

## **REPORT OF THE ORGANIZING COMMITTEE**

**Bogor, July 24<sup>th</sup>, 2007**

- The Honourable Director General of Livestock Services, Prof. Dr. Tjeppy D. Soedjana
- The Honourable Director General of Agency for Agricultural Research and Development, Prof. Dr. Achmad Suryana
- President and Vice President of the World Rabbit Science Association, Prof. Steven Lukefahr (USA) and Prof. Luc Maertens (Belgium)
- The Honourable Mayor of the Bogor District, Mr. Diani Budiarto
- Director of Indonesian Centre for Animal Research and Development, Dr. Abdullah M. Bamualim
- Distinguished delegates from overseas, participants of the Seminar, Ladies and Gentlemen,

Greetings !!

On behalf of the Organizing Committee allow me to extend our sincere and warmest Welcome or “Selamat Datang” to you all in this very First International Seminar on Rabbit Production in Indonesia. It really is a great pleasure to see you all gather here together for the same objective.

I am pleased to inform you that this Conference is attended by participants from 4 continents. Coming from 8 countries, represented by USA and Mexico, India, Belgium, Italy, Hungary, Nigeria, and of course from Indonesia, as you may have seen the displayed flags of the country of origin of participants. Eighty two people, a number beyond our expectation, consist of research scientists and academics (55%), rabbit businessmen (10%), rabbit farmers (20%), extension workers from livestock services (10%) and others, including students and hobbyists (5%) are participating in this Seminar. Total number of papers contributed for the seminar are 46; 13 from overseas and the rest come from Universities and Research Institutes –two articles come from far away, West Sumatera and Papua. Papers cover various aspects of breeding, nutrition, management, reproduction, meat and fur processing, and also strategic policies for the small – and medium –scale farming of rabbits. These papers will be published in a Proceedings.

The seminar activities, the oral presentation of papers, all are held plenary, carried out in this auditorium for all participants. The poster presentation is open for the whole 2 days of seminar, but there will be a special time in the second day devoted for this session. The post congress tour, for those who are participating, is started at the afternoon of the second day, leaving for Lembang and then followed by the next program to Magelang and Bali.

I would like to express my sincere gratitude to the Director General of AARD, Prof. Dr. Achmad Suryana for his support and encouragement to organize this meeting. Without it, this meeting may never take place. To the Director of ICARD Dr. Abdullah M. Bamualim, who has been supporting this Seminar since the first time, including allocating budget for this Seminar. Also to the Director General of DGLS that has supported to inform his staffs all over Indonesia, especially in Java, to participate in the Seminar. A gratitude is also conveyed to Mayor of Bogor District, for his support to provide the venue and all required facilities for this seminar.

A special thank is extended to Prof. Steven Lukefahr (USA), the President of WRSA, and Prof. Luc Maertens (Belgium), the Vice President of WRSA. Both gentleman encouraged and urged me to go on organizing this Seminar I am, personally happy with the presence of Prof. Cheeke (USA),

my former supervisor at OSU, whose support for rabbit production in the world is outstanding. To Prof. Zsolt Szendro (Hungary), Prof. Alessandro Finzi (Italy), Prof. Carlos Becceril Perez (Mexico), Prof. Csilla Eiben (Hungary), Prof. Y.B. Rajeshwari (India) and Dr. C.A. Chineke (Nigeria), who come from a very long distance, I am grateful. To my fellows and friends participants from Indonesia thank you also for participating in this Seminar. I do believe that your participation will contribute a significant benefit to the development of rabbit industry in Indonesia.

Lastly, I would like also to thank all parties and members of both Steering and Organizing Committees, who have been working very hard and spend their time and energy to make this seminar possible. Nevertheless, as there is a saying .... Nobody's perfect. On behalf of the Committee I would like to apologize if there is any inconveniences in organizing this Seminar. Please do not hesitate to contact anyone in the Organizing Committee if you have any queries. Wishing you all to enjoy this Seminar and memorable stay in Indonesia.

Bogor, 24<sup>th</sup> July 2007,

**Dr. Yono C. Raharjo**  
Chairman of the OC

**WELCOME ADDRESS**  
**DIRECTOR CENTRE FOR ANIMAL RESEARCH AND**  
**DEVELOPMENT**  
**AGENCY OF AGRICULTURAL RESEARCH AND**  
**DEVELOPMENT**  
**Bogor, July 24<sup>th</sup>, 2007**

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First of all, let us thank God Almighty, that because of His amazing grace, we all are able to gather here at the International Seminar on Rabbit Production. It is my privilege and pleasure to welcome you all to this Conference. A deep appreciation is extended to you, especially the overseas delegates, who have come a long long way from your home country. I really am proud that we have representatives from 4 continents (America – USA and Mexico, Asia – India, Europe – Belgium, Italy and Hungary, and from Africa – Nigeria).

Indonesian Centre for Animal Research and Development (ICARD) coordinates research in animal production, which is managed by Indonesian Research Institute for Animal Production (IRIAP) and in animal diseases, managed by Indonesian Research Institute for Veterinary Science (IRIVS). Within the IRIAP, we do research on the production of various livestock animals, such as dairy cattle, sheep and goat, duck and chicken and also rabbits.

Interest in raising rabbits and shifting from family own consumption to income orientation is responded through a more intensive research in rabbit production. It has been reported that rabbit raising, although mostly in a very small scale operation, could contribute significant income to the farmers in the villages. Areas such as Brastagi (North Sumatera), Nagari Sembilan (West Sumatera), Lembang and Pangalengan (West Java), Kopeng, Magelang, Tawangmangu and Kaliurang (Central Java and Yogyakarta), Sarangan and Malang (East Java) and Bedegul (Bali) are places where rabbit farmings have become earnings for farmers. Not only the meat and fur from rabbit that can be utilized, apparently, its manure and urine have become very popular as organic fertilizer for vegetables and cut flower. Nevertheless, these high potentials and prospects from the rabbits have not been fully utilized. Lack of good quality breeding stock, short of technologies, expensive feed for intensive farming, slow growth, high mortality, are among problems faced by farmers. Indeed there are still lots of research to be done to improve the rabbit production, especially for Indonesian situation.

The theme of the Conference “Towards Small – and Medium – Scale. Rabbit Production” is a good choice as this covers not only medium to big farmers, but also the small farmers even the “household – type farmers’ are also well thought. Through this Seminar, where collaborative studies may be linked, ideas may be exchanged and, knowledges and experiences may be shares, I

believe that significant contribution to increase farmers welfare through rabbit production is not a dream.

On behalf of the ICARD, I extend my sincere gratitude to Honorable Director General of AARD – Prof. Dr. Achmad Suryana, Director General of Livestock Services – Prof. Dr. Tjeppy D. Soedjana, for your moral and material supports, and more importantly for your presence here, that give us a great encouragement to improve the development of rabbit production in Indonesia. To the Mayor of Bogor District Mr. Diani Budiarto for his courtesy of the venue and its facilities, A great thanks is also extended to our distinguished delegates from various countries as well domestic participants, researchers, rabbit farmers, who are willingly spending your valuable time to help improving rabbit production in Indonesia.

I would like also to thank all parties and members of both Steering and Organizing Committees, who have devoted their time to make this seminar success. Allow me, for this event, to request Prof. Dr. Achmad Suryana, the Director General of AARD, to officially open this Seminar.

Bogor, 24<sup>th</sup> July 2007

**Dr. Abdullah M. Bamualim**  
Director of ICARD

**ADDRESS FROM DIRECTOR GENERAL  
OF AGENCY OF AGRICULTURAL RESEARCH AND  
DEVELOPMENT  
ON THE OPENING CEREMONY OF INTERNATIONAL  
CONFERENCE ON RABBIT PRODUCTION  
Bogor, July 24<sup>th</sup>, 2007**

- The Honourable Director General of Livestock Services, Prof. Dr. Tjepny D. Soedjana
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- Distinguished delegates from overseas, participants of the Seminar, Ladies and Gentlemen,

It is indeed my pleasure to welcome you all to Indonesia, especially to those who come to Indonesia at this very first time. My warmest welcome and appreciation is extended to you for your participation in this first International Conference on Rabbit Production in Indonesia. The Agency of Agricultural Research and Development (AARD) through the Indonesian Centre for Animal Research and Development (ICARD) is very delighted to host this meeting.

As may also occur to some other countries, rabbit has become very popular livestock raised by farmers in the villages. Such case also occurs in Indonesia and especially nowadays, interest in raising rabbit increases very rapidly. From North Sumatera to Papua, except in Kalimantan, Maluku and Nusa Tenggara, raising rabbit is not longer strange to farmers. Rabbit gains its popularity. Initially, as early as 1980, rabbits were widely distributed by Government to farmers in the village areas to improve animal protein consumption. At such time a concept of rabbits as “mini meat factory” was popular. At present however, the objective has shifted to raising rabbits as a significant earnings for rabbit farmers. It is also reported that more and more farmers increasing the numbers of their rabbit population. Although the majority of farmers raised small number of rabbits (5 – 20 does), it is no longer surprising if some farmers have significant numbers of rabbit (200 – 500 does). The rabbit farming is moving from hobby to industry. Therefore the theme for this conference: “Towards Small and Medium Scale Rabbit Industry” is considered as appropriate for the development of rabbit farming, especially for Indonesian situation.

There, of course, some problems still exist that may discourage this development; in productivity, including high mortality before and after weaning, psychological feelings (‘bunny syndrome’) in consuming rabbit meat, as well as economic consideration, and however, I do believe that through this meeting, exchange of experiences, research results and ideas may to some extent overcome these various problems and give benefit to the development of rabbit farmers here and elsewhere. Moreover, through this initiative, the collaboration of the ICARD and the Scientists as well as industries from overseas can be built to improve better rabbit farming and production.

A special thank is offered to Mayor of Bogor District, Mr. Diani Budiarto for his kindness in providing the venue and facilities for this Seminar. Sincere thank is extended to the World Rabbit

Science Association and to its Indonesian Branch, who have significantly play an important role on this Seminar, and also to the Director of ICARD, Dr. Abdullah M. Bamualim and members Committee of this Seminar who have been working very hard to make this Seminar successful.

And last, but not least, I hope you enjoy this Seminar and your stay in Bogor, Lembang, Magelang and Bali. Thank you very much.

And by the help and grace of God, Our Lord, I pronounce this Seminar.....Opened.

Bogor, 24<sup>th</sup> July 2007,

**Prof. Dr. Achmad Suryana**  
Director General of AARD

## **SUMMARY AND RECOMMENDATIONS OF THE SEMINAR**

### **General**

1. Rabbit farming in most developing countries, including Indonesia, was initially aimed at improving family meat consumption, and as a small cash income, if any. Scale of farm is small, depending almost entirely on forage feeding, using locally available or cheap material for hutches, a family labour activity and hardly any cooperation with other raisers. Known as central for rabbit production is Lembang (West Java), Tawangmangu (Central Java), Sarangan and Batu (East Java).
2. Advantages of rabbit farming includes (i) needs small capital investment and working capital, (ii) small amount of land (iii) utilize agricultural/ industrial wastes, (iv) produce high quality meat and other multi products (fur, skin, manure, pet and laboratory animals,
3. Interest in rabbit farming in Indonesia increases tremendously since 2003. The development is very fast, from North Sumatra to Lampung, from almost every regency in West and Central Java to Yogyakarta and East Java, from Bali to Papua. This development probably co-incidently occurred due to the spread of Avian Influenza, restriction to raise poultry around the settlement in some districts, high price of poultry feed, increases short of poultry meat supply (which actually is the most affordable meat for rural people), open market and high price for rabbit 'products' (meat, pet, laboratory rabbit, manure, and a small quantity of fur), demand for the product is high, while supply is limited
4. Nowadays, raising rabbit in Indonesia, although majority are still small in scale (5 – 15 does), but many farmers are found to raise more than 30, 50 or even 200 does. Rabbit are raised for several purposes, i.e. meat, fur, pet, laboratory and manure for fertilizer . Rabbits is a profitable animal to farm, B/C ratio of 1.42 for meat-type intensive system, when forage is included B/C ratio increased to 1.74. The corresponding ratios for meat and fur rabbit is 1.79 and 2.40, while for pet production is 1.80 and 3.55. While for lab animal without forage feeding is 3.10
5. The orientation of rabbit farming is shifted to a business activity. It is a viable means for improving nutritional needs of the rural people, additional or primary income and job opportunity

### **Breeding and genetics**

1. Crossing and selection is carried out as means of improving productive performance of rabbits. Crossing of some breeds is commonly used to expect positive heterosis
2. In Hungary, crossing of male Panon White x female from selected maternal line gave best performance and production yield, in Indonesia, the initial research on F1, cross of male FG to other female breeds (NZW, NZW cross, FG and FG cross) gave distinct variation of litter performance, depending on the breeds, while genetic distance and discriminant analyses conform that NZW, Rex and Satin and 'Reza' rabbits at Balitnak (IRIAP) were improved through selection and crossing
3. Crossing of Rex and Satin, conducted at IRIAP-Indonesia, to form a new breed of rabbit containing a combination of Rex- and Satin-like fur (shiny, smooth and fine fur) was achieved in the second generation. Further selection indicated the stability of the traits.

4. The hair growth in rabbit occurs in 3 prime cycles, baby prime (0 – 10th weeks), intermediate prime (11 – 20<sup>th</sup> week ) and senior prime (21<sup>st</sup> week-). Guard hair and underfur grew together and becoming denser with the increasing age of animal. At the intermediate cycle of non-Rex rabbit, guard hair grew more than the underfur. In any cycle, hair weight per cm<sup>2</sup> area increased with the increased of hair density, but average weight of each hair decrease with the increase of hair density. Guard hair of the Rex is smaller than those from non-Rex rabbits and the type of Rex hair cuticles was wave type, which supported the hair softness.

## **Reproduction**

1. To improve reproduction in rabbit, milk production and management of reproduction should be looked at carefully.
2. Milk production is one of the important aspect, which is often overlooked, in the reproduction of rabbits. From a series of research in Belgium, there is evidence that livability and growth performance are closely related to the quantity and quality of milk ingested during lactation. Highly efficient hybrid does have daily milk yield 250g or 60g/kg BW during the 4 weeks lactation, and at peak lactation protein output per kg metabolic weight (13.4 g/day/ kg<sup>0.75</sup>) exceeds the Holstein cow. Milk from rabbit is rich in fat (12.9 g/100g), protein (12.3 g/100 g) and energy (8.4 MJ/kg), and nearly no lactose content (<2 g/100g) which explains extremely rapid growth of the young (6x birth weight in 3 weeks).
3. Other than nutrition, number of suckling kits, the parity order, the breed and gestation overlapping degree (17 – 20 d of gestation, milk yield decrease rapidly) influence the milk yield. Heat stress also reduces milk yield when night temperature > 25<sup>o</sup>C.
4. An accurate indirect method to measure milk production of a doe is to weigh the female before and after the once a day nursing event. However, measuring weight gain of litter between birth and the age of 3 weeks is a very good estimate of the milk yield during the period.
5. Management of rabbit does starts at their birth. A female candidate should be chosen from large litters with medium or high birth weight, where number of teats is 10. Selected kits should be nursed by small or medium litters. After weaning or after 10-11 week-old, feed restriction or diet with higher fiber content is suggested. Further, first insemination can be delayed till maturity is really achieved. Before the first mating receptivity can be increased through flushing, an ad libitum high energy/protein diet feeding. Double mating could be practiced to increase fertility. Control nursing for primiparous and free nursing to multiparous does help reducing the mortality of kits and changing free nursing of lactating does 2 – 3 days prior to mating to control nursing, receptivity and fertility, increased litter size. Increasing daily illumination 7 – 8 days before mating is suggested to increase receptivity and fertility
6. No correlation observed between doe weight with the litter size or litter weight, but there is significant correlation on litter size and individual litter weight; higher litter size causes smaller weight individually.
7. To gain optimal performance of the production, heat accumulation should be avoided, optimal temperature for rabbit is 16 – 18<sup>o</sup>C
8. In an attempt to preserve ovary, including ewe ovary, Intrauterine transplantation to pseudo pregnancy rabbit can be used



## Feeding and nutrition

1. Attempts to increase productivity of rabbits while also reducing the price of rabbit feed is continuously carried out through nutrition research. A special interest is to explore potential of by-product feeds and forages since rabbit is herbivorous and by-product feeds and forages is usually cheap source of feed, while also exploring some other plants containing chemical compounds or technology (fermentation or supplementation) that may give benefit to the health or production of the animal. Some protein sources from plants, however, do have antinutritive factors which impair the digestion, induce changes in the intestinal mucosa, leading to the death of animal
2. Yucca and Quillaja, two plants native to Mexico and Chile, are source of saponins which have immunostimulatory properties, reduce the incidence of stillbirth and also useful to control odor and ammonia in animal houses, antiprotozoal activity, nematodal activity, lowering cholesterol level, anti inflammatory and growth promotant..
3. Calliandra, a potential tropical legumes, contains high tannin content. The leaves, fresh and dried can be fed to rabbit up to 45 and 30% respectively, but its fiber component is less digested when the leaves is wilted. Detannification of *Calliandra calothyrsus* by PEG or lime improved digestibility and performance of rabbit.
4. Other plant, *Moringa olifera* leaf, containing  $\beta$ -sitosterol, decrease levels of cholesterol (84 – 117 mg/100g) and glucose (10%) in the blood serum
5. Palm kernel meal (PKM) and kapok seed meal (KSM) can be included in rabbit diet up to 5%. However, at inclusion of more than 20 % in the diet, PKM caused negative response to growth, eventhough did not affect the digestibility of DM,OM and CP. On the other hand, at 15% inclusion KSM reduced the digestibility of DM, N, CF and DE.
6. Fermentation of cassava waste increases protein content and i feed digestibility. Fermented products can be used as protein source and inclusion at 10 and 20% in the diet improved bodyweight significantly
7. The use of probiotics has drawn many interest in recent years. Kefir, a cocktail of microbes, showed to give better immune system activity in rabbit's blood (better immunostimulant) than did the *Lactobacillus acidophyllus*, but both probiotics show no effects on cholesterol level of the rabbit meat (so can't be assumed to have antyhypercholesterolemic agent).
8. Supplementation of vitamin E is recommended to improve fatty acid profile and oxidative stability of meat, while lysine supplementation on diet containing 18% CP did not affect feed intake and nutrient (protein, fat and cholesterol) content in the meat, but at 0.72% supplementation it did increase calcium deposition to about 20%.
9. Rabbit health is sensitive to dietary content; excessive dietary protein content for weanlings reduce the digestive health especially when replacing fiber. To avoid more incidence in the digestive disorders is to reduce intake level between 4 – 7 week-old. Reduction of 30% intake after 3 weeks should be followed by progressive ad lib intake.

## Management and economics

- Environment is one factor that should receive high attention and consideration in rabbit farming. Environmental factors such as ambient temperature, solar radiation, humidity, wind velocity, light and noise are affecting comfort and performance of rabbit

## Meat and fur

1. Meat is a good quality nutritious food. However, for rabbit meat there are preferences in consuming it. To some community, rabbit meat is not so popular; either due to 'bunny syndrome' or considered 'haram' (not allowed to be consumed, a rule applied as restriction in the Moslem society). Attempt to popularize could be done through processing to other form of products, such as frankfurters, meat ball, burger, nugget and others. There is also evidence that processings increased the economic value of the products (40 – 120%) and provided more job opportunity. Besides, meat from rabbit matches of modern lifestyle, i.e. high protein, less cholesterol, fat and sodium. The image of meat from rabbit is haram is actually misused. Rabbit meat is *halal* (allowed to be consumed), a statement advised by the Moslems Authority.
2. Some research results on processings showed that inclusion of 20% cassava flour produce good physical characteristics of rabbit meat ball; meat quality is influenced by part of the animal cuts. Loin has higher tenderness and water holding capacity than that of thigh, however, dietary fiber level did not affect quality of rabbit meat. On the other hand, type of animal protein, such as worm meal (*Lumbricus rubellus*) increased stretching and tensile strength, and tear resistance of rabbit skin.

## Disease and hygiene

1. Enteritis is the biggest problem in the rabbit farm. It causes a great loss to the industry as well as in the small scale farming.. Causative agents of the problem could be due to infectious agents such as bacterial or parasite infections or non-infectious agents. Clinical symptoms of the diseases vary, from anorexia, poor weight gain, bloat, constipation, fever, watery diarrhea to hemorrhagic enteritis. When it is caused by coccidian, coccidiostats packed within gelatin capsules and given *per os* to the rabbit were more effective than mixed in the feed or drinking water to prevent the liver coccidiosis. Oocyst production was very small and mortality was much less
2. Enteritis could also be related to the disorder of digestive system, including constipation, which occurs due to the effect of slowing down activity of intestinal motility causing gas accumulation in stomach, intestine and caecum and consequently bloat or distention of the abdomen, which is painful and followed by death to the animal.
3. Most of the respiratory infection in rabbit was reported due to bacterial infections rather than the mycoplasma infection. However, in 2006, from 10 sample tested, one of the rabbit show the sign of mycoplasma infection.
4. Mycotic and parasitic organisms do infect rabbit, which although is seldom to cause death but it can cause significant economic loss, through decrease productive performance. Attempt to control disease caused by fleas, flies, lice, mites, ticks, worms, protozoa and fungi can be done through Antihelminthica, acaricide, fungicide and anti-inflammatory agents.
5. Hygiene strategic, including 'all in all out' measures, feeding strategies could help the problem – coccidiosis prevention program with anti coccidial, low digested and digestible fiber balance,

### **Alternative sustainable production in regions**

1. Tropical region of the world, where most of the developing and emergent countries are located, has variety of different climates and orography, but meat production from rabbit is still feasible
2. Village rabbit farming grows rapidly, but sporadically, in almost all Districts in Central Java, starting with 2 – 4 does per family, bamboo cages, depends mostly on forage feeding. noted that there were 125,785 does in 10 districts. Magelang is one of the districts in Central Java that has been experiencing rapid development in rabbit farming. Sociological data showed that more than 70% of farmers have educational background more than high school, 73% are started within the last 3 years, 48% farmers are at micro scale (1–9 does), 48 small scale (10 – 30 does), others have more than 30 does, battery system, forage and by-products feeding, B/C 2.7, market through rabbit collectors or traditional market
3. Rabbits in Jayawijaya Papua were raised in a simple way, running loose, roaming during in the day and kept in the pen or in the house at the night. Most meat product were consumed by the family, however some are also sold for family cash. There are about 17,000 heads of rabbit in the District of Jayawijaya.
4. Batu, Malang in East Java, raised mostly NZW, Rex and FG. LS birth were 7.17 – 7.67, LS alive at birth were 6.92 – 7.30, LS at weaning 6.66 – 7.13, age of weaning 5.2 – 5.7 week-old, weight at weaning 475 – 508 g/head, adult weight were 2384 – 2771 g/head, age at first mating for doe were about 21 week-old, service per conception were 1.10 – 1.5, gestation period were 30.48 – 30.80 days, and litter interval were 41.11 – 43.07 days, mortality < 4%.

### **Problems**

1. Low availability and high price, if any, of good quality breeding stock
2. Limited knowledge on technology of proper farming, nutrition and especially disease control and prevention and lack management of the group
3. Although is increasingly consumed, rabbit meat is still not a popular meat to consume
4. Lack of cooperation among farmers
5. Farming rabbit is not a government priority

### **Government role**

1. Rabbit development is not the main priority of the government but efforts are made to facilitate the development. Government support has been shown through providing investment and working capital to selected farmers in the selected areas such as in Java, Bali and North Sumatra in 2006.
2. To more develop rabbit farming into a scale that has significant impact to the better socio-economic status of the people, Government support is imperative. Providing good quality breeding stocks, availability of technology, creating markets, training of farmers are some of the supports that can be done.

### **Strategy for development**

1. Changing orientation from family meat supply to business type activity needs a change of strategy to develop farming and marketing. However, it is not going to be easy to fully industrializing rabbit, even just to reach a medium scale industry.
2. Problems that may be arising with intensive, industrial farming includes (i) animal production is inhumane and detrimental to animal welfare, (ii) controlled by corporate interest and is driven by profit motives, rather than ethical concerns for animal well-being, (iii) exploits workers, (iv) competes with grain for human consumption, (v) animal products are unhealthy causing degenerative diseases (vi) produced through the use of antibiotics hormones and other chemical which could be dangerous to human health, (vii) harmful to environment, therefore it is considered that rabbit production does not fit into the industrialized, globalized, corporate-controlled model. Therefore rabbit production offer an alternative method of animal production more acceptable to society particularly in developing and emerging economies
3. In a hot climate area, a strategy for small scale rabbit production could use a so called ‘an alternative keeping system’, which is constructed as small underground cell, easy to inspect, closed by insulated lid and connected by a tube to external cage, nest is set into the cell while feeder and drinker is set at the external; it should an easy structure, using local materials, forage feeding, avoid heat stress and no medication for disease. This model is open air and low density ensures a fair sanitary condition, favored by microbial dispersion in the external environment and high quality meat is produced
4. To promote rabbit farming, there should be diversification of meat products, and continuous national campaign
5. To ensure success of farming farmer selection, training for extension workers and farmers, early on farm supervision, project multiplication and development program should exist in the country. Sustainable system of rabbit production should involves the use of renewable on-farms resources, such as local breeds, forage or garden plots, local materials for hutches and use family labor so low investment and operating cost is kept. When market allows, demand or popularity of rabbit products is high, i.e. market is open and the price is high, poverty is abandoned then up grading from small to medium or large scale using external inputs and invest more capital can occur.
6. To increase efficiency and effectivity hence profitability integration other farming enterprises, e.g. horticulture, aquaculture, vermiculture is advised, and development of, small and/or medium scale should be based on farmers cooperation. Family should be encouraged to consume meat, either from rabbit or from other animal at regular basis. Dynamic and viable rabbit breeding industry depend on cadre of rabbit scientist engaged in the activity.
7. A concept of ‘Kampoeng Kelinci’ came out after the discussion. It is established in the agroecologically suitable area supported with favorable socioeconomic situation, includes a breeding center and high percentage of people in the village raise rabbits and is based on farmers group cooperation. This model ensures sufficient consumption of nutrition, income for the farmers and more job opportunity. This model can also adopt an open nucleus concept, in which through selection and evaluation could improve productivity of rabbit in both breeding center, multiplication center and farmers.

## **Research**

1. Past researches were on rabbit nutrition, processing of meat and pelts/fur, milk production and semen quality, evaluation of forages and by-product feeds, some field trials, selection of rex, satin, cross breeding to form reza, meat type rabbit and combination of both
2. Further research : create medium weight with exotic fur rabbit, use of herbals to reduce mortality and increase milk yield, while exploring other potential high yield palatable forages and by-product feeds
3. Continuous search of disease control, probiotics, prebiotics, organic acids, plant extracts, enzymes and immune modulators.
4. Tests some models for small- or medium-scale farming to achieve a more industrial level of rabbit business.