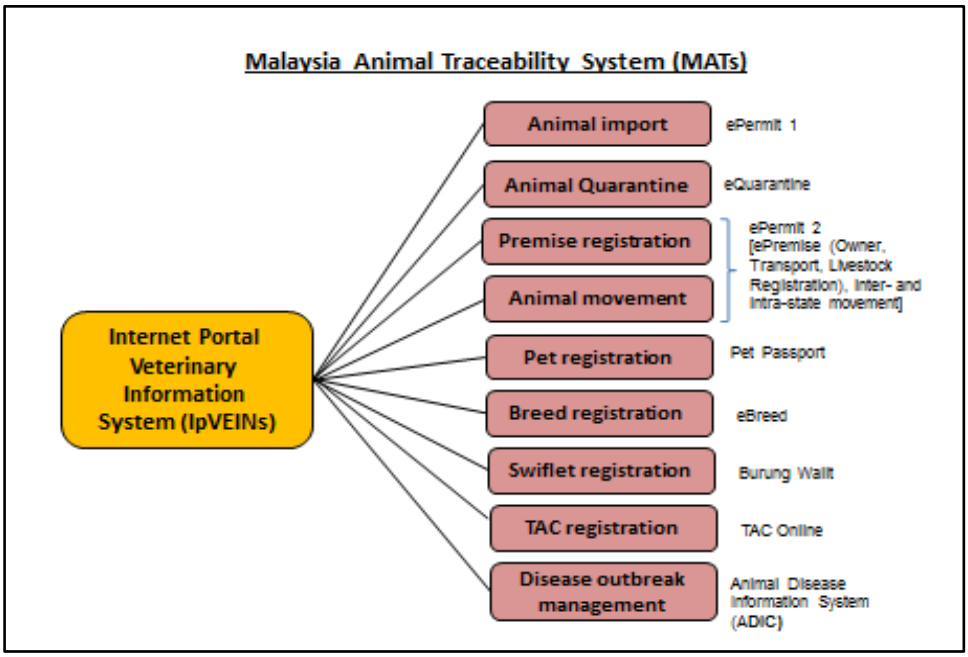


Figure 2: Modular database in Malaysia Animal Traceability System (MATs)

Methodology

The modular systems' report was obtained from Biosecurity Management and SPS Division (BPBS), Livestock Commodity Development Division (BPKT) and Livestock Resources and Technology Development Division (BPSTT). The data for each modular system were obtained from various databases as listed in Figure 2. The import and export permit data were collected from the Quarantine Services and Import/Export Section (SQIE, BPBS). The most important data including premise, owner and animal registration and inter- and intra-state animal movement data were obtained from the ePermit2 database administered by the Disease Control and Eradication Section (SKAPP, BPBS). The pet registration data was also obtained from the same section. Besides that, the animal disease index management procedure was obtained from the Animal Disease Information Centre (ADIC) managed by Epidemiology and Surveillance Section (EpiS, BPBS). Apart from that, the breed registration data were obtained from the Reproductive Technology and Breeding Section, BPSTT.

Results and Discussion

The DVS's ePermit1 system integrates with the Royal Custom Malaysia's e-Permit system. The system is used for application and issuance of import and export permits for animals and animal products. This system is also able to produce International Veterinary Health Certificate (iVHC) for the declaration of the animal or animal product health status. The system's trial period was officially started in the DVS headquarters on 1st January 2009 and has been rolled out in phases to all the 14 states in Malaysia thereafter. Table 1 shows the number of import and export permit issued increased every year using the ePermit1 system.

Table 1: Total number of import and export permits issued per year

Permit	Category	2009	2010	2011	2012	2013 (Aug)
Import	Animal produce/ product	21,890	26,274	30,489	33,893	25,312
	Live animal	186	514	4,938	6,368	4,824
	Total import permit	22,076	26,788	35,427	40,261	30,136
Export	Animal produce/ product	41,458	56,035	70,157	87,930	53,191
	Live animal	10	340	10,796	25,590	15,802
	Total export permit	41,468	56,375	80,953	113,520	68,993
Total permit		63,544	83,163	116,380	153,781	99,129

Source: SQIE, Biosecurity Management and SPS Division, DVS

The Animal Quarantine System (eQuarantine) pilot project was completed recently. This system can be used to book any government animal quarantine station throughout Malaysia a month before the animals are expected to arrive in Malaysia. This system will also register all the animal identifications entering the quarantine station. Before the quarantine period end, the traders or animal owners will apply for the animal movement permit using the ePermit2 system. The same animal identification will be transferred from the eQuarantine to the ePermit2 system for issuance of the animal movement permit and Domestic Veterinary Health Certificate (dVHC).

The ePermit2 system consists of three modules: ePremise, inter- and intra-state movement. The ePremise module was developed to register all premises or areas incorporated with animals. Each registration requires information on the premises, owners, transports and the animal itself. There are 29 types of premise classification including livestock farms, slaughter houses, processing plants, quarantine stations, veterinary clinics, pet shops and other premises related to animal and animal products. A unique premise identification codes will be used for these registered premises. The premises were marked with a premise plate embedded with an RFID. The number of premises registered since 2009-2013 are given in Table 2.

Although the number of premises registered is still low but this system has managed to identify various types of animal incorporated premises owned by Government, privates or NGOs. Thus far, the data have not been captured nor compiled before. This information is important to DVS for future transformation planning based on the distribution of veterinary service's needs. From the disease control perspective, this information will advance the National Disease Control Plan and National Surveillance Plan to a higher level by providing a more detailed distribution of premises.

The livestock farms showed the highest number of premises registered with 30,858 premises. From the livestock farms that have been registered, the distribution of cattle, goat and sheep, pig and chicken farm is shown in Figures 3, 4, 5 and 6, respectively.

The transport vehicles used by the farmers or traders for animal movements are also registered to facilitate another layer of information in the traceability of animal movements. The registration includes the vehicle registration plate number and also the names and contact numbers of the driver and assistant driver. As a completion for the animal movement tracing, the ruminant transport vehicles are sealed with seal tags to prevent diversion to unauthorized destination and the seals will be opened at the final destination by the veterinary authority. This procedure was designed to prevent spread of livestock diseases especially under the Foot and Mouth Disease (FMD) control program. To date, 15,356 transports have been registered for animal movement and the registration will continue to increase with time.

Table 2: Total of premises registered with DVS, Malaysia (up till August 2013)

Premise classification	No. of premises
Abattoir/Slaughter houses	259
Animal recreational/Sport/Training centre	46
Animal pound	5
Animal product outlet	91
Animal protection centre	7
Cold storage/ Warehouse	49
Entry point	26
Feed mill	60
Government-approved quarantine station	160
Government quarantine station	13
Grazing area	530
Hatchery	41
Holding yard	88
Livestock farm	30,858
Livestock waste premise	6
Milk collecting centre	33
Pet breeding premise	12
Pet owner's house	2,451
Pet shop	517
Pharmaceutical outlet	10
Processing plant	311
Satellite farm	42
Small and medium scale premise	692
Special purpose dog premise	5
Swiftlet premise	5,783
Target area concentration	17
Trader’s premise	442
Veterinary clinic /Hospital	176
Veterinary laboratory	19
Veterinary research/ Training centre	19
Veterinary services office/Centre	145
Wet market	667
Zoo / Animal park	22
Total	43,602

Source: SKAPP, Biosecurity Management and SPS Division, DVS

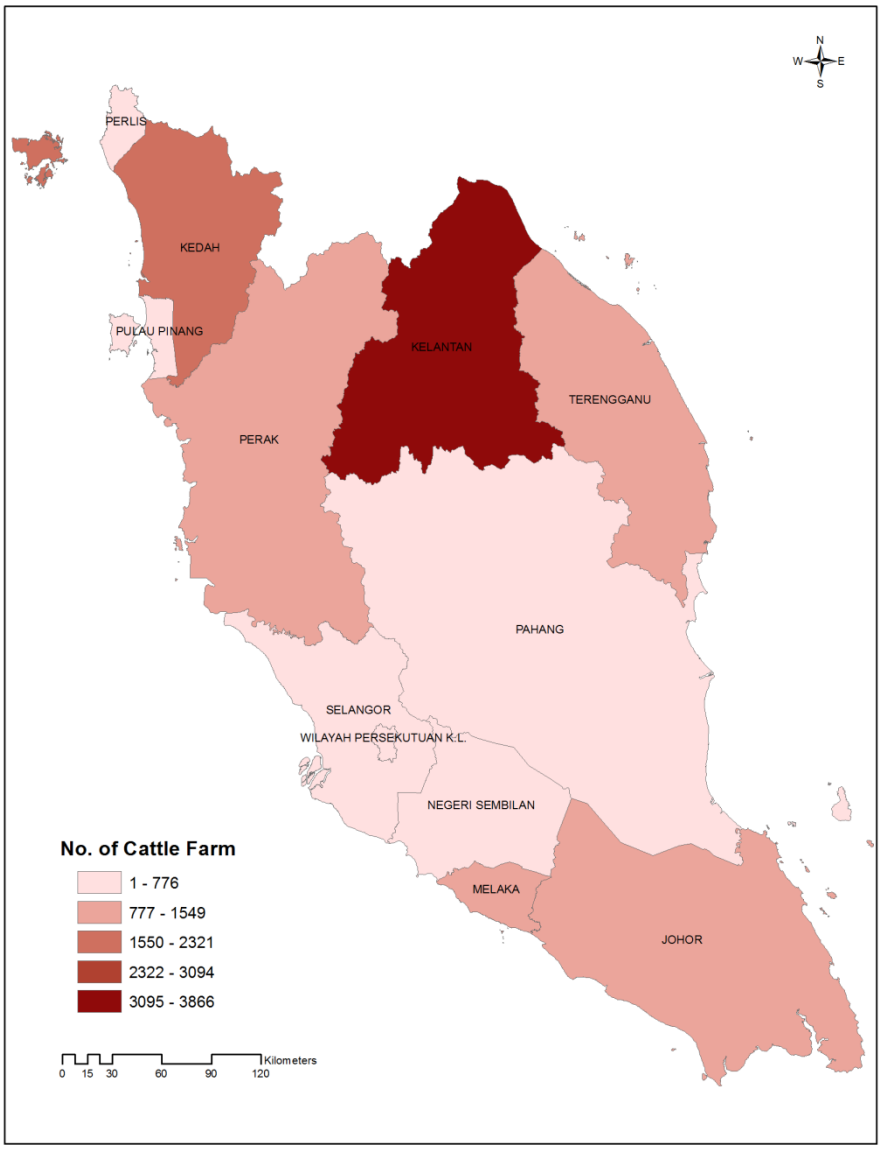


Figure 3: ePermit2 - Distribution of cattle farm in Peninsular Malaysia

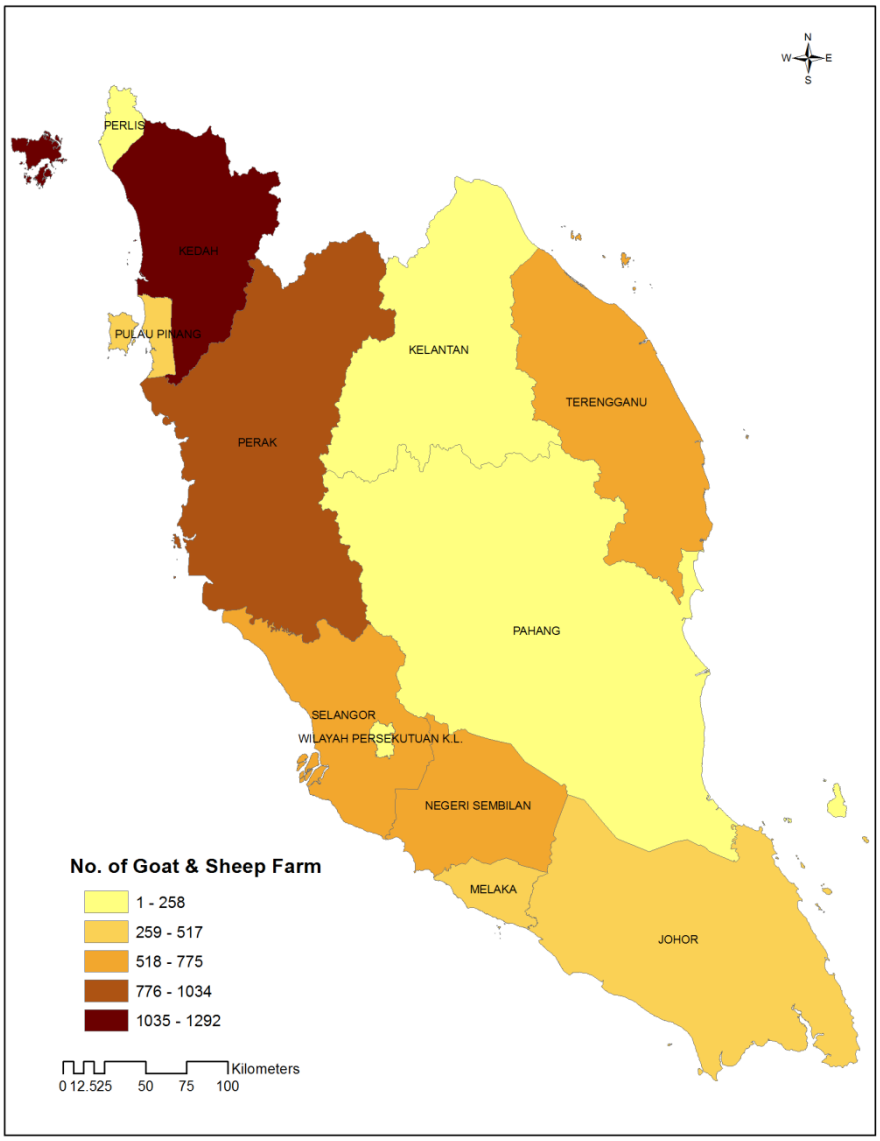


Figure 4: ePermit2 - Distribution of goat and sheep farm in Peninsular Malaysia

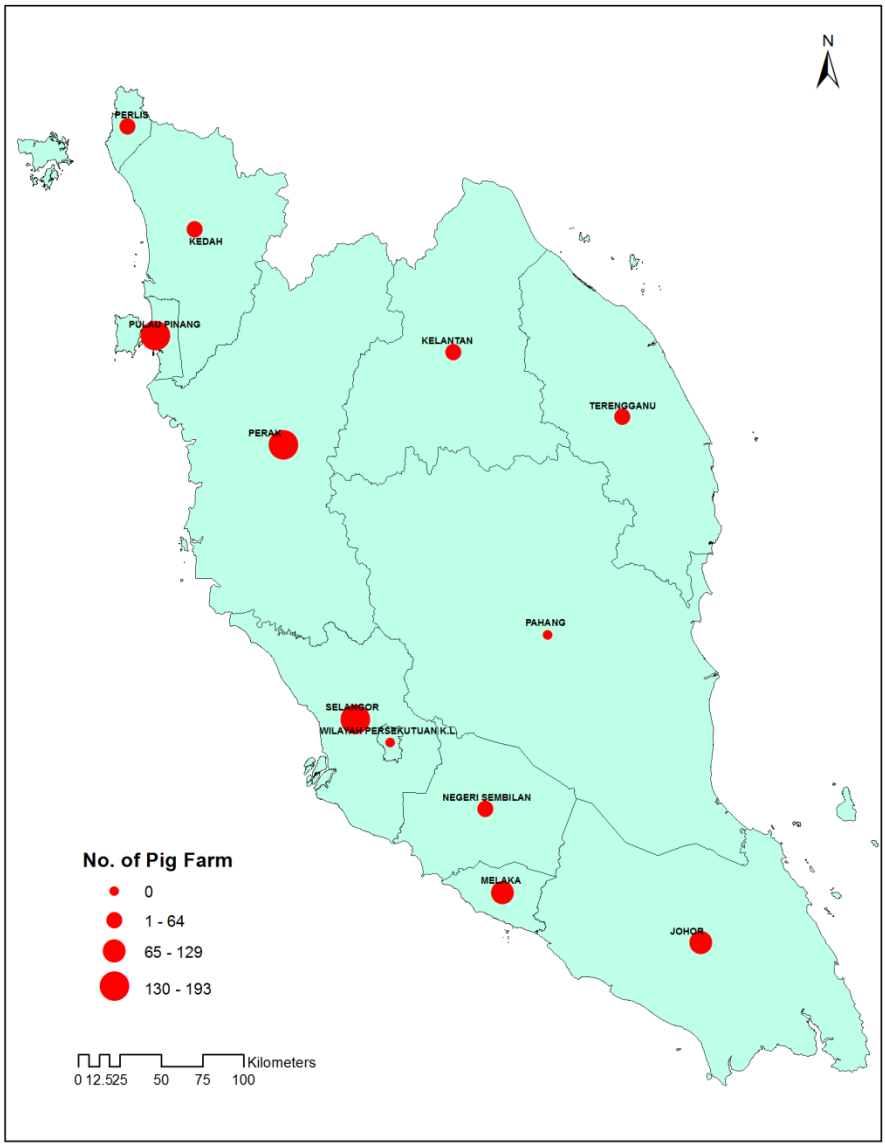


Figure 5: ePermit2 - Distribution of pig farm in Peninsular Malaysia

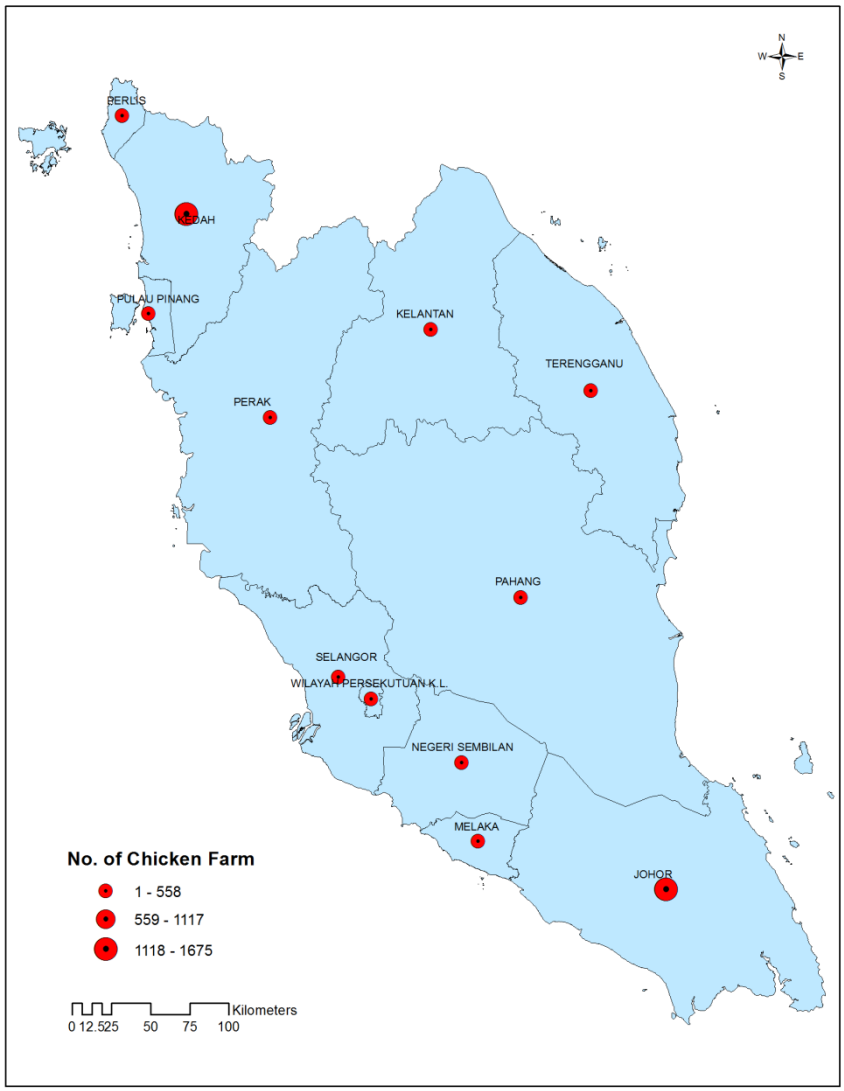


Figure 6: ePermit2 - Distribution of chicken farm in Peninsular Malaysia

Besides that, the animals especially ruminants are individually identified with visual ear tags or RFID tags while non-ruminants such as chicken and pigs are identified in groups using batch number and ear notching respectively. Currently, the RFID tag used is specified as a low frequency (LF) and full-duplex RFID tag. The result as illustrated in Figure 7 showed that the usage of RFID tags is higher than the visual ear tags; the Director General of DVS had implemented a mandatory procedure the use of RFID tags for imported cattle since year 2009. For local animals, the use of RFID tagging is optional but encouraged.

The inter- and intra-state modules are used to manage the animals and animal

products movement. In order to approve an application for the animals and animal products movement, the disease status in the premise origin must be countercheck. Upon arrival at the farms or slaughter houses, the permits and veterinary health certificates are verified by the district veterinary authority or a meat inspector. Any non-compliance found is reported to the Enforcement Division or Biosecurity and SPS Management Division for further investigation. Table 3 shows the number of inter-state permit issued from year to year since the implementation of the ePermit2 system. Meanwhile, the intra-state module was officially implemented in August 2012. Up till September 2013, 9,998 permits were issued.

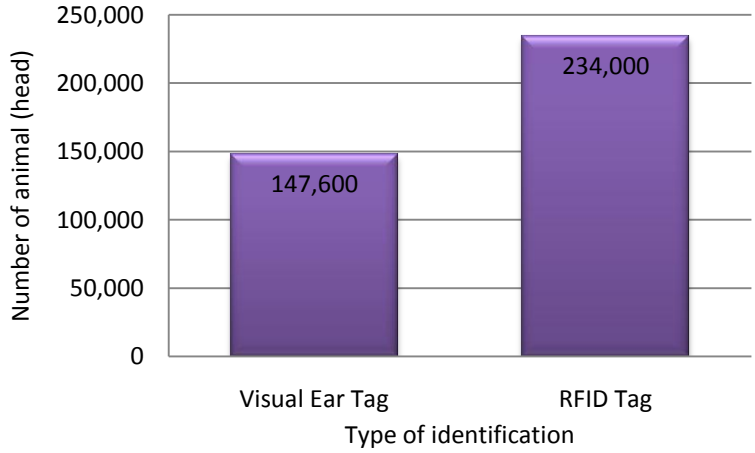


Figure 7: Frequency of animal with different types of identification (up till August 2013)

Table 3: Total number of inter-state permits issued per year

Permit	Number of permits issued per year				
	2009	2010	2011	2012	2013(Aug)
AKPK*	5,050	21,208	32,586	27,895	20,917
AKPM**	5,050	21,208	32,586	27,895	20,917
Total	10,100	42,416	65,172	55,790	41,834

Source: SKAPP, Biosecurity Management and SPS Division, DVS
*AKPK – Animal movement out of the state permit
**AKPM – Animal movement into the state permit

The Pet Passport System was officially launched in year 2012. The system had been used as a trial since January 2011. The system is used to register pets such as cats, dogs, horses, and rabbits. The objectives of the system are to control pet diseases, to improve the pet traceability system, to encourage responsible pet ownership and to promote animal welfare awareness. The individual pet is identified with the injectable RFID and the owner is given a pet passport document. Up till August 2013, 4,665 pets have been registered with 2,992 Malaysian owners and 125 foreign pet owners residing in Malaysia as shown in Table 4.

The eBreed System was officially launched in October 2011. The system is used to register pure bred livestock which include cattle, goat, sheep, buffaloes and pigs. This applies to both the local and imported animals which have certificates of birth issued by the local authority or the veterinary authority. The system aims to gain international level breed status, to value add pure breed animals through a valid registration and to facilitate the implementation of compensation during disease outbreak. Applications for pure bred livestock certificates are assessed by the state and federal veterinary authorities. They will then certify the authenticity of the breed purity through the on-site inspection. Table 5 shows cattle was the highest species to be registered.

Table 4: Total of pets registered

Type of pets	No. of pets
Cat	2,847
Dog	1,714
Horse	94
Rabbit	10
Total	4,665

Source: SKAPP, Biosecurity Management and SPS Division, DVS

Table 5: Total pure bred livestock registered in eBreed system

Species	No. of animals
Cattle	72
Goat	24
Sheep	4
Buffalo	0
Pig	0
Total	100

Source: Livestock Resources and Technology Development Division, DVS

The Malaysian BurungWalit Registration System was developed in year 2005 and was upgraded in 2012. The system register swiftlet houses and bird's nest processing plants. The registration is done separately from the ePermit2 system to fulfill the importing country requirements. The premises are identified with an embedded RFID device. Up till August 2013, 6,860 swiftlet houses have been registered.

The TAC Online system is managed by Beef Section, Livestock Commodity Development Division. This system registers29 target area concentrations (TAC) that rear cattle in oil palm plantations. It also registers the farmers receiving the subsidies under Livestock Entrepreneur Transformation Scheme (TRUST Scheme). The TAC's coordinators update the data annually to monitor the performance of the farmer.

The Animal Disease Information Centre (ADIC) was developed as Malaysia's disease reporting system. The disease status from ADIC is reported to OIE twice a year. This system is effective since 2008 and managed by Epidemiology and Surveillance Section (EpiS), Biosecurity Management and SPS Division. The reported diseases are managed using color coded system as illustrated in Figure 8.

The modular system works separately in different databases. The Internet Portal Veterinary Epidemiology Information System (ipVEINS) is a platform to integrate not only all the databases in place but also records all the services and activities conducted by the veterinary authority. The system further produces reports including time series, frequency, listing and multi-level reports. This system uses the premise identification codes from the ePermit2 system to tie up the information with the premises which allows trace back whether to study epidemiology, food safety, zoonotic disease eradication and so on. Although the system is still in the development process, it is expected to produce a higher quality system and provides more informative and intelligence data.

Color codes	Description
	Disease reported but not confirmed
	Investigation completed and disease confirmed
	Disease control measures in place
	Disease recovered and active surveillance in place
	Disease freedom

Source: EpiS, Biosecurity Management and SPS Division, DVS

Figure 8: Color coded disease index management

The implementation of the animal traceability system is carried out based on Animal Act,1953 (revised 2013), Animal Rules,1962 and State Enactments. Besides that, DVS has enforced compliance with the Malaysia Veterinary Protocols (MVP), Malaysia Veterinary Standard Operating Procedures (MVSOP) and Import Protocols (IP). The protocols and procedures explain the regulations in force and how procedures should be performed. The enforcement is subject to the directive of the current DG.

Conclusion

The animal traceability system is very useful when the structure is designed properly. The three main components: animal identification, premise and owner registration and animal movement tracing, represent the most important information to complete the traceability system. For disease control, these three main components should be developed and linked. While for farm management or to prevent animal from stolen, systematic animal identification and recording system is adequate.

The ePermit1 and ePermit2 system allows the animal movement to be monitored closely by the veterinary authority. The information required can be produced in real time with the availability of internet facilities. This online system has changed the method in disease control program and it seems to be more efficient and user friendly. The farmer can choose to apply for import/export and movement permit by themselves or go to the nearest veterinary offices located in all districts. Further study should be conducted to know the benefit of the system.

From the enforcement perspective, the number of illegal movement cases has reduced. The farmers or traders find it easier, faster and more cost benefit to move their animals legally. The movement into and out of state permit can be applied and produced at one stop center including the payment of permit's fees.

Although the animal traceability system does not prevent disease to occur, but we can predict the animal at risk and minimize the risk by implementing the disease control strategy at the right place and time. Besides that, the animal traceability system can help to investigate the disease occurrence back to the animal origin.

From Malaysia's experience, the implementation process has to be synchronized with the current legislation to achieve the goals of the development. The evaluation of the system will lead the country to strengthen the traceability system and improve the weaknesses.

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