



Sustainable Livestock Production in the Perspective of
Food Security, Policy, Genetic Resources, and Climate Change

Proceedings Full Papers

10-14 November 2014, Yogyakarta, INDONESIA



The 16th AAAP Congress



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**SUSTAINABLE LIVESTOCK PRODUCTION IN THE
PRESPECTIVE OF FOOD SECURITY, POLICY, GENETIC
RESOURCES, AND CLIMATE CHANGE**

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Asian-Australasian Association of Animal Production Societies

✧ **Scope of AAAP:** AAAP is established to devote for the efficient animal production in the Asian-Australasian region through national, regional, international cooperation and academic conferences.

✧ **Brief History of AAAP:** AAAP was founded in 1980 with 8 charter members representing 8 countries-those are Australia, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines and Thailand. Then, the society representing Taiwan joined AAAP in 1982 followed by Bangladesh in 1987, Papua New Guinea in 1990, India and Vietnam in 1992, Mongolia, Nepal and Pakistan in 1994, Iran in 2002, Sri Lanka and China in 2006 , thereafter currently 19 members.

✧ **Major Activities of AAAP:** Biennial AAAP Animal Science Congress, Publications of the Asian-Australasian Journal of Animal Sciences and proceedings of the AAAP congress and symposia and Acknowledgement awards for the contribution of AAAP scientists.

✧ **Organization of AAAP:**

- President: Recommended by the national society hosting the next biennial AAAP Animal Science Congress and approved by Council meeting and serve 2 years.
- Two Vice Presidents: One represents the present host society and the other represents next host society of the very next AAAP Animal Science Congress.
- Secretary General: All managerial works for AAAP with 6 years term by approval by the council
- Council Members: AAAP president, vice presidents, secretary general and each presidents or representative of each member society are members of the council. The council decides congress venue and many important agenda of AAAP

✧ **Office of AAAP:** Decided by the council to have the permanent office of AAAP in Korea. Currently # 909 Korea Sci &Tech Center Seoul 135-703, Korea

✧ **Official Journal of AAAP:** Asian-Australasian Journal of Animal Sciences (Asian-Aust. J. Anim. Sci. ISSN 1011-2367. <http://www.ajas.info>) is published monthly with its main office in Korea

✧ **Current 19 Member Societies of AAAP:**

ASAP(Australia), BAHA(Bangladesh), CAASVM(China), IAAP(India), ISAS(Indonesia), IAAS(Iran), JSAS(Japan), KSAST(Korea), MSAP(Malaysia), MLSBA(Mongolia), NASA(Nepal), NZSAP(New Zealand), PAHA(Pakistan), PNGSA(Papua New Guinea), PSAS(Philippines), SLAAP(Sri Lanka), CSAS(Taiwan), AHAT(Thailand), AHAV(Vietnam).

✧ **Previous Venues of AAAP Animal Science Congress and AAAP Presidents**

I	1980	Malaysia	S. Jalaludin	II	1982	Philippines	V. G. Arganosa
III	1985	Korea	In Kyu Han	IV	1987	New Zealand	A. R. Sykes
V	1990	Taiwan	T. P. Yeh	VI	1992	Thailand	C. Chantalakhana
VII	1994	Indonesia	E. Soetirto	VIII	1996	Japan	T. Morichi
IX	2000	Australia	J. Ternouth	X	2002	India	P. N. Bhat
XI	2004	Malaysia	Z. A. Jelan	XII	2006	Korea	I. K. Paik
XIII	2008	Vietnam	N.V. Thien	XIV	2010	Taiwan	L.C. Hsia
XV	2012	Thailand	C.Kittayachaweng	XVI	2014	Indonesia	Yudi.Guntara.Noor

Remark from Chairman of the 16th AAAP Congress

Dear all of the scientists, delegates, participants, ladies and gentlemen,

As the host of the 16th AAAP Animal Science Congress, we do impress, thankful, and present a high appreciation for your participation in joining the 16th AAAP Conference in Yogyakarta, Indonesia. We can see the very great enthusiasm of all the scientists to solve livestock problems as well as to share valuable information and knowledge for human prosperity all over the world.

A large numbers of representatives are participating in this conference, which indicates that the interest in the field of animal science is continuously increasing among member countries. We have invited some Plenary Speakers and Invited Papers who are qualified as scientists and bureaucrats in animal science field to share their valuable information and knowledge. Other participants can deliver their precious research through oral and poster presentations. This congress is also paralleled to symposium held by livestock organization and institution as well as some academic meetings.

The theme of the 16th AAAP Congress is “Sustainable Livestock Production in the perspective of Food security, Policy, Genetic Resources and Climate Change”. We believe that animal production in Asia and Australasia has become important and strategic sector to provide high quality food, opening up job opportunities, as well as improving farmer’s welfare. Animal science societies, therefore, have to support this growing interest by providing more appropriate and relevant technologies to improve efficiency of resources utilization to produce more animal protein food by member countries. Long term sustainable livestock production will, therefore, be significantly influenced by the national food policy, climate change issues, as well as conserved environments and genetic resources.

On behalf of 16th AAAP Committee and all associates, we wish all of the participants having a great achievement of success and fulfill the expectation as well as enjoying the interaction with all scientists participating the Congress.

High appreciation we may acknowledge to all of sectors, especially for His Majesty of Royal Palace of Yogyakarta, Sri Sultan Hamengku Buwono X, and Rector of Universitas Gadjah Mada, who have concerned to facilitate the Congress site host. Special thank to the Steering Committee, Scientific Committee, Reviewers and Editorial Boards for their great contribution to make the Congress successfully organized.

To you, your excellencies, invited guests and delegates, thank you for choosing to come to this conference and to Indonesia. We hope the arrangements we have put in place meet with your requirements. We wish you fruitful deliberations and an intellectually and socially rewarding stay in Yogyakarta.

We are looking forward to meeting you all in the future congress to continue.

Terimakasih (Thank you)



Budi Guntoro

Chairman of the 16th AAAP Congress

16th AAAP PRESIDENT'S REPORT

Selamat pagi!

Dear Ladies and Gentleman

Attendants of 16 AAAP congress:

It is my great pleasure and honor to welcome all of you at The 16th AAAP Congress on November 10 – 14, 2014 at Grha Sabha Pramana, Universitas Gadjah Mada, Yogyakarta Indonesia. This Congress is jointly organized by The Indonesian Society of Animal Science (ISAS), Indonesian Agency for Agricultural Research and Development, Indonesian Directorate General of Livestock and Animal Health Services-Ministry of Agriculture and Faculty of Animal Science Universitas Gadjah Mada. Universitas Gadjah Mada Campus is located in Yogyakarta, one of the Special Region in Indonesia where culture and tradition live in harmony with the modern nuance and educational spirit makes it a beautiful venue of this Congress.

The 16th AAAP Program consists of scientific and technical programs as well as social and cultural activities. The scientific and technical programs offer five plenary sessions, two satellite symposia, field trip, and many scientific sessions, both oral and poster presentations.

During this event distinguished scientists from all over the world will present plenary papers ranging from livestock policy, food security, local genetic resources, climate change, animal welfare, international trade, as well as global research agenda. I believe that around 1,200 scientists as well as livestock producers, companies, graduate and postgraduate students from 40 countries are attending the Congress and more than 770 research papers will be presented. The Congress also provides not only opportunities to discuss and exchange information and experience with scientists from different regions of the world, but also a good environment to build up friendship between nations is our ultimate goals for the Congress outcome. Moreover, this congress also keeps its tradition to be a forum of communication among researchers, academician, industries and related stakeholders among Asian-Australasian countries.

The social and cultural programs are specially designed to be very important for the congress participants since the promotion of friendship and future scientific cooperation are also central to this AAAP Congress. The Opening Ceremony will offer you the Congress Program at a glance. In addition, participants will also join at a warm Welcome Dinner gathering at Keraton Yogyakarta. Sri Sultan Hamengku Buwono X, His Majesty of The Royal Palace of Yogyakarta will give you the most memorable moment during this event.

Moreover, cultural night offers us an opportunity to introduce significant culture from participants' countries and gives a spectacular performance to enjoy in order to strengthen our friendship and future cooperation. Field trip, on the other hand, provides a wonderful sightseeing to the most valuable ancient heritage around Yogyakarta, such as Borobudur and Prambanan Temples, and more other interesting places to visit. I do hope that you enjoy your stay in Yogyakarta and not miss all of these spectacular opportunities.

Closing Ceremony will be held on November 14, 2014 immediately after the last session of presentation. During this great moment we will welcome the next host of the 17th AAAP Congress to deliver a brief message. The AAAP Congress Award will provide and announce some participant who receive appreciation for their valuable research.

With all of our hospitality, we will try our best to make your brief visit to Yogyakarta and our beautiful country Indonesia, become a wonderful experience and memorable moments.

I wish you all a very pleasant and most enjoyable stay in Yogyakarta, Indonesia.

Terima kasih (Thank you).

A handwritten signature in black ink, appearing to read 'Y. Guntara Noor', written over a diagonal line that extends from the bottom left towards the right.

Sincerely Yours
Mr. Yudi Guntara Noor
President
The 16th AAAP Congress

PREFACE

The proceedings of the 16th Congress of the Asian-Australasian Association of Animal Production Societies (AAAP) held on 10-14 November 2014 at Grha Sabha Pramana, Universitas Gadjah Mada, Yogyakarta, Indonesia, consist of two volumes. Those are Volume I of Plenary and Invited Papers and Volume II of Abstracts Contributed Papers. This is the second volume of the proceedings that contains a total of 754 abstracts, consist of 368 papers for oral presentation and 386 papers for poster. Papers were categorized into various disciplines, such as Nutrition and Feed Technology; Genetics and Reproduction; Physiology, Animal Welfare and Health Management; Product Technology and Food Safety; Waste and Environmental issues; Forage Agrostology; as well as Agribusiness, Marketing, Extension and Community Development. The scientific committee has initially received a total of 1,028 abstracts from 42 countries. After reviews have been made, 60 of them were rejected and 74 were cancelled by the authors. The reviewers consist of 4 international and 71 internal reviewers from 6 universities and 1 research institute in Indonesia. In the interest of time limitation for proceedings publication, we apologize for not including 140 submitted abstracts in the proceedings since they were not being followed up with full manuscripts until the extended due date we offered.

The scientific committee would like to thank all the reviewers and appreciate their effort to make significant contribution in reviewing the full manuscripts. Similarly, we would also like to thank supporting staffs at the secretariat office of the Faculty of Animal Science, Universitas Gadjah Mada as well as of the Indonesian Center for Animal Research and Development who have helped in the preparation of the proceedings. Finally, we would like to thank all the authors for their valuable contribution to the congress and make it useful for our societies.

Editorial Team

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B 412 DZ	Effects of Marl and Kaolin on Growth Performances, Digestive Efficiency and Wet Droppings of Broiler Chickens <i>D. Ouachem, A. Meredef, A. Kalli, N. Kaboul, A. Mehdaoui, and Z. Ahmed Gaid</i>	1958

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B 766 ID	The Effect of Utilization Chitosan-Turmeric Extract in the Diet of Broiler Chicken As An Immunomodulator <i>Ari Kusuma Wati, Zuprizal, Supadmo, and Sundari</i>	1984
B 788 TW	Effects of Dietary Supplementation of Sorghum Distillery Residue and Its Solid Fermented Product on Growth Performance and Immune Response in Broilers <i>P. H. Lin, Y. T. Chen, F. C. Tsai, S. M. Lee, and I. H. Chen</i>	1987
B 853 NG	Growth Performance and Organoleptic Properties of Broilers Fed Rumen Filtrate Fermented Shea Nut (<i>Vitellaria paradoxa</i>) Meal <i>D. N. Tsado and J. Akinwolere</i>	1991
B 868 KR	Effects of Lysophospholipids on Growth Performance, Nutrient Digestibility, Blood Profiles and Carcass Traits in Broilers <i>Y.K. Hyun, W. Boontiam, Y. J. Ji, L. H. Fang, H. J. Kim and Y.Y. Kim</i>	1995
B 872 KR	Effects of Gromax [®] Supplementation on Growth Performance, Carcass Traits, Blood Profiles and Secretion of IGF-1 in Broiler Chickens <i>J. S. Hong, G. I. Lee, J. M. Kim, H. S. Choi and Y. Y. Kim</i>	1999

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B 957 LK	Effect of Phytase Enzyme on Phosphorous Availability of Broiler and Breeder Rations <i>M. A. J. P. Munasinghe, R. M. A. S. Bandara, B.C. Gallawattage and G. Weerakkody</i>	2005
B 1018 TW	Effect of Pelleting of Two Stage Fermented Process on Feed Composition, Broiler Growth Performance and Nutrition Digestibility <i>R. H. Yeh and K. L. Chen</i>	2008
B 1019 TW	Two Stage Fermented Process Improved Standardized Ileal Amino Acid Digestibility of Feather Meal in Broilers <i>K. L. Chen and R. H. Yeh</i>	2012
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B 1023 KR	Effect of Dietary CTCzyme® Supplementation on Broiler Performance Andde Novo Gut MOS Formation <i>S. Aditya, S. H. Jang, J. H. Min, W. S. Siau, J. H. Lee, M. Ahammed and S. J. Ohh</i>	2020
B 1027 TW	Metabolizable Energy of Local Grown Cassava in Taiwan and the Feasibility in Replacement for Corn in Broiler Feedstuff <i>S.R. Lee, L. Ananda, Y.H. Chen, B.H. Lin and S.Y. Wang</i>	2024
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Rearing Lactating Horse for Farmers' Additional Income: A Case Study in Saneo Village, Dompu, West Nusa Tenggara, Indonesia

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ABSTRACT

Sumbawa wild horses' milk is famous in Indonesia because of its use for good recovery. The study was aimed at to describe the management of lactating horses for milk production and the income analyses of farmers raising horse for milk production in Saneo village Waja-Dompu, Sumbawa Island, West Nusa Tenggara, Indonesia. A survey was conducted on 30 respondents determined by simple random sampling over 143 farmers raising horse for milk production. Primary data were obtained by conducting the observations and interview based on the questionnaires, and the secondary data were gathered from government institutions. Data related to horse management and horse productivity were analyzed using descriptive method, and the level of farmers' income were analyzed using output-input method. The dairy horse farming in Saneo village was an extensive traditional system and a secondary job for farmers. The lactating horses and their foals were leaved grazing in a common grazing field during the day and kept in the pen near farmers' house during the night and separated with their foals. In the pen, all the horses were only fed about 10 – 20 kg mixture of grass and other roughages without considering the number of the lactating horses and about 1 kg rice bran was given to each lactating horse. Because of the lack of farmers' knowledge in dairy horse management, the mares were only milked at night and in the morning before grazing. The foals were leaved with the mare during the day and weaned naturally, result in the milk production was relatively low. However, the average farmers' monthly income was IDR1.839.486 ±359.869in which 43% of it was derived from milk selling. This additional income was higher than the minimum monthly salary. The results suggest that raising management of lactating mare should be further improved through increasing government role in extension of dairy horse management.

Key Words: Milking mare, Farmer income, Management system, Milk production

INTRODUCTION

Most of human milk consumption are supplied by cows milk. However, in some areas like Sumbawa island, milk is mostly supplied by horse and buffalo milk, and surplus production is sold as an additional income. The composition of horse milk is comparable with human milk, particularly in its' protein, lactose and ash content (Lametti et al. 2001). Furthermore, the casein content and the proportion of casein and whey protein contents of mare's milk is relative low, so it does not clot when acidified, therefore, it is good for infants' food.

Hermawati et al. (2004) reported that milk of Sumbawa mares contains strong antimicrobial activity of nine species bacteria. Rijatmoko (2003) also reported that the Sumbawa horse milk contains antimicrobial agents against *tuberculosis* Mycobacterium. That might cause an outstanding and popular "mare milk" promoted as acure for pneumonia, tuberculosis and typhoid, making its demand and price increases, and may create promising business.

Sumbawa horse milk is partly come from Saneo village and it is sold in the region of Dompu, Mataram, even to other regions such as in Java, including Jakarta and East Kalimantan. This activity is expected to develop as a promising agribusiness to increase framers' income. To support this expectation, it is necessary to provide a base line information for developing the

mare's milk production. Therefore, as an initial stage, this study was conducted to describe the management and productivities of the dairy horses, especially in Saneo village.

MATERIALS AND METHODS

This study was conducted in the Saneo village, Woja, Dompu District, West Nusa Tenggara Province, with consideration that this village has a potency to produce horse milk, both geographically and the quality horse. A survey was conducted on 30 respondents' of total 143 horse farmers by using a systematic random sampling technique (De Vaus 1991). Primary data related to horses' farm performances (identification of farmers and their horses' population); management of dairy horses (breeding and breeding stock selection, feeding system, housing, health, milking and milk marketing); horse productivity (age of puberty, heat period and estrus cycles, age of first mating, gestation period, litter size, foaling interval, age of first milking, daily milk production and milk production/lactation) and farmers' income were obtained by a way of observations and interview based on the questionnaires. While the secondary data such as the horses' population as well as number of farm animals and the size of the region were gathered from government institutions. The average of data related to horses' farm performances, management of dairy horses, and livestock production were analyzed using descriptive method; while farmers' incomes were analyzed using output-input method.

RESULTS AND DISCUSSION

Horses farm in Saneo Village

Saneo Village is one of villages in the Dompu District with an area of 49,000 km² located in the plateau area which is about 9 km from the government center of Dompu. Most villagers in Saneo live from agricultural activities and conducted on dry land. Horse farming and other animal husbandry are their secondary jobs. The horse reared in this village is a pony type horses. Each farmer had 4 ± 2 horses with the population structure consists of 60% of mature female, 11% of mature males and 29% foals. The main goal of this horse farm is to produce milk.

Dairy horses' management

Horse breeding stock. Most respondents (90%) did not consider the quality of the horse in selecting their breeding stock. They only considered the age of the horse. They thought that a good breeding stocks of horses were those being capable in reaching mature body size when their ages of one and a half to two years old. Ninety-five percent of farmers did not know the characteristics of a good horse for breeding stock. Therefore, the development of horse population was going very slow. Consequently, they did not pay particular attention to their horse breeding problem. All these reproductive traits run naturally, where the existing stud at the grazing location mated female at any time, so that productivity of the horses at overall horse farms were relatively lower than the theory proposed by Jacob (1994).

The characteristics of female reproductive parameters were 24.77 ± 1.55 months; 28.13 ± 1.66 hours; 21.00 ± 0.74 days; 26.00 ± 1.2 months; 10.83 ± 0.51 months and 36.43 ± 0.9 months successively for age of puberty, estrus period, estrus cycle, age of the first mating, gestation period and age of first getting birth respectively. The litter size was only one colt which was weaned naturally with the foaling interval of 13 ± 0.83 months. While the characteristics of males reproductive parameters for both the age at puberty were 24.60 ± 1.35 months and the age at the first mating were 25.56 ± 1.2 month. Therefore, it need extensions from related institution, to increase their knowledge of good characteristics and reproduction management of dairy horses.

Feeding system. The horses' feeding system in Saneo village is quite unique. The horses were left roaming freely on pasture at 08.00 am to 05.00 pm. That is why there is a term 'wild horse', then their milk produced is well-known in term of "wild horse' milk". In the late afternoon the horses were escorted back to the pen near the farmers' houses and fed about 15-20 kg of grass/head. Especially for lactating horses one kg of rice bran per head was given before night milking at 07.00 pm. In this study, it was identified the types of feed often given by the farmers when the horses in the stables such as *Sesbaniagrandi flora*, *Gliciridia*, *Leucaenachepala* and mostly field grass. Hermawati (2005) identified 32 types of forage eaten by horses in pasture in island of Sumbawa including in Saneo village indicated that horses consumed many types of plants in the paddocks. However, body condition of the lactating horses in this study was relatively thin. This indicated that their nutrient intakes was not enough to fulfill their nutrient requirement. Additional nutrient intakes from grazing time of only 15-20kg forages and 1 kg of rice bran supplied insufficient nutrients for lactating horses. Therefore, the farmers need to learn about feed and feeding the lactating mare.

Pens. The horse pens are generally built in the yard of farmers' houses and not yet fit the prerequisite of dairy animal. Generally, the condition of stables have bad environment. The cages are built by using second materials and local-available material, with an average of economic age was only one year. The cages have an average wide of 4.2 ± 0.84 m and an average length of 4.4 ± 0.91 m, especially only for lactating horses.

Health maintenance. Farmers generally have a high awareness in the prevention and treatment of the sick horses. They vaccinate their horse against anthrax every year. Vaccination is partially subsidized by the local government, while the sick horses treatment were cashed by themselves by calling the paramedics or veterinary who live around farm.

Milking management. The lactating mares were milked at night when they arrived back in the cage from grazing land and in the morning before the horse leaved the cages to the pasture. The milk production was very low and only 1.5 ± 0.1 liter per day when they were milked since the first week to three months of lactation and 1.1 ± 0.2 liter/day when they were milked for three to six months periods. Low milk production was associated with the type the horse. The horse in Saneo is not a good horse for dairy type. In addition, it is because the colts were left roaming freely on pasture and suckling to their dam during the day. The farmers were not wean the colts to keep the dam producing milk, so it can be used commercially. They did not know the animals would remain lactating despite the colts was weaned, provided that the dam was continuously milked. Theoretically, although the young off spring are early weaned, the mothers continue producing milk as long as they are given more amounts of feeds. On the other hand, the farmers realized the importance of producing milk hygienically. Before milking, they cleaned every thing related to prevent milk contamination, and in milking time, the foals were tied up away from their mother.

Farmers' income

The average of farmers' net income was IDR 1.839.486 \pm 359.869 monthly which about 43% derived from milk selling (Table 1) with the price of IDR 25.000 per liter. This net income reached above the monthly minimum salary of IDR 1.100.000 in 2013. This means that in the Saneo village the farmers' income significantly. It is important to improve the management of lactating mare in this village by educating them and supporting their financial.

Table 1. Net farm income of farmers rearing lactating horses (2013)

Item	Total cost (IDR)	Minimum monthly salary in 2013 (local government) (IDR)
Fixed cost	612.563± 212.255	
Variable cost	331.552±95.527	
	Total cost	
	944.115± 238.455	
Gross income		
Value of horse sold (+)	8.312.694± 2.364.261	
Horsevalue end of the accounting year (+)	14.275.000± 5.912.734	
Horsevalue at stating year (-)	10.004.662 ± 4.814.047	
Value of horse milksold (+)	9.491.750± 2.202.886	
	Total revenue	
	22.074.782±4.359.249	
Annual net farm income	22.073.838±318.438	
Monthly net farm income	1. 839.486 ±359.869	1.100.000

IMPLICATIONS

Raising horse for milk production increases farmers income. Their income may be further increased by improving the management of the lactating mares.

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CERTIFICATE



This is to certify that

A. RAI SOMANING ASIH

has participated as a

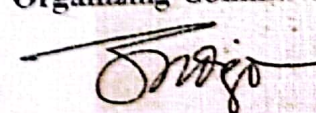
ORAL PRESENTER

at the 16th Asian-Australasian Association of Animal Production Societies Congress
“Sustainable Livestock Production in the Perspective of Food Security, Policy, Genetic Resources and Climate Change”
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