

NEWCASTLE DISEASE PROBLEMS IN INDONESIA

I Gde SUDANA* and Masri HANAFI**

Introduction

1 Background information

Indonesia is a tropical country, located between 97° and 140° East, and between 8° North and 10° South. It consists of more than 12,000 islands, 3,000 of which inhabited. Human population is about 138 millions, 70% of which consisting of farmers; the growth rate is 2.5% per year.

There are two seasons, i.e. rainy season from the month of October to May and dry season from June to September. Annual precipitation is variable, high up to 4,000 mm in Western Indonesia and low down to 800 mm in Eastern Indonesia.

Livestock consist of cattle, buffaloes, goats, sheep, pigs, horses and poultry. The livestock population as of 1976 is shown in Table 1. Most of animals except pigs and horses are in Java, and the livestock are raised extensively by farmers. Java covers only 7% of the total land area of Indonesia.

Table 1 Livestock population in Indonesia (1976)

Cattle	6,1 millions
Buffaloes	2,4 millions
Goats	6,1 millions
Sheep	3,2 millions
Pigs	2,5 millions
Horses	649 thousands
Poultry	121 millions

2 Poultry husbandry

1) Extensive backyard poultry keeping.

Among 120 million chickens in Indonesia, 96% are native chickens and only 4% are high breed chickens (1972).

Native chickens are raised extensively by farmers. The owners do not provide either food, housing, medication or vaccination against infectious diseases. The chickens live freely round the house and neighbouring yards. A farmer usually owns 5 - 10 chickens. Native chicken has a low egg productivity (40 - 50 eggs per year) and a slow growth rate. Six-month-old hen has a live weight of 0.5 - 0.75 kg and the cock of the same age weighs about 1 kg. But, since the population of native chickens is far greater than the population of high breed chickens, they play an important role in the economy of the country as a source of meat and also they are preferred by people due to their taste, as game bird, and as an additional safeguard for the farmer. Since the late 1950s the Government has been distributing high breed cocks to the farmers in order to improve the productivity of native chicken.

2) Poultry Industry

Poultry farms, breeders or growers, also exist although only in small numbers. In these farms

* Staff, Disease Investigation Centre, Denpasar, Bali, Indonesia.

** Staff, Directorate of Animal Health, Jakarta, Indonesia.

husbandry is intensive and high breed chickens are raised. Eggs and meat are produced for commercial purposes. Farm location is near or around the big cities, to meet prompt city people demands. Day-old chickens are sent from the breeder to the grower.

Skill and modern techniques support the development of the farm. Control and prevention of the diseases depend on such factors.

3) Intensive backyard poultry farming

These farms raise about 500 - 2000 chickens of highly productive breed. Day-old chickens are supplied by the bigger farm breeder. The farmer builds chicken housing in the back-yard. In this system of farming chickens receive proper feed, medication, vaccination against ND and good sanitation.

The farm is run by the whole family as a means of providing additional safety.

3 Poultry diseases in Indonesia

- (1) Bacterial diseases: coli septicemia, mycoplasmosis, staphylococcosis, salmonellosis, infectious coryza.
- (2) Parasitic groups: *Leucocytozoon caulleryi*, Coccidia, *Plasmodium juxtannucleare*, *Ascaridia galli*, *Tetrameres* sp, *Choanotaenia infundibulum*, *Nemidocoptes nutans*, *Menopon gallinae*.
- (3) Viral diseases: Newcastle disease (ND), Marek's disease, Fowl-pox, Infectious bronchitis (I.B) and Gumboro disease which has been recently identified serologically.

ND in Indonesia

1 History

Indonesia recognised ND for the first time in 1926 when Kraneveld reported outbreak of highly fatal disease among chickens in Jakarta. He named it pseudofowlpest due to the similarity of the symptoms with the fowl pest.

2 Pathotype

Different strains of ND virus are believed to exist in Indonesia and the predominant strain is velogenic viscerotropic strain. The incubation period is very short (less than 24 hrs). The prominent symptoms are diarrhea, respiratory disturbance and nervous symptoms. Hemorrhage of the proventriculus and caecal tonsil and necrosis of the intestine are the obvious pathological lesions.

3 Spread and source of infections

The disease spreads among the unvaccinated chickens very rapidly and produces high mortality. ND is number one killing disease of poultry in Indonesia and it causes a great loss economically. Outbreak occurs most frequently among native chickens as native chickens are not vaccinated. In the big poultry farms or backyard farms in which intensive husbandry is carried out outbreak of ND is very rare. Cases of ND occur throughout the year but the peak incidence is in the dry season (Table 2).

Table 2 The incidence of Newcastle disease in Indonesia

Transition to the dry season	17,1
Dry season	49,8
Transition to the wet season	27,4
Wet season	5,3

The source of virus is the sick chicken or carcass of chicken which died of ND. The ND virus isolated from cockatoo as a source of disease in chicken has not been identified. Preliminary studies also showed that sera of pigs in Bali contained antibody against ND but virus isolation so far has not been successful.

Factors involving the spread of the disease i.e.: a) huge number of unvaccinated chickens b) extensive husbandry and c) low education of farmer.

4 Economic losses

The economic losses caused by ND consist of high mortality and slow body growth.

The death toll was found mostly in native chickens the data of which are as follows:

<u>Year</u>	<u>Death toll</u>	<u>Percentage of population</u>
1974	997,565	1,07%
1975	1,219,045	1,24%
1976	696,945	0,57%
1977	193,892	0,18%

Main problems

1 ND vaccine

The quality of ND vaccine used in Indonesia is adequate for coping with outbreak of disease both in poultry farms and native chickens.

Under the existing conditions the provision of vaccine required for mass vaccination in native chicken just covers 20 - 25%. In addition an improvement is required for control of the vaccine quality, vaccine storage and vaccine usage.

2 Extensive poultry keeping

As mentioned earlier, chicken raising is carried out extensively where chickens are not kept in hen-house. During the night chickens are sitting in trees or on top of houses, which makes it difficult to catch them for vaccination. These circumstances illustrate why only part of chickens is vaccinated and even this could not be well recorded individually. Thus, it is understandable that the awareness of the people to poultry contagious diseases needs to be improved regarding either method of raising, sanitation for dead chickens, remnants of slaughtering and the significance of disease control.

3 Transportation

How to reach the villages in the framework of mass vaccination by vaccinators who are concentrated in the capital of the districts or sub-districts is also a big problem.

The road conditions and the availability of public transportation or the transportation owned by vaccinators are being improved by the Government, which takes a considerable time.

4 Manpower

Field extension officers, chicken catchers, vaccinators and surveillance officers are required for the implementation of mass vaccination.

Until now specially designated personnel for ND control programme has not been available. The existing animal health personnel of the Animal Husbandry Services is responsible for various diseases control including ND.

Measures

1 Production and types of vaccine

Until 1969 the vaccine used was inactive Mukteswar strain. It was not extensively used and its efficiency was often questioned because it failed to cope with the outbreak. Thus the death toll remained high although vaccination was carried out every six months.

Since 1969 there has been an improvement in the government financial capability which enables to provide more funds for ND control than in the previous years and the use of Komarov strain vaccine has been introduced. Mass vaccination in chickens older than two months using Komarov vaccine has given a sufficient immunity so that outbreaks could be overcome. Mass vaccination in chicks under one month has been carried out by using F strain vaccine through eye or nasal drops. When 1 - 2 months old they are inoculated with Komarov vaccine.

Sporadic cases of ND are continuously found in areas out of vaccination campaign or where non vaccinated chickens exist. However, the death toll has decreased and the threat of outbreak become less serious.

The total coverage of vaccination in the native chickens has been up to now 20 - 25%. There is a probability that part of the non vaccinated chickens became immune through the virus transmitted from the vaccinated chickens. Besides the local vaccine, imported vaccines are also used such as Lasota, B₁ which is imported from Europe and mostly used in poultry farms with born layers and broilers.

2. Extension

Extension services are carried out by Animal Husbandry Services before and after the mass vaccination. Aspects of extension involve the significance of vaccination, time of vaccination, and the area of vaccination mainly to draw the participation of the people in order that they catch their chickens in due time. Other important aspects of extension are how to handle the sanitation of the dead chickens and contaminated articles.

Transport facilities, vaccine storage facilities, stock of vaccine, vaccinators and other facilities related to ND programme are being improved by the government.

3 Building of vaccinator cadres and mobilization of people

Vaccinators and chicken catchers are the most important factors in mass vaccination against ND in order to reach the target of vaccination in villages or rural areas. In this regard the Animal Husbandry Services are holding a special training course for villagers who are expected to be able to vaccinate their own or their neighbours' chickens by themselves and hence to assist the government vaccinators.

The approach through the head of village is beneficial for mobilizing the people and children to catch their chickens. The most convenient time for vaccination is the night or early morning when caught chickens remain in cages.

4 Mass guidance in poultry raising

The mass guidance in poultry raising is an approach for the education of the people on how to raise chickens in a better way and how to control contagious diseases besides an effort to form cadres for poultry farming amongst the smallholders by providing credit, guidance and vaccination services. The distributed breeds in this scheme are exotic and imported ones and cocks of high performance. With this scheme the vaccination results have been much improved.

If the awareness of the people to the significance of ND control could be improved, it could be expected that they would be in the position to purchase vaccine and to vaccinate their own chickens by themselves, hence the free services provided by the government could be halted.

5 Law enforcement

ND is one of the notifiable diseases in Indonesia. In practice it is difficult to enforce the ND

regulations due to the type of chicken raising which is extensively spread in villages of rural areas. The only control which can be implemented in practice is the control on movements of chickens both for meat purposes and for breeding purposes and movement of birds for trade purposes in which quarantine is taking the prime role.

The control of vaccine usage in poultry farms, vaccine storage and distribution are carried out by the government.

Surveillance aimed at collecting data on ND is actively done by the Animal Husbandry Services and the Disease Investigation Centres.

6 Supporting institution

As mentioned earlier the Animal Husbandry Services are the first hand institution dealing with ND control programme. They are supported by type C laboratories at district level, by type B laboratories at provincial level and by regional type A laboratories.

At present there are 4 type A laboratories (DIC) fully operational and 3 other are scheduled to be established so that there will be 7 type A laboratories throughout Indonesia. The establishment of these DIC's has been carried out in cooperation with foreign countries and international agency such as Australia, Japan, West Germany, FAO/UNDP, Canada, UK and France.

There is a national reference laboratory, the Animal Diseases Research Institute at Bogor which has been active since World War II. To compete with the rising demand this institute has been undertaking an overall improvement. Besides there is a special institute dealing with ND vaccine production, that is, the Veterinary Biologic Institute in Surabaya. Nevertheless there is no assay laboratory in the country which is responsible for the test of biologic products including ND vaccine. There is an indication that the government is trying to cope with this problem.

7 Results

The improvement achieved by mass vaccination and the use of various types of vaccines were mentioned earlier. The morbidity and mortality have decreased appreciably, as shown by the willingness and trustfulness of the people in chicken raising, the reduced number of complaints of the people upon the death of chickens in rural areas, the increase in the total of chicken consumed and the increase of the chicken population itself (Table 3).

Table 3 Vaccine supply and total number of vaccinated chickens in 1974 – 1978

Year	Vaccine supply (dose)	Vaccinated chickens	Percentage to the chicken population
74	20,495,200	19,768,829	25%
75	21,270,000	19,691,581	22%
76	22,365,000	24,539,650	25%
77	27,000,000	21,561,417	17%
78	32,845,000	20,839,303*)	19%

*) Incomplete figure.

ND control programme in Bali

1 Justification

Bali province is one of the 27 provinces in Indonesia. It consists of two inhabited islands namely Bali and Nusa Penida. It lies between 8.5° - 9.0° South and 114.5° - 115° East, covers approximately 5,070 - 545.39 sq. km. This province is divided into eight districts, 50 subdistricts and 564 villages and the population totals about 2.4 million people.

Every household is raising native chicken, besides other livestock.

The livestock population in Bali, in 1977 was as follows:

cattle	333,225
buffaloes	9,291
goats	17,935
sheep	263
pigs	492,462
horses	3,795
native chickens	2,428,510
exotic chickens	388,946
ducks	368,212

There are some factors which support the implementation of ND control in the island of Bali. They are:

- (1) The geographical condition of the island of Bali which is surrounded by sea where animal quarantine facilities are available in ports and at the airport.
- (2) The transport facilities and road conditions are better than in other parts of the country.
- (3) The availability of the Disease Investigation Centre (type A laboratory) which provides guidance for the implementation of vaccination, monitors the results of vaccination and conducts diagnosis.

The data on the ND vaccination in the island of Bali are shown in Table 4.

Table 4 ND Vaccination in the island of Bali

Year	Native chickens	Vaccination	Total coverage %
73	2,093,144	200,482	9,58
74	1,682,810	429,461	25,52
75	1,818,569	850,000	46,74
76	2,428,510	1,182,370	81,63
77	2,493,058	2,472,500	99,17

From Table 4 it appears that the vaccination is being promoted year by year.

Since 1978 an intensive campaign has been conducted. The vaccine supply has made it possible to cover a minimum of 80% of the total native chicken population and vaccination is conducted within three years. The vaccination system adopted started with some densely native chicken populated villages. Criteria of selection of villages include the willingness of the inhabitants to cooperate with the vaccination programme. These villages are also suppliers of chickens for markets in towns. From these villages the vaccination is then continued to neighbouring villages until it covers the entire subdistrict. The results of this campaign are evaluated each year and the overall evaluation is conducted after three years.

2 Investigation on ND

From 9 out of 461 birds originating from East Nusatenggara which died in the quarantine station of Ngurah Rai Airport in 1978 ND virus could be isolated through embryonated eggs. In laboratory experiments 2 of them consisted of mesogenic virus while the other 7 were velogenic virus. Velogenic virus was also isolated from one dead duck.

In the end of 1977 and during 1978 H.I. test was conducted against pig sera, the result of which showing that 13% of the total sera tested contained ND antibody. Meanwhile the role of cockatoo,

duck or pig as the source of infection or carrier or transmitter has not been clearly identified yet.

The experiment on the application of ND vaccine is still going on. However the application through inoculation is the best method whereas that through drinking water is the most economical one. Experiment through feed has not given satisfactory results yet. In the laboratory it has been found that application through food required a three fold dosage as compared to other methods of application. Residual effect of the scattered mixed feed is still unknown. Meanwhile the experiment on application through feed is under way aiming at implementing vaccination in chicken under extensive poultry raising system where chickens are difficult to catch during the course of vaccination.

Conclusion

High mortality of chicken caused by ND has been successfully overcome since 1973 by using Komarov and F strain vaccines.

The types of ND virus which have been identified so far in Indonesia are the velogenic and mesogenic types.

The extensive poultry raising system which spreads in rural areas where the hygienic environmental conditions are poor and the existence of other limiting factors in the implementation of vaccination, make it difficult to eradicate ND.

Extension of mass guidance on poultry raising scheme, vaccine supply and intensive vaccination are expected to enable to overcome the difficulty in ND eradication programme in Indonesia.

Control on vaccine quality, distribution of breeding stock, and poultry movements have received more attention besides the emphasis placed on some supporting efforts such as the experiment on easier application of vaccination, and surveillance system.