GALVmed

Protecting Livestock - Improving Human Lives

Newcastle Disease Control Review Workshop
Controlling Newcastle Disease in Africa and South Asia

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Protecting Livestock - Improving Human Lives

Proceeding
of
Newcastle Disease Control Review Workshop
Controlling Newcastle Disease in Africa and South Asia

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Message from the CEO

Dr Peter Jefferies
CEO, GALVmed

I welcome you all to the first workshop on very specific topic of ND control in backyard poultry. I am delighted to see the gathering of esteemed scientists, commercial houses, non-government organisations and government officials. I am confident that this confluence of thought from all stakeholders will develop a concrete future plan to control ND in developing nations. Scenario analysis and our previous ND control experiences in South Asia and Africa will be helpful in future planning.

We at GALVmed, are addressing a very challenging job of human life improvement through protection of backyard poultry from Newcastle disease. Different geographies, diverse socio-economic status and a lack of quality vaccine production and supply chain further increase the magnitude of difficulty. I believe that with our collective efforts and hard work with partners, we can create significant impact in South Asia and Africa. Our list of partners encompasses: commercial manufacturers, developmental agencies, non-government and government organisations; research institutions. Our goal is not only ND vaccination, quality vaccine manufacturing and supply chain creation but more importantly, but we are also focusing on creating a self-sustainable and self-replicating model of quality vaccine supply to poor livestock keepers in South Asia and Africa. This model requires involvement of all stakeholders from poor livestock keepers to commercial vaccine manufacturers. The following are critical steps in this model: vaccination awareness, understanding the economic impact of backyard poultry among poor livestock keepers, creating entrepreneurial spirit among vaccinators and building a supply chain to village level. By showing poor livestock keepers the economic benefits of vaccinating their livestock, we can create a demand to sell effective and sustainable vaccines. Each chicken saved from vaccination is always increasing the socio-economic status of poor livestock keepers in South Asia and Africa.

This workshop is designed as a participatory event, which will create a platform to cross fertilise the ideas and learning from each other's experiences. I am sure that the workshop deliberations will be helpful in creating new strategies to control ND in South Asia and Africa.

Best wishes

Peter Jefferies

Message

Dr. Rajnikant Tirkey
Director
Animal Husbandry Department
Ranchi, Jharkhand, India

Respected CEO of GALVmed, Dr. J.M. Kataria, Dr. Ujjwal Biswas, Prof. Sonaiya, Prof. Wambura, Rajiv Gandhi from Hester Bioscience Ltd., GALVmed directors and team, GALVmed project partners from Asia and Africa, all invited guests and media! First of all, I welcome you all in Ranchi, the state capital of Jharkahnd. It is lovely spring. You have come here in a very nice time of the year.

I understand: you people are gathered here to discuss the future course for controlling ND in Africa and south Asia. You are also going in field to see and learn from people. Some invited speaker will certainly highlight the different issues related to ND control. I like to congratulate you for a very useful outcome out of this workshop for GALVmed and all those who are involved in ND control.

It is my pleasure to be the chief guest of the workshop on ND control in south Asia and Africa. ND especially in village or backyard poultry is a big problem still today and we need to control it so that poor farmers can get enough nutrition and money out of their poultry. Controlling ND in village or backyard poultry also secures biosecurity for commercial poultry. It seems small thing for many people but once you control it, the number of birds starts increasing. The farmer then starts realizing the value of their poultry. They invest on better management. That again results into increased production and productivity of local birds.

The main challenge for regular ND vaccination in village or backyard poultry is the reach of farmer for quality vaccine and vaccinator. Cold chain is still a big problem for regular vaccination in large area. Any effort to come over will definitely results into ND control. I am delighted to know that GALVmed is taking this task and implementing it with support of all stakeholders and government.

Jharkhand is a relatively a new state in India. We are rich in mines and other minerals. We have a large area where farmers keep few birds for their household purposes. Village poultry or backyard poultry is in our culture and Ranikhet or Newcastle Disease is number one killer disease for these birds. Any effort to control this disease will really help our poor farmer living far and remote. I am personally also in favour of promoting backyard poultry and controlling ND. I am delighted to know that SUPPORT is currently working with GALVmed to control ND. Another important point is: they are using relatively thermoresistant vaccine. Such vaccine has abig role to play in ND control in rural area.

There are non-governmental organizations besides the big network of government animal health system in the state. We can work together to control disease like Ranikhet and promote backyard poultry as well as other livestock and poultry. Our department is always supportive for such programs.

GALVmed has called people from Africa and south Asia to discuss on control of ND in Ranchi. It is a matter of pride for us. I like to thank GALVmed for such initiative. Outcome of this workshop will really be very productive for course of action for ND control.

Finally, I like to thank GALVmed for inviting me on this occasion as a chief guest. I wish all the success of this workshop.

Dr R K Tirki

Content

1

About GALVmed

1. About GALVmed

GALVmed (Global Alliance for Livestock Veterinary Medicines) is making livestock vaccines, diagnostics and medicines accessible and affordable to the millions for whom livestock is a lifeline. Working in support of the Millennium Development Goals, GALVmed is focused on combating six of the Developing World's deadliest livestock diseases. For some of these, effective vaccines already exist and so GALVmed and its partners are scaling-up production and addressing the weak links in distribution channels. For other diseases, however, new medicines are needed. GALVmed adopts and adapts research from wherever it is best in the world and focuses its efforts on identifying solutions that will best serve the needs of poor Livestock Keepers. GALVmed recognises that it is sometimes necessary to pursue more than one technology in tandem and GALVmed subsidises the expensive Research & Development stage of selected vaccines and their rigorous testing. Committed to ensuring the future sustainability of production and supply to poor people, GALVmed is aiming for production and delivery to take place from within Africa, the sub-continent and South Asia. GALVmed began operations in November 2005.

GALVmed is a not-for-profit global alliance and a Public Private Partnership. With offices in the United Kingdom and Africa and south Asia, GALVmed is funded by the Bill & Melinda Gates Foundation and the Department for International Development. It comprises members and operational partners that include: FAO, OIE, African Union, European Commission, OVI, OBP, CIRAD and Developing World Governments; non-governmental-organisations such as FARM-Africa, Africare, Vetaid and Mercy Corps; Universities and Research Institutions in the affluent and Developing Worlds, including ILRI and NVI and private partners such as Pfizer, Merial, Intervet, CEVA and Land O Lakes.

GALVmed is not the solution in itself, but a key jigsaw piece that unites other parts of the picture that have traditionally been unconnected. GALVmed's staff complement is intentionally small with the organisation's emphasis focused on capacity- building of networks in Developing Countries that preserve and enhance the livestock lifeline for millions of people. It has the ethical commitment of a not-for-profit organisation, the operational drive and methodology of the commercial world, the support and connectivity of an international private public partnership and believes in the establishment of value chains that are market driven.

GALVmed priority diseases

Cattle
- East Coast Fever
- Contagious Bovine Pleuropneumonia
- Hemorrhagic septicaemia
- Trypanosomiasis

Pigs
- Porcine cysticercosis
- African swine fever
- Classical swine fever

Multi-species
- Rift Valley fever
- Brucellosis

Sheep and goats
- Peste des petits ruminants
- Contagious caprine pleuropneumonia
- Sheep & goat pox

Poultry
- Newcastle disease
- Highly pathogenic Avian Influenza

2

About the Workshop

2. About the Workshop

Global Alliance for Livestock Veterinary Medicine (GALVmed) organized a two and half day workshop on Newcastle Disease (ND) control in Ranchi from 12-14 March 2015. The objective of the workshop was to review the efforts for ND control in south Asia and Africa and draw a pathway for controlling the disease in a sustainable way in unorganized village or backyard poultry in future. The workshop entitled Newcastle Disease Control Review Workshop: Controlling Newcastle disease in Africa and South Asia extracted the learning of ND control from south Asia and Africa. Participants of the workshop from south Asia and Africa included project partners of GALVmed involved in ND control projects; scientists; local veterinarians; ND vaccine manufacturers and distributors; and GALVmed staffs (Annexure C). Main components of the workshop were a formal inauguration session followed by presentations, field visit, working in groups and drawing conclusions.

The method used to draw a pathway for sustainable ND control in village or backyard poultry in future included retrospection into efforts in past; learning from scientists and poultry keeper in field; and finding gaps in ND control approach and way out for a sustainable and effective ND control in village and backyard poultry. Learning in field while implementing ND control projects were shared by project partners of GALVmed in south Asia and Africa (Annex-2). Different dimensions of the disease control were presented by Dr. JM Kataria and Ujjwal Biswas from south Asia and Dr. Wambura and Prof. Sonaiya from Africa. A summary of GALVmed efforts so far on controlling the disease was presented. A field visit of currently running ND control project in an area nearby Ranchi gave participants an opportunity to interact and learn from village or backyard poultry keepers. Participants were then divided into groups: south Asia and Africa. They discussed in group to finalize the issues related to ND control in the respective region and came up with practical way to bridge the gap. Correcting the issues related to supply chain of quality ND vaccine in rural area supported by appropriate policy was the final recommendation for south Asia and Africa.

The rich experience of person and organization working for the control of ND in village or backyard poultry formed a strong basis for right discussion and recommendation for south Asia and Africa. One time and free vaccine of ND to control the disease was ruled out from the beginning of the discussion considering the fast population dynamics of poultry. Vaccination on a regular and sustainable way was considered as the most appropriate answer for control of the disease in village or backyard poultry. A model that benefit all along the supply chain of ND vaccine including the poultry keeper was considered the key for regular vaccination. The role of all stakeholders and actors creating enabling environment through execution of right policy was also discussed.

The venue of the workshop, Ranchi: state capital of Jharkhand in India represents an area where most of the tribal and non-tribal families keep and attach value to village or backyard poultry. The local poultry keepers see Ranikhet Disease (local name for ND in India) as the most important disease causing mass mortality of their birds every year. The importance of the issue was reflected in coverage of the workshop in most of the local newspapers and television.

3

ND control in South Asia and Africa: GALVmed Efforts

3.1 Pilot ND control projects

Dr Mamta Dhawan and **Dr Roggers Mosha**

GALVmed is relentlessly involved in ND control through its partners in south Asia and Africa. First phase of the ND control projects completed in 2012. The first phase consisted projects covering small area and were for testing the idea of implementation in different geography and socio-economic settings.

In South Asia, 31.7 % people (433 million) live in abject poverty. Approximately 70% of the rural poor have livelihoods based on poultry, goats (and pigs in specific regions). Similarly, the poorest people in Africa keep back yard animals especially poultry and shoat. Population below the poverty line (≤2 USD per day) with special emphasis on female livestock keepers from tribal, marginalized and other disadvantaged communities in isolated geographical areas are our main target population.

In spite of availability of commercial manufacturer and distributors of vaccine, poor livestock keepers are devoid of the vaccination. It is mainly due to last mile gap between these commercial manufacturer and end users. The remoteness of backyard poultry and its distribution in larger areas is hampering the access of quality vaccine in proper cold chain. Government infrastructure is also not sufficient to cover these backyard poultry in remote areas. GALVmed has recognized this problem and started working in selected areas to develop a self-sustainable model of vaccination with the help of all stakeholders primarily with local NGOs.

Initially 3 projects in South Asia and 2 projects in Africa were started. GALVmed sensitized Women and men poultry keepers and organized training programs for community animal health workers (CAHW). In South Asia projects, good poultry management practices and deworming were also coupled with vaccination to deliver the maximum benefits to the end users from this initiative. There was no ND outbreak registered in project areas. There was significant increase in the additional household income ranging from 23% to 140% from poultry was recorded.

The encouraging outcome from this intervention attracted more women in village or backyard poultry and also increased household nutritional intake in terms of protein from poultry. In Africa, CAPHAVET is an example of self-sustainable model. CAPHAVET is now independently distributing the vaccine and pursuing vaccination in the project areas after completion of GALVmed project. GALVmed model was well recognized and appreciated at various platforms. Heifer Nepal has started incorporating ND control in their livelihood projects based on improvement through livestock.

During first phase, many research and developmental activities for user friendly ND vaccine technology were performed with leading research institutions like Tamil Nadu University of Veterinary and Animals Sciences, Chennai, India. Thermo-resistant ND vaccine technology was transferred to Hester from our research partner and commercial refinement was performed.

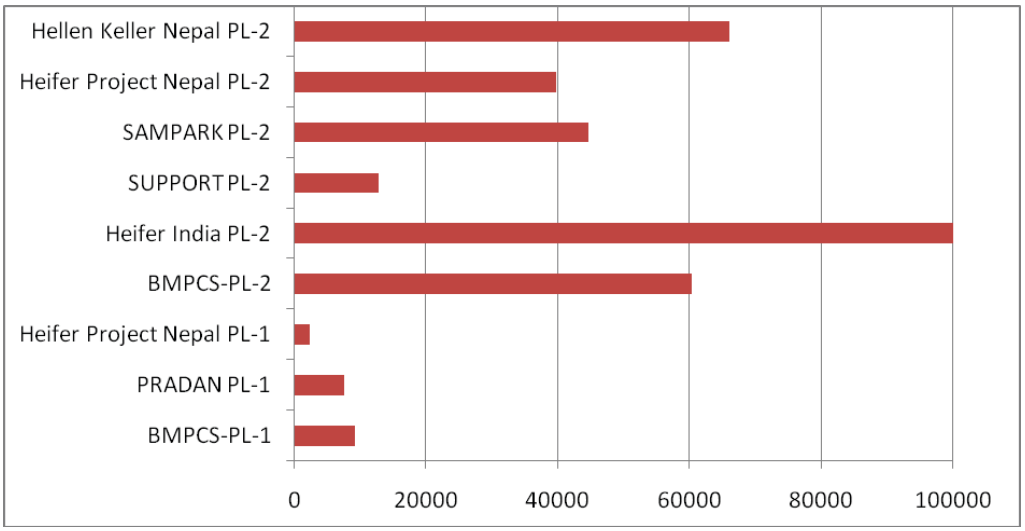
A new vaccination schedule was standardized with ND Lasota vaccine suitable for backyard poultry. Administration of LaSota in eyes of birds irrespective of age at every 3 months without using injectable R2B was found giving enough protection against the disease.

The legal framework for animal health services differs indifferent countries where GALVmed has operation. Advocacy for Community Animal Health Workers (CAHW) was done in all the jurisdictions. CAHW may assist vaccination and other community animal health related programs under supervision of animal health department. They may also act as first line of surveillance and can be utilized by government department in various projects.

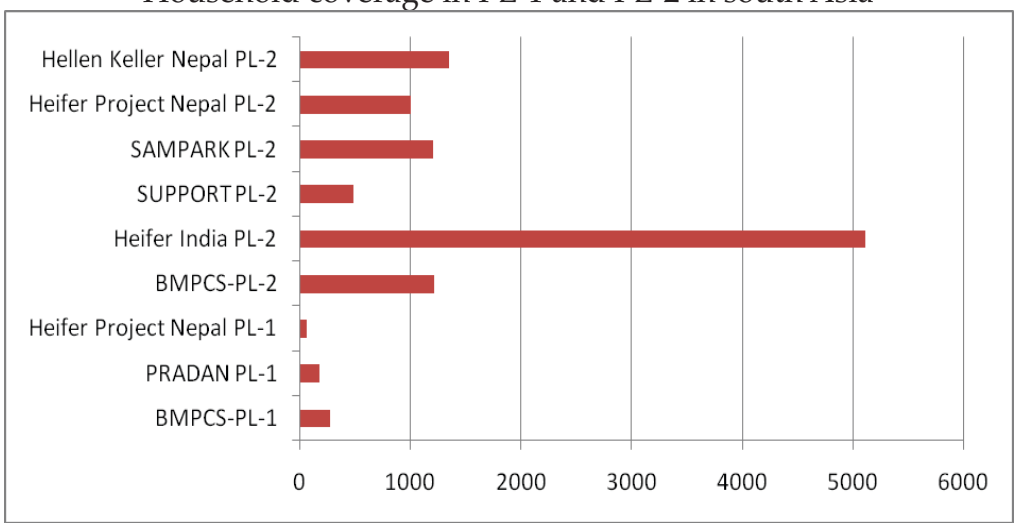
3.2 Scaling up Projects for ND control

Dr Peetambar Kushwaha and **Dr Roggers Mosha**

GALVmed initiated phase -2 projects (PL-2) from 2012 are based on the learning and requirements from phase-1 projects (PL-1). Scaling up of initiatives to cover large geographical area, higher number of households and greater number of vaccination are major characteristics of phase-2 projects. This scale-up of activities in self-sustainable and self-replicating manner require greater collaboration of stakeholders starting from commercial houses to poor livestock keepers.



Household coverage in PL-1 and PL-2 in south Asia



Vaccination coverage (000) in PL-1 and PL-2 projects in south Asia

Drivers of change

Enthusiastic outcomes from ND control projects from PL-1 encourages us to move to next level with scaling –up the production of customized packs for poor livestock keepers and supply chain development. Phase 2 projects are promoting business mode

for regular ND vaccination by linking vaccinators to vaccine retailers and retailers to distributor. Structured communications with audio visual tools are being used to reach to the remote areas and awareness creation among poor livestock keepers. Greater reach of vaccination is ensured by the participation with local partners having core competency in geographical reach and understanding.

The successful model of phase 1 has attracted international developmental agencies like Heifer India, Heifer Nepal and Helen Keller for greater collaboration in ND control. Government is also supporting our vaccination programs.

In South Asia approximately 10 million vaccinations are planned with 4 partners in India (BMPCS, Odisha, Heifer India in Odisha, SUPPORT in Jharkhand and SAMPARK in Madhya Pradesh) and 2 Partners in Nepal (Heifer Project Nepal and Hellen Keller Nepal).

In Africa 10 projects are being implemented in Burkina Faso, Cameroon, Democratic Republic of Congo (DRC), Tanzania, Uganda, and Kenya. Approximately 15 million ND vaccinations are targeted in village or backyard poultry in phase 2 and by 2017.

Quality vaccine manufacturing is relatively more serious problem in Africa than South Asia. Still in both the places government organizations are dominating over private manufacturer in vaccine production. Private organizations are equipped with their distribution system to fetch more market share and profit while public institutions in vaccine manufacturing relatively lack in this distribution and cold chain maintenance. Last mile gap of vaccine delivery and vaccination in remote areas are still a concern on which GALVmed is working with partners.

In Africa vaccine manufacturing, registration and vaccination is more problematic due to different regulations in different countries. This unfavourable environment for importers especially for registration further aggravates the situation. In spite of huge unmet demand and importers willingness, cumbersome product registration process delays the product distribution in majority of the areas in Africa. Quality vaccine manufacturers with international certifications should be encouraged to develop cold chain and distribution system to satisfy the huge unmet needs of poor livestock keepers.

3.3 Mass Access for ND control

Facilitating mass access of veterinary vaccines and products to reduce mortality in backyard poultry farming

Rajiv Gandhi and Raj Gera

Hester Biosciences Limited is a WHO-GMP, ISO 9001:2008, ISO 14001:2004, OHSAS 18001:2007 & GLP certified company, manufacturing animal vaccines and animal health products. It is located near the city of Ahmedabad, in the state of Gujarat, in Western India. Hester has vast experience in distribution systems in India, and is expanding the network in Nepal and in other countries. While Hester's current distribution network is focused on commercial producers, Hester wants to work with poor farmers and village livestock keepers, encompassing social responsibility and providing an additional sustainable business model to this sector. Hester has a high quality range of products suitable for the poor villagers/backyard farmers. 13 Live & 28 Inactivated Poultry Vaccines and 6 Live & 3 Inactivated large animal vaccines are in portfolio of Hester with annual production capacity of 4.8 billion doses.

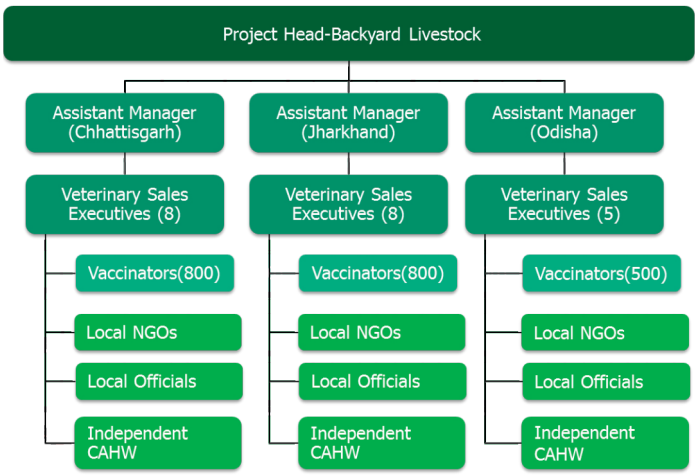
GALVmed assisted Hester for thermo-stable LaSota vaccine technology and commercial refinement. Commercial thermo-stable ND vaccine development, registration and launch in India have successfully done by Hester for use in the village poultry sector. GALVmed and Hester has joined hands for next phase and support the commercialisation and deployment of the thermostable ND vaccine in a way that reaches village farmers over a large scale in India.

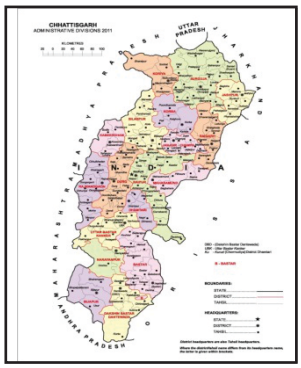
Objectives

- Facilitating mass access to quality veterinary vaccines and health products in rural area through sustainable supply chain
- Reducing mortality in backyard poultry by ND vaccination to increase the house hold income and nutrition

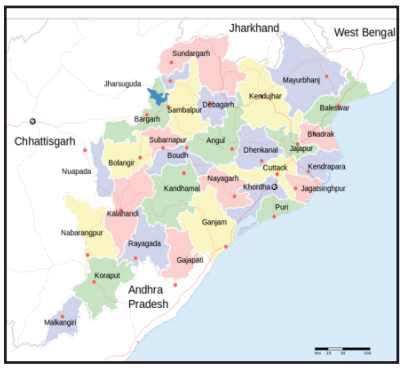
42 districts in three states of India have been identified for the this project viz. Odisha (10 districts), Jharkhand (16 districts) and Chhattisgarh (16 districts).

Hester has established a separate marketing team to control the entire marketing activities in identified states. The team will ensure the entire activity in the project starting from central warehouse to vaccination in identified areas though various internal and external stakeholders. Distribution chain encompassing distributor, stockist and retailers are aligned with the marketing team at respective village, district and state level.

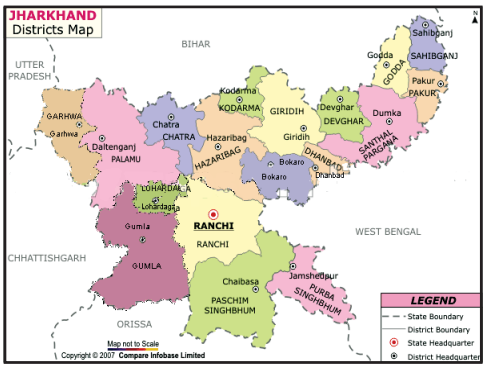




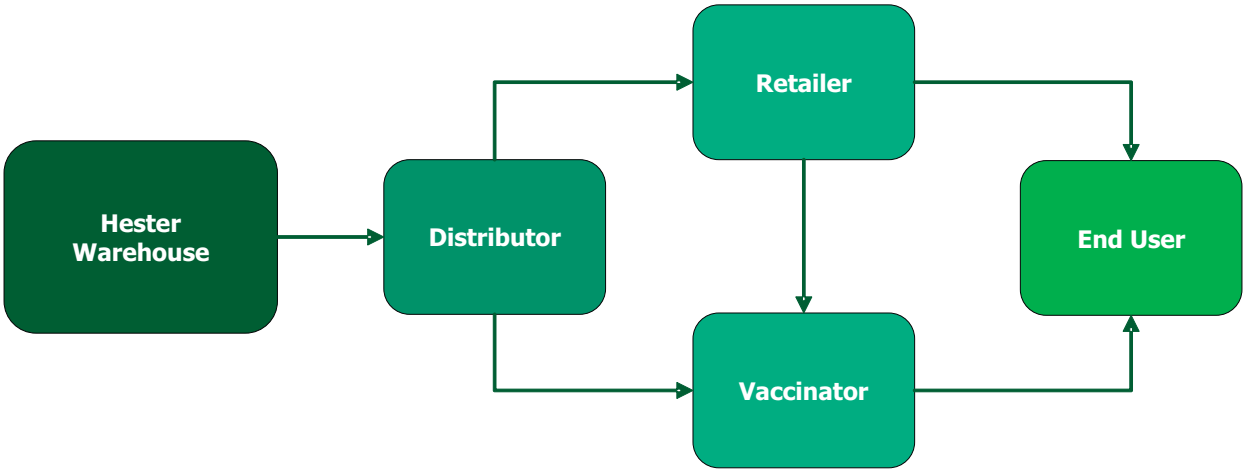
Chhattisgarh



Odisha



Jharkhand



Distribution Model

Marketing team with the help of technical partners in field is planning to create a sustainable chain of vaccine delivery with approximately 2000 vaccinators. Enthusiastic goal of 5 million household is planned for next two year with the help of GALVmed.

4

Opinion of Experts from South Asia and Africa

Innovative Techniques for the Delivery of I-2 Vaccine to Chickens

P.N. Wambura
Professor of Microbiology, Department of Veterinary Microbiology and Parasitology,
Sokoine University of Agriculture, P. O. Box 3019, Morogoro, Tanzania

1. INTRODUCTION

Newcastle disease (ND) remains one of the most devastating poultry diseases worldwide. It causes great economic losses through massive death of chickens in susceptible flocks. It is caused by Newcastle disease virus (NDV) which belongs to the genus Avulavirus under the family Paramyxoviridae (Mayo, 2002).

The only feasible method for controlling ND is through vaccination. Vaccines are the most important intervention for preventing associated morbidities and mortalities from ND. For commercial chickens vaccines have been used successfully and eliminated ND from respective flocks. However in village chickens vaccines have not been used successfully in the control of ND for the past decades. This is because conventional vaccines which have been previously used were not suitable for village chickens in the tropical developing countries due to their heat lability (thermolability) and inappropriate vaccine delivery techniques. Due to these problems solutions were required to overcome them. Research was initiated by Australian Centre for International Agricultural Research (ACIAR) to develop the appropriate ND vaccines suitable for use in developing countries which included V4 (Spradbrow, 1993/94) and I-2 (Bensink and Spradbrow 1999).

For the past 17 years I have been intensively carrying out research on NDV particularly strain I-2 in Tanzania and overseas through the support of the Government of Tanzania through the ministries responsible for Agriculture and Livestock Development, ACIAR, World Bank through Tanzania Agricultural Research Project Phase II (TARP II), the University of Queensland, Sokoine University of Agriculture (SUA) and Central Veterinary Laboratory (CVL) Temeke, Dar Es Salaam. The research involved the study of biology of the NDV, vaccine development (safety, efficacy, potency and innocuity), vaccine storage, delivery and vaccination techniques, and molecular biology of the virus. Through this research there have been notable achievements and breakthroughs on this strain I-2 virus such as sequencing of its full length genome which revealed new insights in the length and nucleotide sequences of the Fusion, HN and L genes. The research also resulted into the development of new processes or products such as assays for rapid determination of potency of I-2 vaccine, green coloured vaccine and coating of I-2 vaccine on oiled rice for oral vaccination of feral and semi domesticated birds.

It is noteworthy that I-2 vaccine is now used in multi-age flocks, where all ages of chickens receive single dose (eye drop) after every 3 months. It can be stored at room temperature (22-25°C) for 30 days and in villages where there is no refrigerator it can be stored for 6 months near the base of clay water pot. For transporting I-2 vaccine at village level, if cool boxes and ice packs even frozen water are not available, the vaccine container may be wrapped up with a damp cloth and carried in a covered open-weave

basket. This allows evaporative cooling which helps to keep the vaccine cool. So far the I-2 vaccine is used in several developing countries (more than 28) in Africa, Asia and Latin America. Through the use of this vaccine and its associated storage and delivery techniques, many countries have reported reduction of mortality due to ND and population of village chickens has increased in recent years.

2. INNOVATIVE TECHNIQUES FOR THE DELIVERY OF I-2 VACCINE TO CHICKENS

Delivery of ND vaccine to the village chickens in developing countries in the tropical climate has been a major challenge over the years. Research was undertaken to try to find better ways of improving delivery and ultimate administration of ND vaccine to chickens.

2.1 Food-based I-2 vaccine:

Because of the unique nature and husbandry of village chickens such as being multi-age and scavenging or feral chickens, some chickens do roost in the trees so it is not easy to catch them in order administer the I-2 vaccine by conventional methods such as eye drop, drinking water or injections. Innovative techniques are therefore required to deliver this vaccine to these chickens.

Cooked white rice has been effective carrier for V4 and I-2 ND vaccines, although it is subject to bacterial spoilage (Jayawardane *et al.*, 1990, Samuel *et al.*, 1993, Biswas *et al.*, 1996, Tu *et al.*, 1998). Raw white rice has not been a good carrier for oral vaccination probably because of its antiviral activity (Tantaswasdi *et al.*, 1992, Spradbrow, 1993/94).This is unfortunate because white rice is readily available in many developing countries. This could be an ideal carrier for oral vaccines as it is stable, cheap and attractive to chickens. Methods are required to overcome antiviral activity in raw white rice. Several experiments have been conducted to determine the effects of various treatments on raw white rice on the survival of strain I-2 of NDV. Mixing the rice with vegetable oil prior to coating with vaccine virus has been one of the best methods (Wambura *et al.*, 2007). Vegetable cooking oil is coated to protect the NDV from inactivants present in raw rice grains (Wambura *et al.*, 2007). Moreover, the oiled rice can stay longer under room temperature without being spoiled than cooked one.

In this study the vaccination of chickens against ND using I-2 vaccine coated on oiled rice resulted into seroconversion. Previous studies have shown that chickens vaccinated through the oral route (particularly via feed) result into protective antibody response after multiple vaccinations (Spradbrow and Samuel, 1991; Johnston *et al.*, 1992; Wambura *et al.*, 2000). In contrast the results from the present study have shown that seven days after vaccination chickens had provoked production of protective antibody response (Wambura 2009). The reason for this difference is not known probably could be due to the effect of oil acting as an adjuvant. Other studies have shown the similar effects of oil when using live ND vaccine via eye drop and inactivated vaccines by injections (Rehmani and Spradbrow 1995).

This food–based vaccine which utilizes materials that are readily available in local areas provides another vaccination regime apart from eye drop and drinking water.

Moreover, this vaccination regime will also ease the vaccination as the rice grain can be prepared by the vaccinators in collaboration with the farmer in the evening and provided to the chickens before they go out for scavenging early in the next morning.

The I-2 virus coated on the oiled rice has been shown to be safe, immunogenic and provoked production of protective antibody response following vaccination of chickens. Oiled rice coated with I-2 vaccine may therefore have potential application in vaccination of feral chickens as well as wild birds which are now domesticated and are difficult to handle such as Guinea fowls, Ostriches and Quails.

2.2 Coloured I-2 vaccine:

I-2 vaccine is becoming popular due to its several advantages over other vaccines such as thermostability and ease administration by eye drop while giving good protection against virulent virus (Tu *et al.*, 1998; Wambura *et al.*, 2000). However some vaccinators have difficulty in determining whether the entire first drop does enter the eye or not when using eye drop method of vaccination. This is because the vaccine is colourless, same as lachrymal secretion. The need for having a virus friendly dye which will not harm or inactivate the virus is therefore warranted. This will enable a vaccinator to determine whether the vaccine drop has entered the eye or not and if not a second drop should be applied.

The most common cause of vaccine failure in poultry is poor vaccine administration. The colour is a visual marker for the vaccine during administration (Cargill, 1999) and hence may help to assess efficiency of vaccine administration especially by eye drop.

The study was conducted to determine the suitable colour to be used for eye drop vaccination.

The results of the present study have shown that the green coloured vaccine is safe in chicken embryos as well as in vaccinated chickens. This vaccine is also immunogenic and resulted in production antibody of titre of ≥23 which is considered to be protective in chickens against field challenge of NDV.

2.3 Use of nanotechnology in delivery of I-2 vaccine:

Nanotechnology is a novel discovery- a field of applied science and technology which deals with the control of matter on the molecular level in scales smaller than 1 micrometre, normally 1 to 100 nanometers (nm), and the fabrication of devices within that size range. Most conventional vaccine delivery techniques to the host are non-targeted and invasive. One of the attractive and innovative nanotechnologies is the non-invasive systemic or local vaccine delivery to the host by means of the nanoparticles. Nanotechnology has the great potential to revolutionize and impact on the way vaccines are developed and used, and the knowledge on vaccinology as a whole. The nanotechniques may be used to improve the I-2 vaccine delivery to the chickens and hence enhance its efficacy.

2.3.1 Use of nano-organogels: Organogels are semi-solid systems, in which an organic liquid phase is immobilized by a three-dimensional network composed of self-

assembled, intertwined gelator fibers. In the present study nano-organogels were prepared and contained 109.5EID50/0.1 mL of I-2 virus where the infectivity titre of 107.5EID50/0.1 mL were retained for 12 weeks which is above the recommended 107 EID50/mL for oral vaccination. The vaccine was stable at room temperature, safe and produced protective antibody response in vaccinated chickens. Moreover the rice coated with trehalose nano-organogel vaccine was used for oral administration and hence suitable for mass vaccination.

Most conventional ND vaccines are heat sensitive; the temperature range within which these vaccines remain stable is very narrow. Heat stable vaccines may be the best approach to control ND in village chickens. Therefore sealing the vaccine inside a sugar glass can effectively broadens the temperature range over which vaccines can survive without inactivation. In addition, the vaccine can be prepared and coated on feed like rice with nano-organogels that is easily administered as exemplified in the present study.

Because nano-organogel vaccine contain no preservatives and are stable at room temperature for prolonged periods, they can be distributed without the need of refrigeration through regular distribution outlets. Application of this technology may greatly increase vaccination coverage particularly in remote rural area where basic infrastructure is lacking. Another advantage of these technologies is that the production of the nanogels is simple and use natural biodegradable materials.

Sugar-glass technology allows vaccines to be made which can be stored and transported routinely at a tropical room temperature. The ultimate goal of this technology is to reach a system where thermostable vaccines can be delivered to remote rural areas in the same way as drugs without a cold chain while maintaining their potency and efficacy.

In conclusion, the present study showed that it is feasible to formulate nano-organogels incorporating strain I-2 vaccine virus coated on rice for oral vaccination of village chickens.

2.3.2 Formulation of I-2 vaccine flakes: Formulation of I-2 vaccine flakes showed substantial improvement in storage stability over wet (liquid) vaccine.

The flakes were developed by sugar-glass-technology using an amorphous trehalose glassy matrix as a stabilizer.

The vaccine flakes are green coloured for easy visual identification and delivery to chickens particularly by eye drop.

The development of thermostabilized dry vaccines and delivery technologies may help to overcome the cold storage and current distribution systems and delivery methods.

Dry vaccine formulations are potentially superior to liquid vaccines in their sterility and stability thus eliminating the need for the cold chain.

The findings from the present study have shown that the trehalose vaccine flakes have several distinct practical advantages over liquid formulations

They were stable at room temperature, required no preservatives, easy to carry and therefore can be transported free of the limiting cold chain systems

The value of the present study is that the trehalose vaccine flakes may be delivered and administered to chickens through eye drop, nasal drop, drinking water or orally (via feed or alone). It produced the protective antibody response in chickens against challenge with virulent NDV. The present results collaborate with the findings from the previous studies which showed that vaccination of chickens with NDV strain I-2 results in protection against subsequent ND challenge.

The trehalose vaccine flakes could be a useful formulation in order to produce a new and affordable ways to store and deliver ND vaccines to village chicken flocks in rural areas particularly in developing countries. This technology can greatly expand the availability and the coverage of vaccination of chickens against ND in rural areas which lacks basic infrastructures if it is optimized and adopted. In conclusion, this study demonstrated that it is feasible to produce dry flake formulation of an avirulent thermostable live vaccine for single and mass vaccination of village poultry.

2.3.3 Formulation of novel nano-encapsulated I-2 vaccine tablets: Formulation of nano-encapsulated vaccine tablet is a novel technique for the delivery of ND vaccine to village chickens. Vaccine tablets were prepared using gelatin, trehalose and casein as thermostabilizers and binders, respectively and each vaccine tablet contained a nominal oral dose of NDV strain I-2 for a single chicken. These ND vaccine tables maintained a titre of 6.7 EID50/0.1 mL for 90 days at ambient room temperature. When these vaccine tablets were given to village chickens a single oral administration of the vaccine produced protective antibody response against challenge with virulent NDV. The findings from the present study showed that if the vaccine tablet formulation technique is optimised, it will allow the delivery of the ND vaccine without depending on cold chains to rural areas in tropical countries. The biotechnology of producing natural dry nano-encapsulated tablet vaccines with enhanced thermostability applied in the present study may be used for other vaccines intended for semi-feral and scavenging village chickens.This study has demonstrated that this natural biodegradable nano-encapsulated antigen delivery technique has the potential for prolonged protection. Moreover, the vaccine tablet formulation when optimised will allow the delivery of the ND vaccine without depending on cold chains to rural areas in tropical countries.

2.3.4 Formulation of gelatin nanoparticles to deliver I-2 vaccine to chickens: Research is going on to use gelatin nanoparticles to further thermostabilise and ultimately deliver I-2 vaccine to village chickens in rural areas without depending on cold chain systems.

3.0 Innovative delivery of vaccines to chickens against new emerging diseases after ND is effectively controlled

Fowlpox- In this case Strain TPV-1 FP live vaccine free from REV has been developed, inoculated through eye drop

Infectious coryza- Serovar B of Avibacterium paragallinarum live vaccine inoculated through eye drop

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ND Control in India, South Asia and Globally with Focus on Backyard Poultry

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Newcastle Disease

Infection of poultry caused by NDV, which is an avian paramyxovirus serotype 1 (APMV-1) that meets one of the following criteria for virulence:

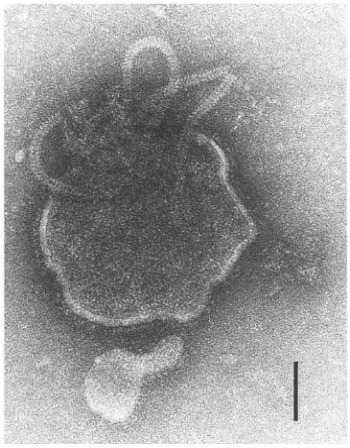
a) ICPI of virus in day-old chicks: 0.7 or greater
b) Possess multiple basic amino acids at C-terminus of the F2 protein and phenylalanine at residue 117, which is the N-terminus of the F1 protein.
(OIE TERRESTRIAL CODE)

Synonyms of Newcastle Disease

- Ranikhet Disease
- Pseudo fowl pest
- Avian pest
- Avian distemper
- Avian pneumoencephalitis
- Pseudo-fowl plague

Etiological Agent

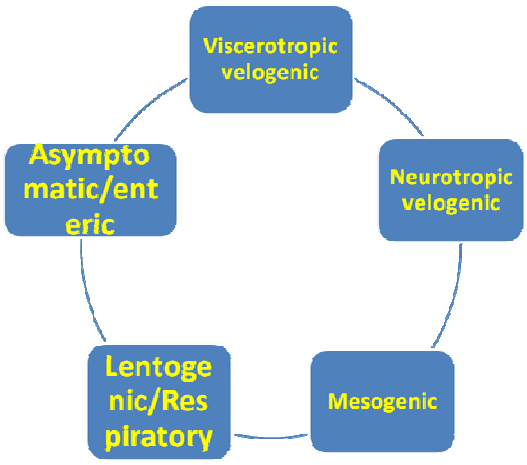
- Family: Avian paramyxoviridae
- Negative sense
- Single stranded
- Non segmented RNA genome
- Round and filamentous
- *Herring bone nucleocapsid*



Electron microscopic structure (Collins)

NDV forms

- NDV strains shows a great variation in pathogenesis.



Clinical signs

- VVND: Green diarrhoea, torticollis, 100% mortality *(Doyle's)*
- NVND: Respiratory & nervous signs, drop in egg production, high mortality *(Beach's)*
- Mesogenic: Respiratory and occasional nervous signs, low mortality *(Beaudettes)*
- Lentogenic: subclinical respiratory infection *(Hitchners)*
- Asymptomatic: subclinical enteric infection.

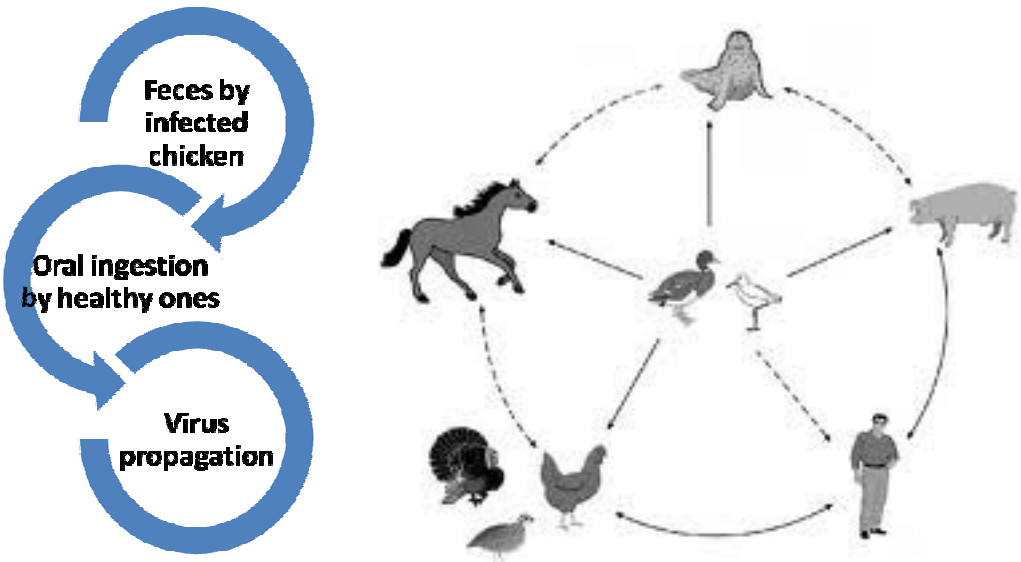
Background

- First reported in 1926. Rapidly spreads in Asia, became panzootic within four decades.
- NDV is prevalent worldwide.
- Spread rapidly during epizootics in poultry.
- Causes 100% flock mortality in susceptible birds.
- To date, it occurs on at least six of the seven continents (Miller *et al*., 2012)
- Since 2000-2009, virulent NDV (vNDV) for chickens has been detected in wild birds, pigeons and poultry.
- Velogenic NDV strains: Prevalent in Central & South America, Mexico, Asia and Middle East.
- Lentogenic strains are reported worldwide.
- Genotypes V, VI, VII, and VIII are the predominant with only virulent viruses.

ND in village chicken

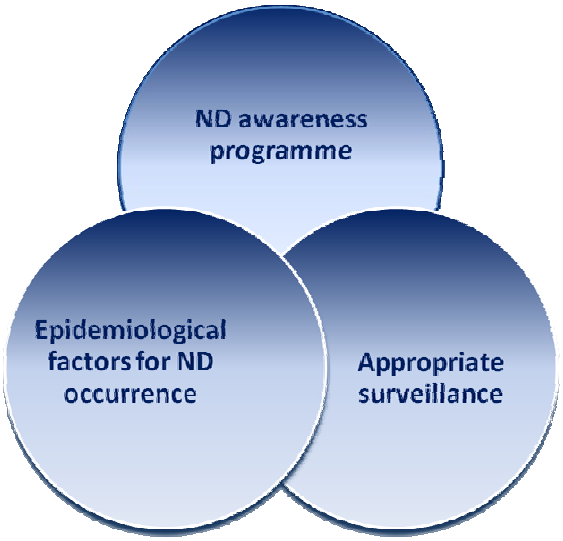
- Single greatest constraint limiting productivity and development throughout the developing sphere (Alexander 1991).
- Velogenic NDV is endemic in village chickens (Spradbrow, 1993/94) and epidemics result in huge economic losses (Martin, 1992).
- Heterogeneity within strains of NDV: maintenance of infection in village poultry populations.

ND transmission in village chicken



Determining ND status of a country

- A country, compartment or zone can be declared ND free, if it demonstrates the absence of ND for 12 months



Control Policies: It matters

- Preventing entry of virus into the country and its spread within country.
- Trade and movement restriction of poultry and its products.
- Reducing the likelihood of ND outbreaks by heat treating the poultry feed (Ireland legislation)
- Slaughter of infected birds and their contacts and the destruction of products.

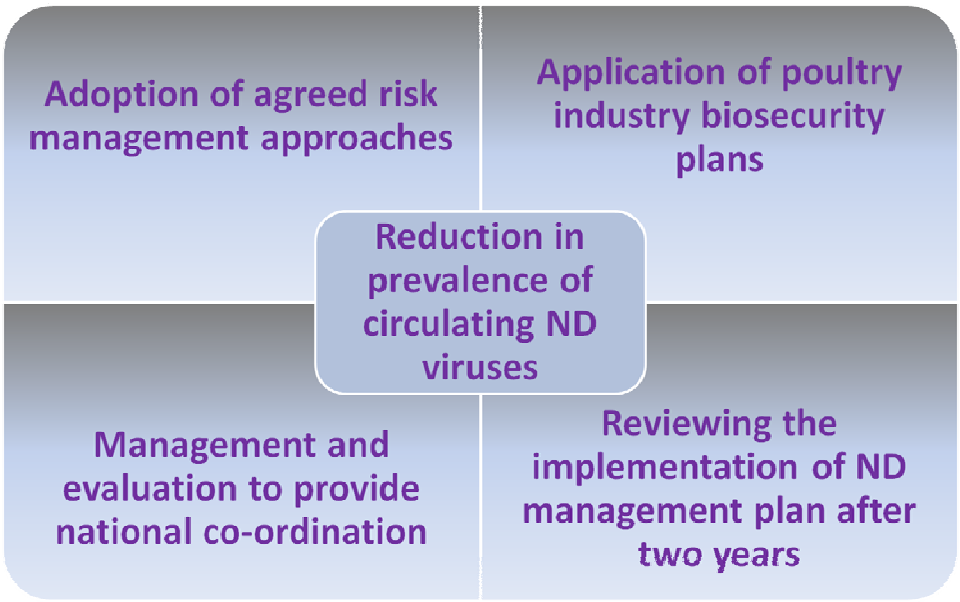
Surveillance Strategies for ND

- *Early warning system* throughout production, marketing chain and processing chain.
- **Clinical:** for early indication of infection.
- **Serological:** indicates protective titre.
- **Virological:** monitors risk population.
- *Sentinel chicken* detects virus circulation, monitors vaccinated and less susceptible populations.

Importation Guidelines

- No ND identified 90 days preceding the export.
- Poultry vaccinated 21 days prior to export with strains other than velogenic.
- Not suggestive for ND on shipment day.
- Chicks hatched from parents kept in ND free area.
- Shipping containers sanitized prior to current use.
- Shipment not been exposed to regions with endemic velogenic ND.
- Inspection of flock before and after shipment by the qualified veterinarian.
- Rational reclamation operations for tackling discarded vaccines.

Strategic Risk Management



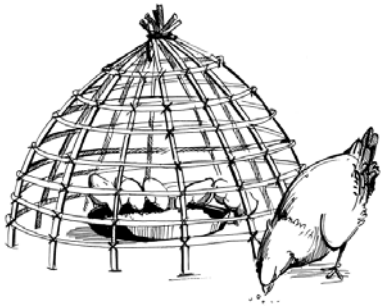
Flock management

- ❑ Zero contact models b/w rural chicken and other poultry.
- ❑ Age and species separate rearing.
- ❑ All-in-all out strategy with complete exit and renewal of flocks.
- ❑ Construction of fences with demarcated boundaries.
- ❑ Practicing indoor village chicken production especially during nights.
- ❑ Burning or deep burial disposal method of dead birds.

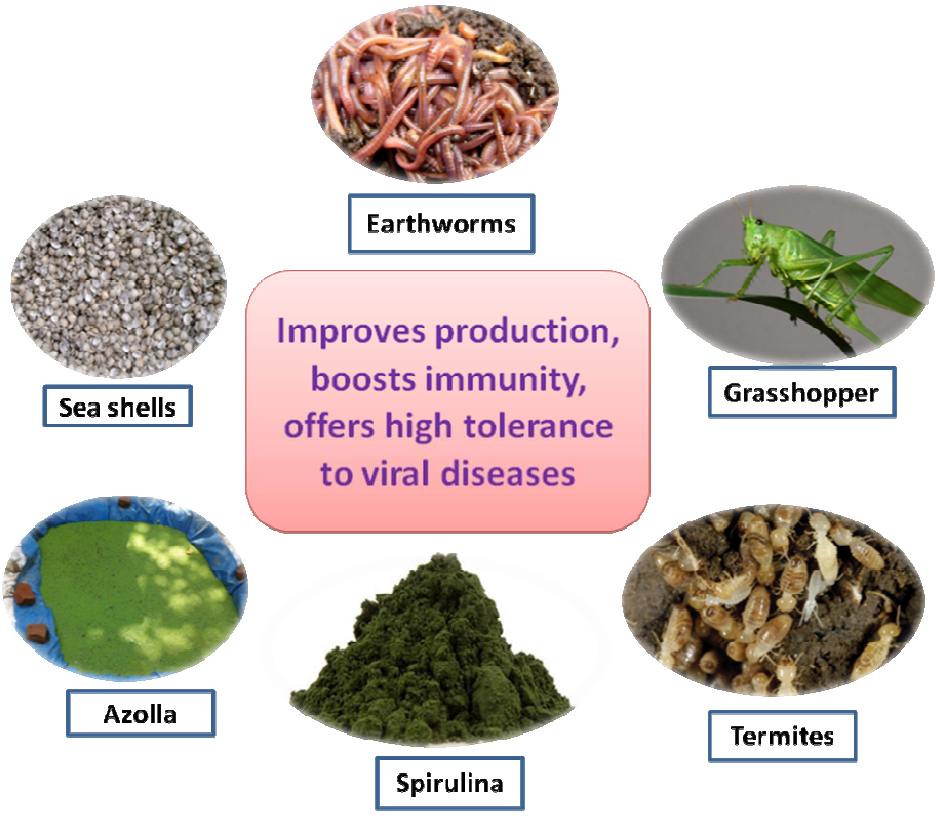
Do's	Don'ts
❑ Procuring backyard stock from known (neighbours) and regular stock sources (KVKs, SAUs and CPDOs) ❑ Quarantine newly introduced birds before releasing into actual flock	❑ Visiting wet and live bird markets frequently ❑ Access of chickens showing signs of illness to live bird market ❑ Back tracking of unsold chicken from markets ❑ Marketing of sick or dead birds ❑ Frequent contact with vehicles, ducks and geese, dogs and cats

Feed and water management

- ❑ Treating ponds and rivers with chlorine.
- ❑ Creep feeding of chicks allows
  - o access to feed
  - o offers shelter
  - o Protects from air borne predators



Additional supplementary feeding



Ethno veterinary medicine (ITKs)

- Treatment with garlic and onion paste, salted chillies, white vinegar, mango bark/ tamarind tree, $KMNO_4$ in water reduces ND symptoms.

Vaccination

- Sustainable strategy for control
- Alters epidemiology of ND
- Prevents disease but not infection
- Vaccination must be regarded as complementary but not alternative to good management, biosecurity and hygiene.
- In enzootic area, only way to reduce risk of disease.

Vaccination Programme

- Maternal immunity
- Vaccine availability
- Flock size & Expected life of flock
- Climate & Geographical density of poultry
- Market age and disease challenge
- Broiler chickens: not vaccinated in low ND risk areas
- Layer chickens: >1 vaccination is required to maintain maternal immunity.

ND Vaccines

- Live ND vaccines: induces local immunity in respiratory tract.
- Live vaccines support only early stages, hence inactivated vaccine induces long lasting humoral immunity.
- Association of live and inactivated is strongly recommended in high ND pressure areas.
- Use of live and inactivated vaccines with an ICPI of >0.4 and 0.7 respectively must be discouraged (EC, 1993).

VACCINE	STRAIN	TYPE	ROUTE
V4	Apathogenic	Primary	Oral, I/N, I/O
PHY.LMV.42	Apathogenic	Primary	Oral, I/N, I/O
Ulster 2C	Apathogenic	Primary	Oral, I/N, I/O
VH	Apathogenic	Primary	Oral, I/N, I/O
Hitchner B1	Lentogenic	Primary	Oral, I/N, I/O
VG/GA	Lentogenic	Primary	Oral, I/N, I/O
Clone Lasota	Lentogenic	Primary	Oral, I/N, I/O
La Sota	Lentogenic	Primary	Oral, I/N, I/O
F (Asplin)	Lentogenic	Primary	Oral, I/N, I/O
Komarov	Mesogenic	Secondary	I/M, S/C
Roakins	Mesogenic	Secondary	I/M, S/C
Mukteswar	Mesogenic	Secondary	I/M, S/C

Vaccines: Thermotolerant (Heat stable)

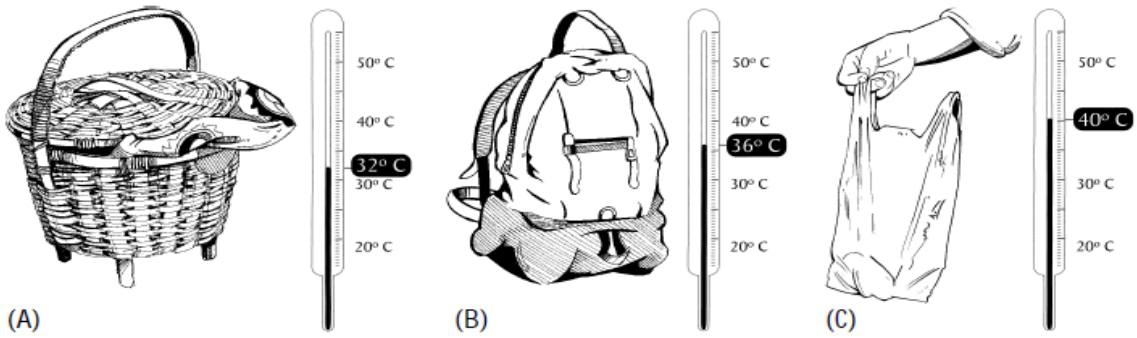
- NDV4-HR & I-2 vaccines (Australian Centre for International Agricultural Research) successfully tested in Asia and Africa;
- Adopted as official vaccine in Vietnam.
- Locally gives full protection against virulent ND virus challenge after one vaccination even at a dose rate of 104 EID50/bird (Vilmos, 1998).

Vaccine Administration

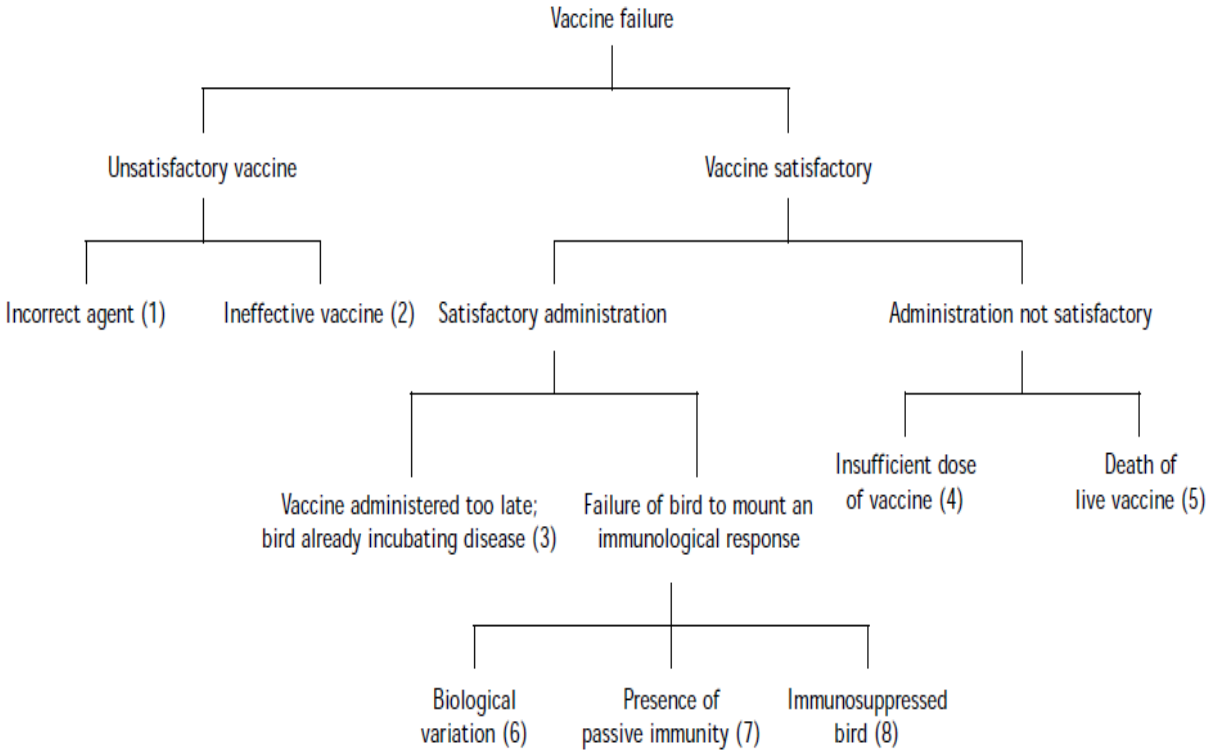
- Drinking water @ 5-7 ml/bird & Finely grounded grains @ 10g/ bird.
- Millet, Sunflower and Sorghum: suitable vaccine carriers.
- Bore-hole and rain water: better than well water.
- Initial vaccine: 2-3 wks apart.
- Revaccination every 2-3 m

Vaccines: Storage

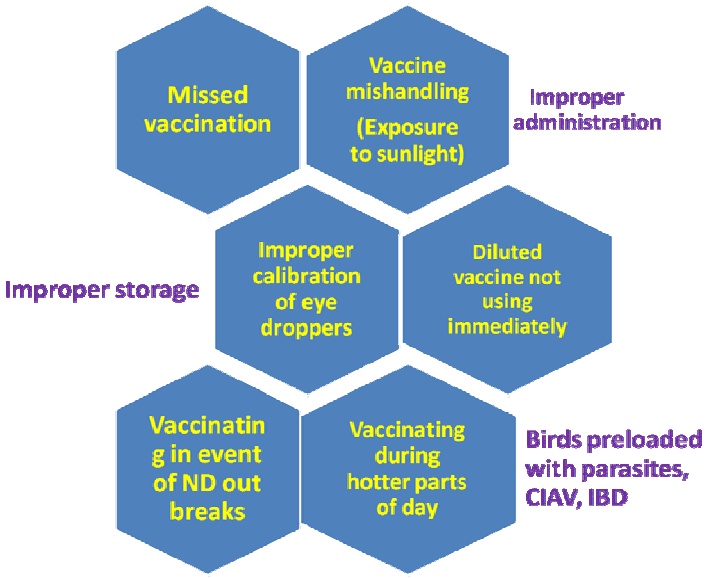
- Coolbox or wrapped in a damp cloth, to avoid sunlight exposure.
- Covered open weave basket allows evaporative cooling which helps to keep the vaccine cool and the cover prevents contact with sunlight.



ND Vaccination: Trouble Shooting (Tizard, 1987)



Other Associated Reasons

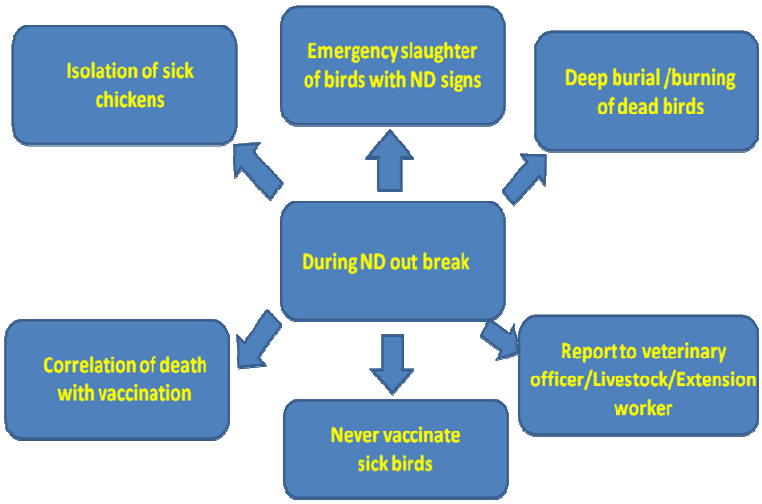


For Successful ND Vaccination

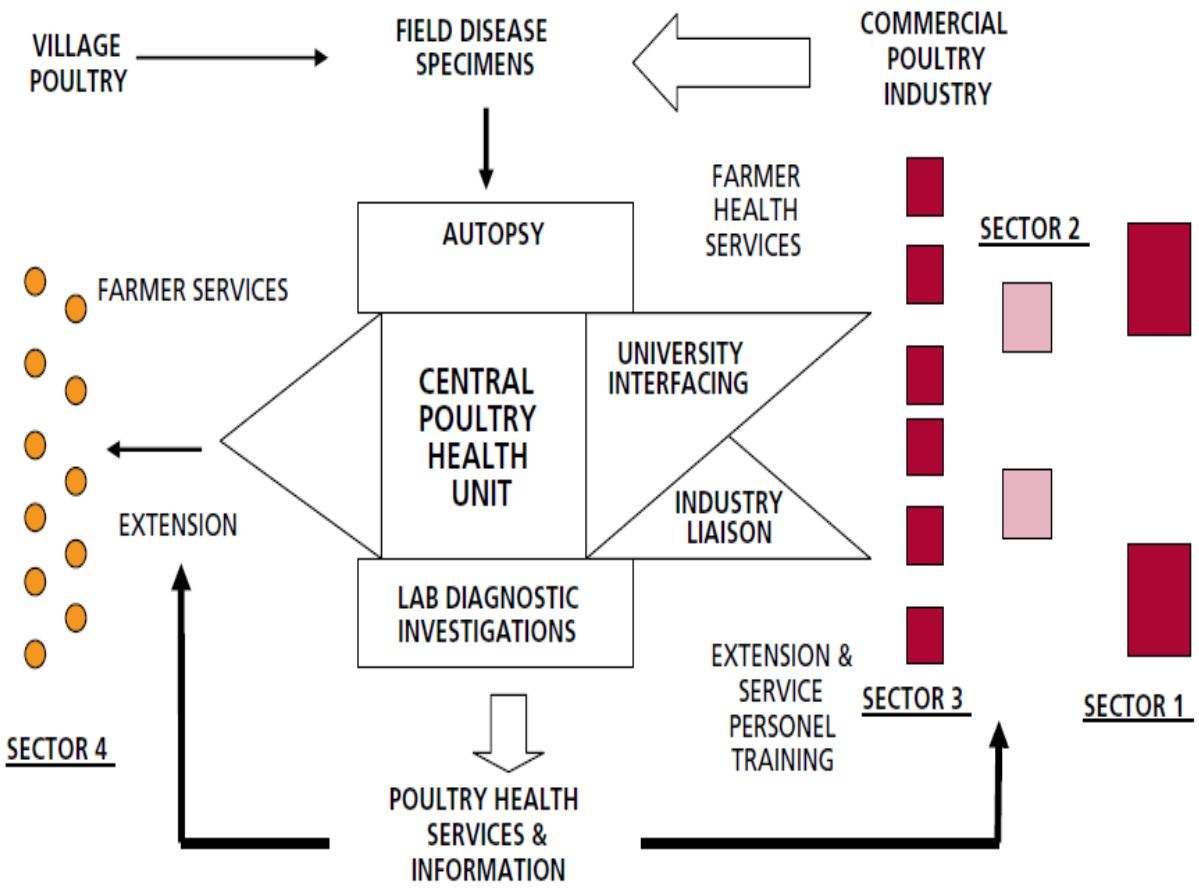
- Awareness of officials, veterinarians and livestock workers regarding importance of ND vaccination.
- Vaccination campaign coincides with ND outbreak.
- Pre-testing of the developed communication material.
- Choosing of backyard owners as community vaccinators is beneficial.
- Assessing the vaccination impact regularly with a base line survey.
- Strengthening of ND surveillance data.

Gender issues in ND Control

- Choosing committed women as community vaccinator addresses
- Gender inequity
- Improves the livelihood status from the income generation.
- Covers large population of village chickens as house specific vaccination is accomplished.



Delivery of Health Services (FAO)



Concluding remarks

- ND in village chickens is a serious problem that affects the welfare of millions of people in developing countries.
- Planning of vaccination campaign, handling and administration are the key issues in control of ND in villages.
- Involving women in ND control programme enhances the output and improves the livelihood of rural women
- Majority of biosecurity issues addressed are difficult to drive with ease and there is scope for visualizing convenient concepts.
- Its still a matter of question whether or not these vaccinal strains do produce effective immune response or they provide the prevailing NDV strains to evolve as a result of escape mutants and subsequent evolution.
- Harmonization of nation's legislations, quarantine and stamping out policies, periodical vaccination and novel biosecurity concepts mainly in terms of wild, pet and water birds is essential for ND control in commercial communities.
- Complementing ND control programme with surveillance, strategic risk analysis and monitoring provides valuable outcome.
- Use of geographic information system (GIS) technology benefits many industries including agricultural systems.

Immunogenic response of a Newcastle Disease vaccine (local isolate) in chicken and seroconversion of a heat exposed lentogenic strain of ND virus (local isolate) in chicks

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Indian poultry industry ranks 3rd and 5th in the world with the annual growth rate of 8% and 15% in respect of egg and meat production respectively (Mahapatra, 2005). The broiler industry recorded faster growth than egg industry (Mahapatra, 2005) which has transformed itself from backyard farming to dynamic agro based industry. Total chicken population has registered an annual growth of 7.3% in the last decade. While farm chicken grew at the rate of 12.4%, Desi chicken showed much lower growth rate of about 2%. Other poultry species showed reduction of 2.3% per annum. India has one of the worlds' largest and the fastest growing poultry industries. Real Gross Domestic Product (GDP) grew 6.4% annually during 2000-2008, making India the scored fastest growing major economy in the world (Ministry of Food Processing Industry, 2008).

Organized sector accounts for nearly 70% of the total poultry output in the country. The current strength of layers and broilers in India has been estimated to be 230 million and 2300 million, respectively. The annual per capita availability has increased from 7 eggs in 1961 to 52 eggs in 2010 and poultry meat for 0.16 kg to 2.96 kg. Presently, a broiler achieves a body weight of 2 kg in less than 40 days with a feed conversion ratio of 1.8 to 1.9 and layer produces > 325 eggs in 52 weeks of production with an average egg weight of 54-58 g and FCR of less than 2.0 kg/dozen of eggs. Family poultry are still very important through using available natural resources efficiently; it constitutes an important component of agricultural and household economy, direct food production as well as employment and income generation from resources poor small farmers specially women.

Newcastle disease (Ranikhet Disease) is the most serious, highly contagious, epizootic poultry disease and causes devastating looses in both organized as well as backyard poultry sectors by high morbidly and mortality. No remarkable progress has been made in controlling Newcastle disease (ND) in free ranging village flocks. Vaccination is the most effective means of controlling ND and has been used throughout the world since 1940 (Beard and Hanson, 1984). Now a days, various pharmaceutical private agencies and State Biological are producing ND vaccines in India consisting of live attenuated LaSota strain, B1 strain, F strain and NDVH strain. These vaccines are routinely used mainly in the commercial poultry sector. In spite of that such measures appear not to be effective in many cases as frequent reports of ND out break even in vaccinated flocks are recorded. On the contrary, application of these vaccines in rural areas is limited due to some problems like i) heat liability of vaccine strains of virus, ii) Large doses presentation, iii) affordability, iv) maintenance of cold chain for effective administration of the vaccine and v) ignorance of the farmers. Therefore, to prevent the

economic losses by sudden outbreak of ND, it is very important to develop an effective and easy to administer vaccine from local isolate. Among the live vaccines, the thermostable vaccine requires less stringent transport requirement in the field.

Therefore, with this aim, Department of Veterinary Epidemiology and Preventive Medicine, Faculty of Veterinary and Animal Sciences, West Bengal University of Animal and Fishery Sciences, collected samples from field outbreaks suspected ND, processed the samples in the laboratory of the Department as per OIE and isolated the virus and confirmed the ND virus by performing HA and HI test with known positive antisera which was collected from Indian Veterinary Research Institute, Izatnagar, Bareilly, U.P. Out of 84 isolates, 24 were pathotyped by performing MDT, ICPI and IVPI as per OIE (2004). All the pathotyped isolates were sent to OIE, FAO and National Reference Laboratory for Newcastle Disease and Avian influenzas, Viale dell's Universita, 10–35020, Legnaro (PD), Italy for further characterization. The OIE Laboratory adopted genotyping method for phylogenetic analysis of the isolates.

One viral local isolate was selected having ICPI 0.04, MDT 126 hours, EID50 108.54/ml and IVPI 0.00 for preparation of vaccine following the guidelines of the Commission of the European Committee (1993) and OIE (2004). After 36 serial passages into 9-11 days old embryonated SPF fowl eggs, the virus was attenuated. From that attenuated virus, vaccine was prepared as per the guidelines of OIE (2004), FAO (2002), by preparation of master seed and working seed. No exogenous (bacterial, mycoplasmal and fungal) contamination was detected by laboratory test in the vaccine (as per OIE, 2004). Ten time doses was inoculated into each chicks (as per OIE, 2004) but no abnormality/mortality was detected in inoculated birds and showed above protective level of titre from 7th day (1.56±0.04) onwards to 21st day (1.71±0.04) of post inoculation. In potency test, the mean titres were good from 7th day (1.53±0.03) to before challenge i.e. 42nd day (2.43±04) and end of post challenge i.e. 56th day (2.44±0.05) in the test group of experimental chicks.

This live attenuated ND vaccine (local isolate) showed significantly the highest immunogenic response after 21st day of post challenge (2.44±0.05) in comparison to the commercially available lentogenic strain ND vaccine i.e. NDVH (2.26±0.06), B1 strain (2.23±0.08), F strain (2.38±0.05) and LaSota strain (2.42±0.5) when experimental potency study was performed. It was also confirmed that the ND vaccine (local isolate) had significantly the best immunogenic performance in commercial broiler bird just before marketing i.e. at the age of 40 days (2.65±0.01) in comparison to the available vaccines in the market at same age, i.e. NDVH strain (2.53±0.01), F strain (2.53±0.01) and B1 strain (2.48±0.03) when vaccinations were performed intranasally at the age of 5 days and boostering at 26th day in 30 thousand broiler birds for each of vaccine group in farm condition.

The vaccine proved very effective when inoculated thorough drinking water in 30 thousand commercial broiler birds in farm condition at the age of 5 days and boostering at 26th day. The HI titre was 2.27±0.05 just before marketing. And having very good post immunogenic titre i.e. 2.41±0.03 at the age of 63 days when challenge study was done at the age of 42 days in isolated condition, with no abnormality/mortality in experimented group.

It is fact that among the live vaccines, the thermostable vaccine requires less stringent transport requirements in the field. With that objective, this attenuated virus was exposed in various temperature i.e. 25°C for 36 days, 37°C for 29 days, 40°C for 30 days, 43°C for 30 days

and 56°C for various time period i.e. 5 mins., 10 mins., 15 mins., 30 mins., 1 hr., 2 hrs., 4 hrs. and 8 hrs. and HA titre (as per OIE, 2012) and EID50 (FAO, 2002) were determined in every 2 days (for 25°C and 37°C temperature exposure) and every 6 days (for 40°C and 43°C temperature exposure) interval. And seroconversion study was performed by oro-nasal inoculation (106.5 EID50 per dose) of thermal exposed virus (43°C temperature 12 days) in susceptible commercial broiler chicks in isolated condition as well as in layer birds in farm condition. Serum antibody titres were detected at every 7 days interval of experimental group and monthly in farm condition.

The attenuated virus successfully tolerated the 25°C and 37°C temperature with a minimal declining of HA titre and EID50. The pre- exposure HA titre (29) and EID50 (109) declined to 28 and 108.50 respectively after exposure at 25°C temperature and the pre-exposure HA titre (29) and EID50 (1010.16) decreased to 27 and 108.5 respectively while exposed for 29 days at 37°C. Again the residual virus was serially passaged 3 times in SPF embryonated fowl eggs and the harvested virus was exposed at 40°C for 30 days. The pre-exposed HA titre i.e. 29 and EID50 i.e. 1010.20 retained its viability and infectivity in a slight declined manner i.e. HA titre 27 and EID50 109.62 respectively. Again by 3 serial passages in SPF embryonated fowl eggs, the virus was exposed at 43°C temperature for 30 days. The HA titre declined from 210 to 24 on 12th day and from 18th day onwards it became nil. But the EID50 declined from 109.25 (pre-exposed) to 109.5 at the end of the 30 days exposure at 43°C temperature. The 12th days exposed virus at 43°C temperature after 3 serial passages exposed to 56°C temperature. The pre-exposed HA titre i.e. 28 and EID50 i.e. 108.78 could be detected 25 and 107.36 respectively after 10 mins. exposure but from 15 mins. onwards both the values became nil.

The progeny of the 12th day exposed virus at 43°C temperature was tested and no exogenous contamination (as per OIE, 2012) was found. The thermal exposed virus was safe that was proved by biological inoculation @ 10×106.5 EID50 per dose intranasally in commercial broiler chicken (as per OIE, 2012). The thermal exposed virus was inoculated in 20 commercial broiler chicks intranasally @ 106.5 EID50 per dose at the age of 5 days and boostering was performed after 21 days of primary inoculation. The mean HI titres were 1.26±0.4, 1.74±0.2, 1.44±0.05, 1.80±0.2, 2.01±0.06, 1.65±0.05 and 1.59±0.05 at every 7 days post-inoculation respectively up to 49th day. The virus was inoculated through drinking water in layer birds once in a month in farm condition. The highest mean antibody titre reached to 2.56±0.60 and the lowest was 1.53±0.50 from last April to December that persisted always above protective level i.e. 1.50±0.0.

From the study it was concluded that live attenuated lentogenic strain ND vaccine (local isolate) was having the highest immune response when administered to commercial broiler chicks in laboratory trial as well as in field condition. This virus (local isolate) could withstand the thermal exposure of 40°C for 30 days and 43°C for 12 days without losing its viability in laboratory condition and after inoculation into the broiler chicks and layer birds, it could produce satisfactory level of HI titre. The virus can be used as vaccine strain which will be able to withstand the environmental temperature up to 40°C for 30 days without losing its viability and embryo infectivity.

REFERENCE:

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A Value Chain Approach to Sustainable ND Vaccination Scale-Up in Africa

Emmanuel Babafunso. Sonaiya
Department of Animal Sciences, Obafemi Awolowo University, Ile-Ife, Nigeria
Email: fsonaiya@oauife.edu.ng

Five Essential Elements in Sustainable ND Control

- **An appropriate vaccine, vaccine technology and vaccine distribution mechanisms**;
- Effective extension materials and methodologies that target veterinary and extension staff, as well as community vaccinators and poultry producers;
- Simple evaluation and monitoring systems of both technical and socio-economic indicators;
- **Economic sustainability based on the commercialization of the vaccine and vaccination services and the marketing of surplus chickens and eggs**;
- Support and coordination by relevant government agencies for the promotion and implementation of vaccination programmes.

Assumptions of a Village Poultry Model

1. Family flocks are small enough to find all their feed needs on the range;
2. Supplements are used to maintain the 'homing' instinct;
3. Family flocks serve multi-purposes but sale is acceptable;
4. Genetic diversity is unlimited (Na, Fr, Dw, B/W feathers);
5. All flocks are owner-managed and all production systems can be adopted.
6. **All operators and units adopt free market principles.**

Village poultry development projects in some African countries (after Fakhrul Islam and Jabbar, 2003)

Project	Objectives	Activities
Cameroon/ LSDP	To increase meat and milk production and raise the incomes of poor livestock herders by promoting producer associations, enhancing the participation of the private sector in providing services and strengthening land regulations to improve the use of rangelands.	The formation of poultry and dairy producer groups (for input supply and marketing, with particular focus on women). Credit for semi-intensive poultry production. **Vaccination campaigns against ND** and the privatization of animal health care, including credit lines for beneficiaries.
Malawi/ MSPPM	Provision of village-based food and income-generation opportunities by small-scale poultry enterprises to the poorest segment of the village population, especially women.	Expansion of semi-scavenging poultry model; **provision of training in health and husbandry practices** and credit to the women for poultry enterprises
Republic of Benin	To improve livelihood of the rural population through improvement of traditional village poultry.	**Training of village vaccinators**, support to construct hen houses, training of poultry producers, access to a micro-credit scheme

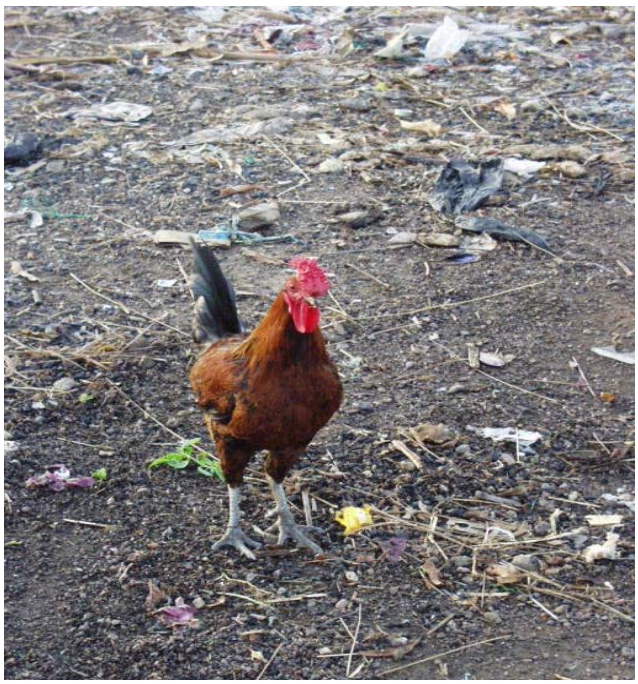
LSDP- Livestock Sector Development Project, MSPPM- Malawi Smallholder Poultry Production Model

Four Critical Project Elements

- Credit repayment rates,
- Marketing constraints (mainly competition with large commercial producers; result in poor credit repayment),
- Mortality rates, and
- Feed costs.

The IFAD review concluded that there is a need for development projects to continue introducing new technologies by which an increased level of profit can be achieved from smallholder semi-intensive poultry-rearing.

Two Examples from West Africa: Benin & SeNEGAL



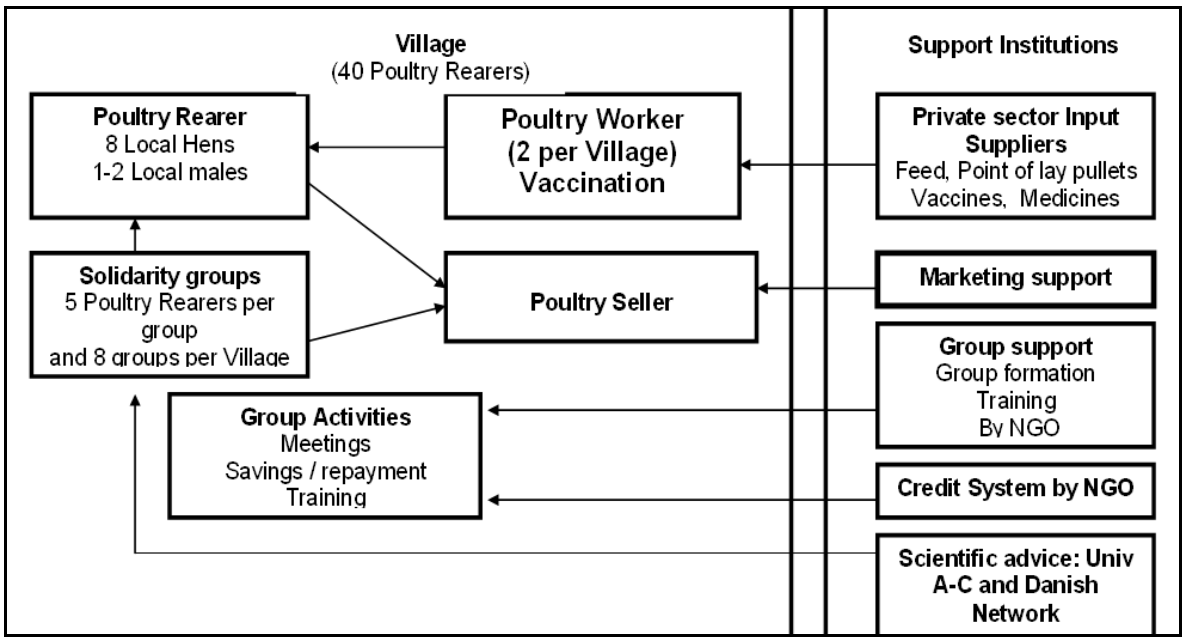
Village Poultry Development in Benin

CHRYSOSTÔME Christophe, RIISE Jens Christian & Frederic HOUNDONOUGBO

INTRODUCTION

- 90% of the estimated 29 million poultry In Benin are kept in village systems (10-20 birds per family)
- Village Poultry are controlled by women.
- The VP Development strategy involved:
  - Suitable micro-credit system;
  - Technical services (training and coordination);
  - Provision of veterinary services and inputs

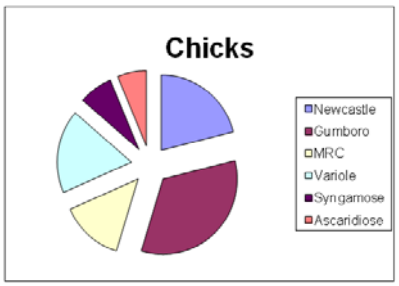
Benin Village Poultry Development Model

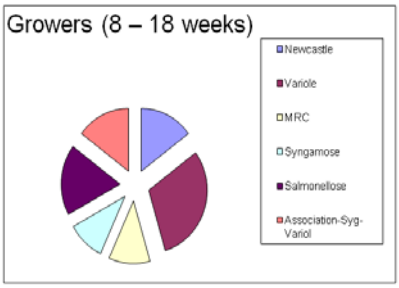


Micro Credit Concept and Components

- Depending on the cadre (poultry rearer- PR, village vaccinator- VV, poultry seller- PS) each member was provided with a small loan of 30,000 FCFA (50 USD) for PR and 25,000 FCFA for VV and PS.
- The repayment period was 1 year for PR and 6 months for VV and PS. The interest rate was 12% per semester while the rate of saving was 18% per semester. The penalty for defaulting was 2% per month on the capital remaining due.

Disease Matrix





Lessons Learned in Benin

- **Monitor and develop markets for live birds**
- Apply research on the use of locally available feed resources for poultry and develop simple guidelines
- Support local craftsmen to make available equipments (e.g. baskets, drinkers, feeders) for poultry rearers
- **Set up an adequate ND control program**
- Promote the consumption of eggs

Village Poultry Development in Sénégal

COLUFIFA, POGV2, Danish Network, Vélos pour le Sénégal, DANIDA, IFAD

Overall objective

- To establish a village poultry production model, that will improve the livelihoods of the target families and empower the women involved.

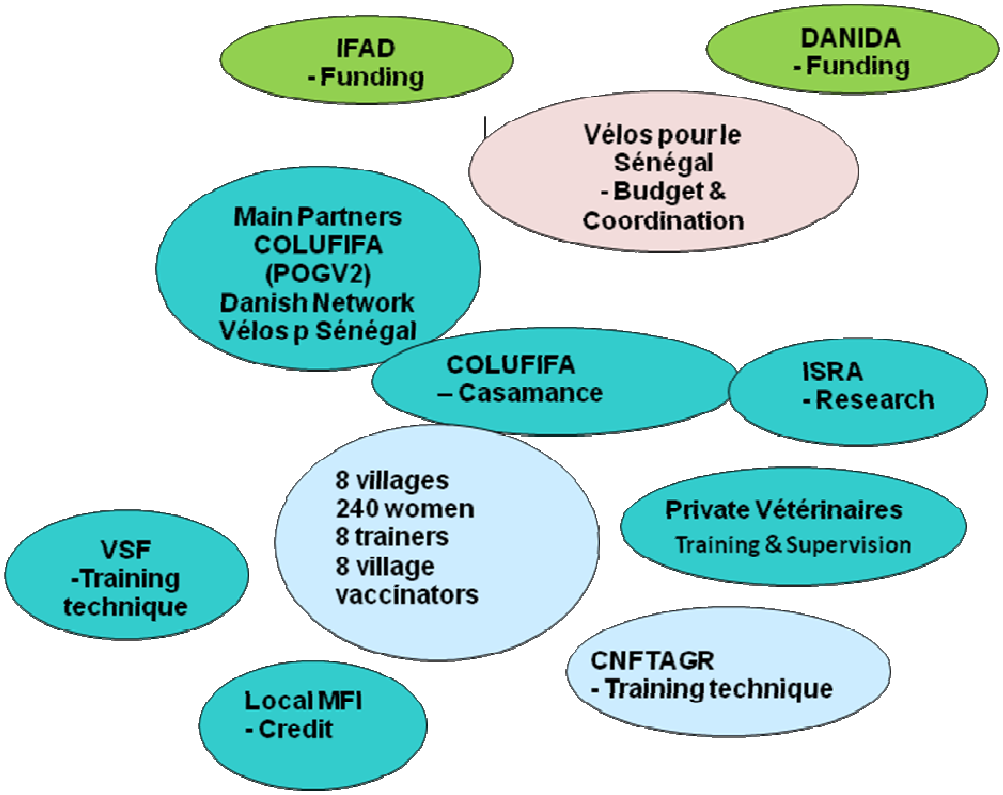
Specific objectives

- to increase poultry production and the income from poultry in the target group
- to increase the involvement of women in decision making processes in the villages
- to build capacity in the implementing organisation, COLUIFA

Target group

- 240 households in 8 villages, mainly poor women.

Project Organogram



Financial implications

- Total funds available: approx. 150,000 USD.
- Salaries for NGO personnel (4) and local agents (8) (31%)
- Deposits and revolving fund for farmers opening accounts (11%)
- Training of trainers and farmers (18%)
- Materials for equipment (1%)
- NGO Capacity building (16%)
- Baselines, Monitoring and Evaluation (23%)

Preparations

Preparations start with

1. Village sensitization
2. Meetings with possible partners:
   - Financial institutions
   - Private vets
   - Vétérinaires Sans Frontières
   - ISRA
   - Ecole d'agriculture (CNFTAGR)
   - Local politicians

Selection of beneficiaries: Poor women

- Sensitisation workshops for the president(e)s and village agents
- Participatory selection of poverty criteria in each community
- The village chose 30 female beneficiaries, 1 village agent and 1 VVV

PARTICIPATION AND OWNERSHIP!

Capacity building in the villages

- Sensibilisation
- Group organisation
- Technical Training, Farmer Field Schools
- Training in savings and credit
- Weekly or bi-weekly follow-up

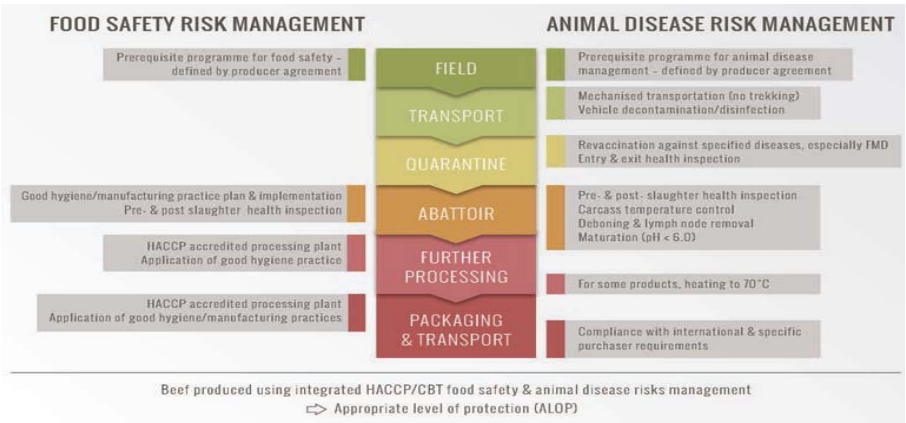
Lessons Learned in Sénégal

- Village poultry production is increased, Newcastle Disease is under control.
- Marketing of products should be better organised.
- The solidarity groups of five women each empowered and organised women in the villages
- The annual interest rate of 24% on credits should dereduced
- The veterinary services should be better organised

What carrot or stick can ND vaccination programmes offer?

- To answer this important question, we may borrow a leaf from the control of Foot and Mouth Disease (FMD) in Southern Africa.
- The management of FMD risk along value chains applies the concepts of commodity-based trade (CBT) and hazard analysis critical control points (HACCP).

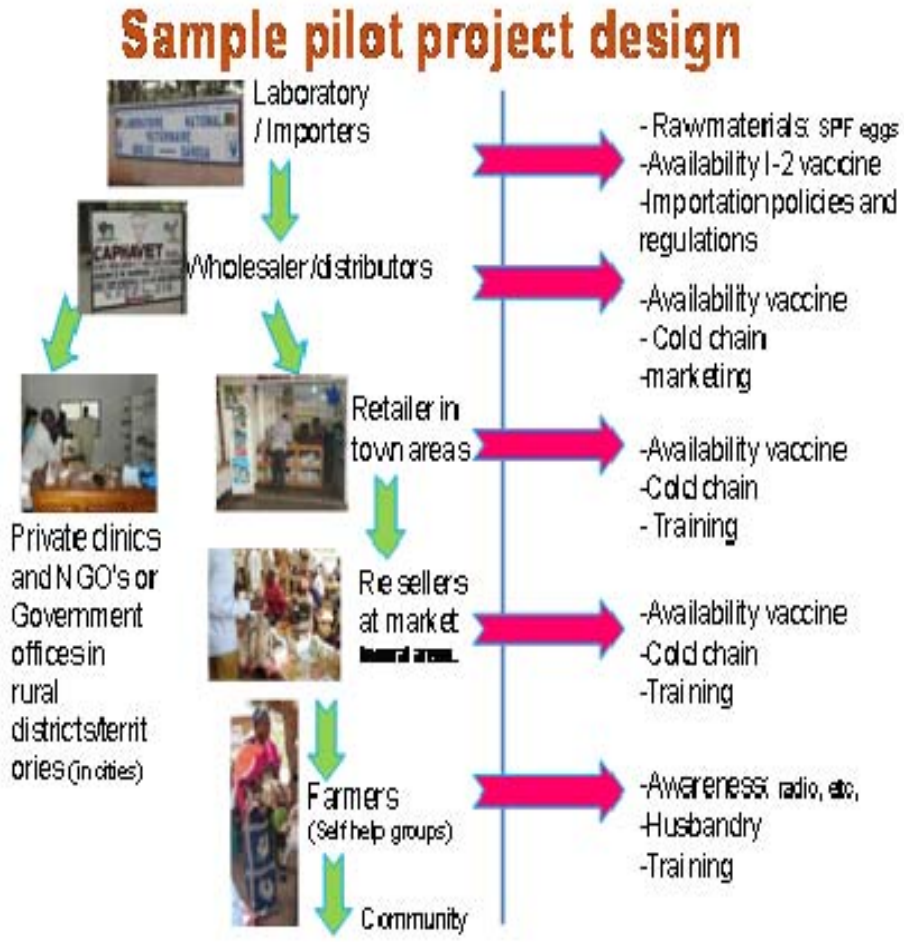
FMD Risk Management Measures along a Value Chain for Beef Production in the Zambezi Region of Namibia



Source: Penrith and Thomson, 2015

What Appropriate ND Management will Facilitate Trade and Livelihoods

- GALVmed ND project template (on the right) focuses on the ND vaccine and describes a value chain for the vaccine.
- Perhaps the focus should be on the poultry that will receive the vaccine and the village poultry value chain.
- There are opportunities to introduce the ND vaccine into village poultry as they enter and move along their value chain.



Benefits of a VP value chain approach to ND vaccination

- **To The Community-** ND is a "community disease"
- **To The Household-** ND B/C ratio = 14.8.
- **To The Commercial Poultry Sectors-** VP ND.
- **To The Backyard and Scavenging Sector-** Small scale commercial
- **To The GO and NGO Sectors-** links VP to profitable markets

Final Word

It is within the context of increasing trade in VP (i.e. conversion into a "micro" business) that a sustainable ND vaccination programme can operate along the VP value chain in Africa.

5

Field Visit

Learning from village/backyard poultry keepers: Field visit

A field visit was organized for all the participants in Gargali village in Mandu block of Ramgadh district in Jharkahand, India. The visit site is closely located to the workshop venue, Ranchi. GALVmed project partner SUPPORT is currently implementing a ND control project in that area. All the participants were divided into 3 groups and sent to 3 different hamlets of the Gargali village. The 3 different hamlets selected for field visit were Indrabad, Uppartola and Pachkiriya. The objective of the field visit to meet village/backyard poultry keepers and get first-hand information on ND control and village/backyard poultry for further discussion during the workshop.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6

Learning from Field Projects in South Asia and Africa

Learning from field projects in South Asia and Africa

Dr Rahul Srivastava and Dr Heshborne Tindih

GALVmed project partners implementing ND control projects in south Asia and Africa presented on different aspects of project implementation, outcome and impacts. They also discussed important strength, weakness, opportunity and threat to their projects. Partners from 4 different countries in Africa talked about ND control projects. Partners from 3 different states in India and Nepal shared their learning from ND control projects. Experiences shared came from diversified part of south Asia and Africa and formed the basis for drawing pathway for future ND control projects.

	Project Partner	Location	Topic of Presentation	Presented by
			Africa	
1.	Pharmavacs, Manyara	Tanzania	Sustainable distribution of I-2 Thermo-tolerant vaccine as a means to control ND and improved household livelihood in northern and central region of Tanzania	Dr. Sultan J.H.
2.	Chasavet Service, Morogoro	Tanzania	Improving backyard poultry productivity through control of Newcastle disease	Dr. Charles S. Ndesamburo
3.	Veto Impact	Burkina Faso	Establishing a sustainable poultry and small ruminants service delivery in Burkina Faso	Dr. Samuel Minoungou
4.	KEVEVAPI	Kenya	Vaccination initiative in the village sector poultry for Newcastle disease in western counties of Kenya	Dr. Benson Kibore
5.	BRENTEC Investments Limited	Uganda	Delivering animal health solutions to farmers	Dr. George Mukiibi Muka
			South Asia	
6.	BMPCS-Iswar Mayurbhanj, Odisha	India	Controlling N.D. in BYP by developing a sustainable vaccination network	Piyush Mishra
7.	Sampark Social Organization Jhabua, MP	India	Prevention of Newcastle disease for promotion of backyard poultry among tribal / poor families	Nilesh Desai
8.	Heifer Project Nepal	Nepal	ND control in backyard poultry in Nepal, phase-II	Durga KC
9.	Heifer Project International India	India	Improving backyard poultry production in Mayurbhanj by controlling Newcastle disease (IBBPPM-ND)	Dr. Sushmita Parai
10.	Helen Keller International	Nepal	Prevention against Newcastle disease (PRAN)	Dr. R.P. Thakur
11.	SUPPORT, Jharkhand	India	Prevention of Newcastle disease for promotion of backyard poultry among tribal/ poor families	B.S. Gupta
12.	JSS & Abhiyan, Jhapa	Nepal	Newcastle disease pilot project in Jhapa, Nepal	Dr. P. Sapkota and Lokpriya Khanal

All the presentations were discussed in detail by persons from different organizations and having experience in ND control and village or backyard poultry. Main points of all the presentation and discussion from south Asia and Africa have been captured in following SWOT format. Details of all the presentation are available in Annex-A.

SOUTH ASIA

Strengths S	**Opportunities O**
• Resources and qualified/ trained staff-Sufficient • Working area knowledge/understanding • Better linkage with the community • Previous experience in agriculture/poultry farming projects • Good linkages with state government institutions • Quality vaccine • Quality training of vaccinator by professionals	• Encouraging response of state and national authorities • Development of public-private partnership • Livestock business/entrepreneurship • Development of trained manpower • Increase in backyard poultry population • Strong awareness • Thermo-stable ND vaccine
Weakness W	**Threats T**
• Scarcity and high attrition rate of vaccinators • Payment for vaccination by farmer • Awareness and difficulty in sensitizing poultry keepers • Lack of supply chain and irregular supply of vaccine • High prices of vaccines and limited numbers of importers • Geographical constraints and lack of electricity, cool box and refrigerator • Unavailability of appropriate dose of vaccines	• Impact of other diseases • Bird flu outbreak • Vaccination failure due to inappropriate vaccination or breakage in cold chain

AFRICA

Strengths S	**Opportunities O**
- Strong partnerships - Type of vaccine: I-2 thermostable - Women as target for delivery - Good & easy practises: local vaccinators, use of experts in delivery - Vaccine market opportunity - ND distribution profit margin	- Market up-scaling (business opportunity) - Micro-credit schemes to support adoptions - Training: on business models to vaccinators - Inclusion of other products in ND delivery system
Weaknesses W	**Threats T**
- Monopoly, Pricing & quality of vaccines - Government support, certification & registrations of vaccines - Effective awareness/communication - Accessibility to the farmers - Business sense in the mind of vaccinators - Cold chain maintenance reduces the profit margin	- Vaccine supply & vaccination accessories - Other diseases i.e Fowl pox, Coryza - Willingness to pay for the vaccine - Specific pathogen free eggs - Record keeping - Regulation standards

7

Way Ahead

ND Control Projects: The way ahead

The workshop, engaging people having knowledge and experience in ND control and village/backyard poultry, tried to come up with a clear strategy for future ND control projects in south Asia and Africa. GALVmed staffs were asked not to join to any group but to remain as an observer. Groups composed of participants from south Asia and Africa were assigned tasks to come up with followings.

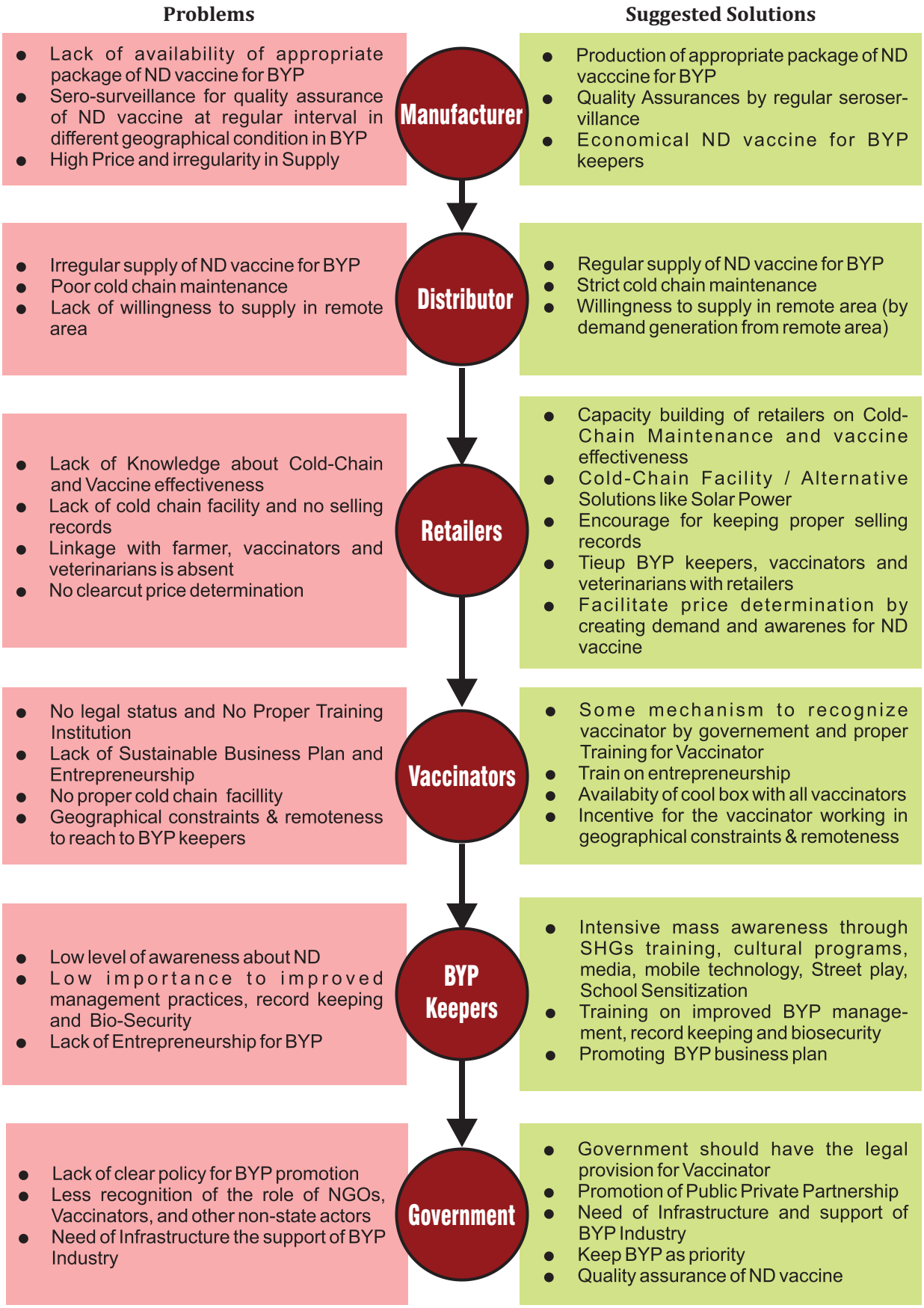
- A clear project structure for ND control in Africa
- A clear project structure for ND control in South Asia
- A clear and pragmatic defined role of each stakeholders for regular ND vaccination in BYP/village poultry

Following method was adapted for the group discussion.Participants from south Asia and Africa were assigned into 2 different groups. Both the groups were asked to

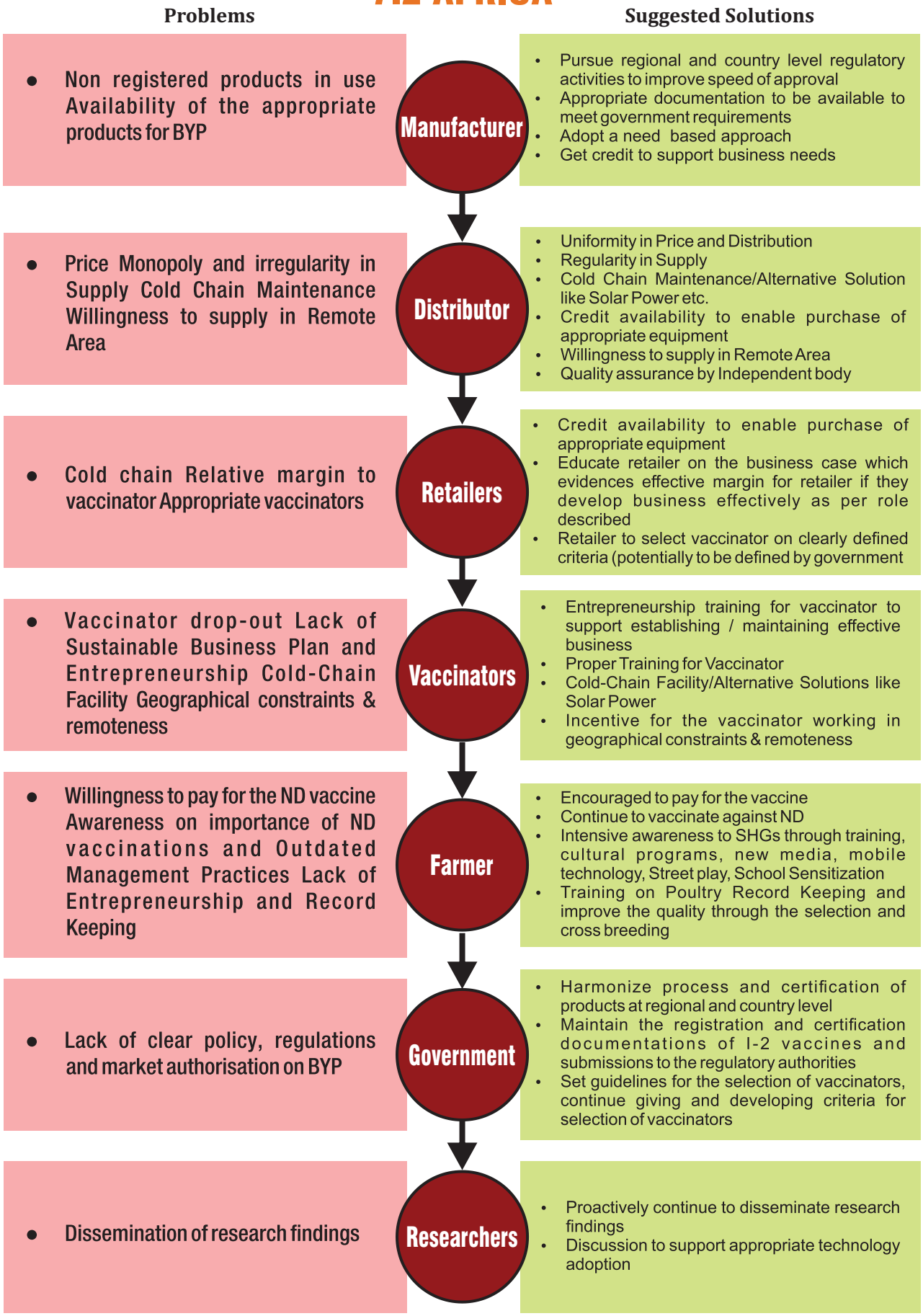
- List out the entire problems related to regular ND vaccination in field.
- Look into the problems and if you can group them with a clear broad title
- Set a pragmatic goal for each group titleto achieve regular ND vaccination in field
- List out what is functioning well and what not for that problem listed
- List down concrete actionsto bridge the gap between what functioning well and what not functioning well
- Suggest who need to act on those concrete actions
- Is there any problem implementing the concrete action

Both the groups identified the bottleneck in regular ND vaccination in field covering all aspects of supply, cold chain maintenance, vaccination awareness and payment related difficulties. Prioritization of problems and most practical solution to resolve these problems were also suggested by each group. Their findings have been reorganized into following formats to reflect the future strategy for ND control projects.

7.1 SOUTH ASIA



7.2 AFRICA


Problems
Suggested Solutions
Non registered products in use Availability of the appropriate products for BYP
Manufacturer
Pursue regional and country level regulatory activities to improve speed of approval
Appropriate documentation to be available to meet government requirements
Adopt a need based approach
Get credit to support business needs
Price Monopoly and irregularity in Supply Cold Chain Maintenance Willingness to supply in Remote Area
Distributor
Uniformity in Price and Distribution
Regularity in Supply
Cold Chain Maintenance/Alternative Solution like Solar Power etc.
Credit availability to enable purchase of appropriate equipment
Willingness to supply in Remote Area
Quality assurance by Independent body
Cold chain Relative margin to vaccinator Appropriate vaccinators
Retailers
Credit availability to enable purchase of appropriate equipment
Educate retailer on the business case which evidences effective margin for retailer if they develop business effectively as per role described
Retailer to select vaccinator on clearly defined criteria (potentially to be defined by government
Vaccinator drop-out Lack of Sustainable Business Plan and Entrepreneurship Cold-Chain Facility Geographical constraints & remoteness
Vaccinators
Entrepreneurship training for vaccinator to support establishing / maintaining effective business
Proper Training for Vaccinator
Cold-Chain Facility/Alternative Solutions like Solar Power
Incentive for the vaccinator working in geographical constraints & remoteness
Willingness to pay for the ND vaccine Awareness on importance of ND vaccinations and Outdated Management Practices Lack of Entrepreneurship and Record Keeping
Farmer
Encouraged to pay for the vaccine
Continue to vaccinate against ND
Intensive awareness to SHGs through training, cultural programs, new media, mobile technology, Street play, School Sensitization
Training on Poultry Record Keeping and improve the quality through the selection and cross breeding
Lack of clear policy, regulations and market authorisation on BYP
Government
Harmonize process and certification of products at regional and country level
Maintain the registration and certification documentations of I-2 vaccines and submissions to the regulatory authorities
Set guidelines for the selection of vaccinators, continue giving and developing criteria for selection of vaccinators
Dissemination of research findings
Researchers
Proactively continue to disseminate research findings
Discussion to support appropriate technology adoption

7.3 Measuring the outcome and impact of ND control projects

Dr Lamyaa Al-Riyami
Monitoring, Evaluation and Reporting Manager, GALVmed

A key outcome of GALVmed's monitoring and evaluation function is developing the learning and understanding needed to support our Newcastle Disease market development activities. Donors increasingly require a transparent and quantitative framework that clearly shows the outcome and impact of their funding. In this way their investment decisions can be evidence led. Demonstrating impact is important for advocating the work of GALVmed to partners and stakeholders.

The success of ND control projects in village/backyard poultry (BYP) depends on the regular vaccination of birds against the disease using good quality and effective vaccines. Time, money and effort are all required to convince village/BYP keepers to regularly vaccinate. Keepers should start vaccinating their birds regularly after seeing the benefits associated with vaccination. There are numerous ways to measure the outcome and impact of ND control projects. Measuring the levels of adoption is one of the methods employed by GALVmed.

Adoption is a measure at a point in time of both:

- the percentage of animals vaccinated in a given area
- the percentage of livestock keepers / households in a given area who vaccinate their animals.

By measuring the levels of adoption and the processes taking place around adoption, GALVmed will gain a practical understanding as to what drives / constrains the use of vaccines by small-scale livestock keepers. This understanding is vital to successfully inform the process of scale-up. Additionally, the level of adoption provides a useful basis of determining (through modelling) the impact of GALVmed's work.

The M&E work will take two different approaches in measuring adoption- a micro and a macro data gathering and analysis approach. We also aim to demonstrate impact using a combination of modelling and financially related measures.

Data collected in the field will be fed into and analysed using an online data management tool termed "Yaap" - Your Algorithmic Advising Platform. Yaap is being used within GALVmed to track, understand and manage GALVmed's field data to support real-time decision making. Analyses can be structured to quantitatively understand the current scenario of the farmers, distributors, vaccinators and producers and track key performance indicators at a micro and macro level, and identify strengths and gaps. Therefore it is essential that we collect good quality data from our field projects. GALVmed is currently in the process of simplifying and optimising its data collection process. Any interesting reports generated using Yaap will be shared with our partners to ultimately improve project implementation and success.

Finally, in the year ahead, The Bill and Melinda Gates Foundation, via the Harmonised Indicators Framework aim to measure and evaluate Impact Indicators for every market-facing grant. These will be common across all grants, and will comprise the "Impact Indicators Module" looking at realised productivity, and realised value in terms of income and contribution to nutrition. The Impact Indicator Module will come with a list of key indicators and a survey questionnaire template. Information will be shared with partners in due course.

8

Concluding Remarks

8.1 On behalf of Project Partners

Namaste and Good afternoon,

Honourable chairman, distinguished delegates present in ND control review workshop controlling ND in Africa and South Asia.

I feel honoured to address this august gathering for a concluding remark on behalf of GALVmed projects and its partners. Let me first thanks GLAVmed for inviting all of us for a noble cause for poverty alleviation and ND projects which are closely related issues. So this is the right time to hit the hot iron on its head.

It will be our joint endeavour to make a BYP producer whoever lives in a remote corner in a village for improving their means of livelihood. The outcome of ND control programme would certainly help to uplift the life of small farmers. This workshop has opened the door for all of us to work together and whole heartedly for this noble cause.

Last but not the least our expectations for a successful launching of the project all over the world and expect another review meeting in near future.

Thank you all. .

Dr Prahlad Sapkota
Jhapa, Nepal

8.2 On behalf of commercial manufacturers of Vaccine

Thanks to organizers for wonderful organization of workshop in India to discuss various issues related to ND control in village/backyard poultry and I extend thanks to GALVmed in particular about their sincere efforts in controlling the ND in local chicken. Thank You

As part of manufactures, I wish to commit ourselves in principal and action for production of good quality vaccine for backyard poultry. Quality of vaccine products is of paramount importance for any manufactures. There are few organizations adopting shortcuts and producing low quality vaccine without any control on quality of vaccine. As good manufacturers, we have to be very critical on Pharmaco-vigilance and we have to take responsibility to provide quality vaccine to our end user and beneficiary.

Furthermore we also have to create a total marketing awareness program to facilitate the wide distribution of vaccine among all beneficiaries. As a manufacturer, we have to create a proactive mechanism with blend of push and pull strategy for distribution of vaccine through our distribution network.

Lack of business sense among poultry keepers is quite evident and we need to focus on capacity building of our customer base. When our end users will be equipped with good business sense, our business will simultaneously grow and easy distribution of vaccination will be ensured among village poultry keepers. We need to involve all stakeholders at the grass root level for creation of business sense among livestock keepers with the help of local NGO or expert in business in that locality.

The role of monitoring and evaluation is crucial in impact assessment. The sustainability of this initiative is dependent on the financial gain of the vaccinator. The upliftment in the socio-economic status of vaccinator and poultry keepers will be quite evident if the initiative is successful resulting in substantial benefits to all stakeholders involve in this value chain. This type of information should be properly recorded and reported from all stakeholders.

On behalf of all manufacturers and my colleague, once again thank you GALVmed for this wonderful event.

Thank You

Dr. George Mukiibi Muka
Brantec, Uganda

8.3 On behalf of GALVmed

On behalf of GALVmed, I extend my heartfelt gratitude to Chairman and all participants for proactive participation. We started this workshop with GALVmed experience in South Asia followed by Africa. All the partners discussed in detail about their working in different geographical environments.

It was a really learning experience for everybody from various challenges faced by manufacturers, distributors, retailers, vaccinators and farmers. This knowledge and understanding the challenges of all stakeholders will definitely equip us to do our work more efficiently. I repeat one the popular statements of our second President while graduating the students that I now give you the power to read and write and do all that pertains to your degree.

These three days of deliberation among all stakeholders give everybody more knowledge and power to perform our work in field more efficiently.

Thank you
Dr Tindih

9

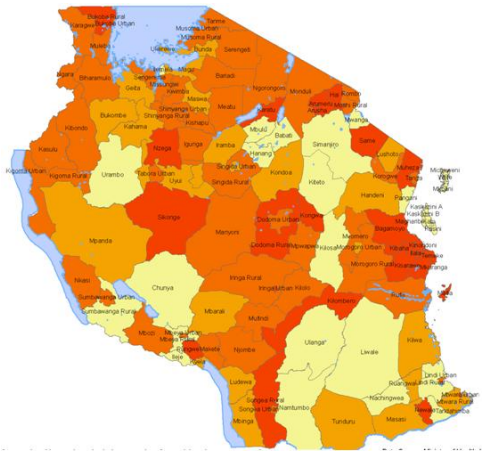
Annexure-A

Sustainable distribution of I-2 Thermotolerant vaccine as a means to control ND and improved household livelihood in Northern and Central Region of Tanzania

Dr. Sultan J.H.
Pharmavacs Manyara

INTRODUCTION

- The ND Scaling Up Phase Project started way back in November 2013 targeting 7 districts
- Overall human population is 2,132,353 with 641 villages and 366,960 HHs. Project districts has over 1,428,526 indigenous chickens (represent 43% of national population). The set target is 255 village with 50,000
- The vaccine supply chain:
  - Tanzania Veterinary Laboratory Agency (TVLA
  - Alpha Veterinary Services (Arusha) and the project (Babati)
  - There are 7 district s and 18 wards Distributors in the whole project districts
  - 120 active Vaccinators including newly trained 88 CVs (ref separate sheet)



  - The price structures; ranges between Tshs 5,000 (main)to Tshs 10,000 (CVs) and Tshs 100 per chicken (farmer)
  - Total number of vaccines sold is 461,464 dosis and dewormers 620 packets with over 120,000 chickens dewormed

Strength of the project

- Participatory trainings of both CVs, distributors, farmers and government staffs
- The type of vaccine in use; Thermotolerant I-2 and LaSoTa mainly during crisis
- Availability of vaccine
- Reliability of vaccinators, New project very reliable, but few in old project

- Willingness of village poultry keepers in paying for the services rendered by the CVs

- The other products in combination with ND vaccines are; dewormers, external parasite, infectious coryza, fowl typhoid
- The profit margins earned by key players in the chain ranged between Tshs 1,000, 3,000 towards Tshs 25,000 (CV)
- The broad geographical coverage of the project (8 districts)

WEAKNESS AND AREAS TO BE ADDRESSED

Weakness during implementation of the project

- The project depend upon a sole Importer of the I-2 vaccine from the TVLA
- There are some districts with very few number of the distributors (Simanjiro, Karatu)
- Unwillingness of some CVs to use LaSoTA
- Unwillingness of some famers to use other animal health products
- Awareness creation at farmers levels through use of village meeting alone proved to be not very effective
- Feed supplements adoption (sources)

Proposed practical solutions

- The need to discuss with the management of the TVLA regarding the above delays to rectify the above gaps
- GALVmed with partners to work out best modality of administration of LaSoTA vaccine through eye droplets especially during vaccine crisis
- The need for the GALVmed management to find out best option for multiple producers who will guarantee the availability of the reputable animal health products and the vaccines timely and promptly
- Holistic approaches that includes primary school pupils, market days and vaccine distributors at all levels
- Provision of supplements feeds using locally available products (feeders) according to age groups

Conclusion

- Improved household productivity has been as a result of the skills and knowledge imparted to extensionist, farmers and CVs.

- Continued outbreak of other related poultry diseases such as Fowl pox, infectious coryza, and fowl typhoid. GALVmed working with partners will be praised very much by the farmers as soon as they facilitate the introduction of new formula for the fowl pox vaccine combined with Thermotolerant I-2 vaccine
- The project has brought new changes in mind sets and attitudes towards the use of the innovative ND 1-2 vaccine as a means to control their chickens against the Newcastle diseases.

- The introduced innovative vaccine supply chain Model is still working well.
- Unreliable and delays of Thermotolerant 1-2 vaccine supply necessitates a long term solutions to address these re occurrence shortcomings that affects the whole supply chain.

Improving Backyard Poultry Productivity through Control of Newcastle Disease

Dr. Charles S. Ndesamburo
Gairo District- Morogoro Region in Tanzania

INTRODUCTION

- The project started on February 2014 after being delayed for 3 months due to unavailability of vaccine
  - Training of Enumerators and baseline studies,
  - Training of agrovet and extensionists,
  - Training of community vaccinators,
  - Awareness creation meetings, censor of the poultry and deworming campaigns.
  - Implementation of the baseline studies findings

- Supply chain
  - Vaccine used is NCD I-2 strain manufactured by TVLA
  - The vaccine is distributed by Chasa Animal Care
  - There are 3 distributors in the district and only one in ward level
  - Price structure of your supply chain
  - 98 vaccinators were trained, but only about 73 in average are active through out
  - Total number of vaccine used is 266,400 doses and dewormer is 480 satchets of 30gm each

Strength of the project

- The type of vaccine used is NCD I-2 strain
- Its was readily available but now there is no production for the past three months which leads to delay the vaccination campaign
- Ability and willingness of farmers to pay is among the challenges we are facing but more sensitization work is deployed to address the issue.

- Other diseases are prevalent in the project area.
  - Fowl typhoid, Infectious coryza and coccidiosis are the problems in the project area. This leads to the source of selling the product to clear the disease.
- The profit margins is reasonable though the distributors wish to get at lower price.

Weakness and areas need to be addressed

- The weakness of project
  - Availability of the vaccine is a problem because we are depending only on one source, TVI public manufacturer with the following challenges;
  - Short expiring time, you may press an order and get a batch which has only three months to expiring time
  - Distributors wish to get the vaccine at lower price.
  - The farmers believes on farming and taking it as traditional so poultry as a source of income need more time to change there mindset. Farmers expected the vaccine to be free of charge which sometimes discourage the vaccinators.
  - Poor knowledge, farmers can't differentiate ND with other diseases. They assume any death of the poultry is due to ND so rise up question were deaths occur while they have vaccinated.
  - Poor infrastructure and communication especially in mountainous area
  - People don't motivate themselves for development
  - Generally the vaccinators are very lazy—But sometimes discouraged by the subvillages being far away and also the house hold are scattered which need more time to walk
- Proposed practical solutions
  - More meetings at the subvillage level due to the fact that some are far away.
  - Freeze dried vaccine with droppers is the best due to its long expiring time
  - Should have more than one source of vaccine to avoid interruption of vaccination campaign

Conclusion

- Improving availability of vaccine in the project area by diversification of source of vaccine will improve adoption by farmers.
- Diversification of awareness program to farmers to reach majority of them so that we can improve accessibility and adoption.
- Clear engagement with distributors with clear price structure will improve distribution of animal health products in the project areas.

Establishing a Sustainable Poultry and Small Ruminants Service Delivery in Burkina Faso

Dr. Samuel Minoungou
Project Manager, Veto Impact, Burkina Faso

Introduction

- The project is a consolidation and an extension of a previous Newcastle disease control pilot project which was carried out from February 2011 to September 2012 in Centre East region Burkina Faso. The project intend to respond to most constraints observed during baseline study and use all lessons learnt during pilot phase of the project together with findings from final evaluation to improve supply chain and village poultry production in general. It starts in January 2014.

Objectives

- To establish a viable and self-sustaining animal health supply chain in the project area that will ensure availability and accessibility of Newcastle vaccines of good quality, right dosage size such as 100, 200 and 500 dose vials to livestock keepers in the project area.
- To organize backyard poultry keepers into groups and provide them with basic husbandry practices trainings in order to improve their production.
- To establish poultry and small ruminant health service delivery systems from district towns to village level, driven by vet shops owned technicians in livestock and community poultry vaccinators in the project area.
- To organize awareness campaigns of livestock keepers on the use of Newcastle vaccine, dewormers and other animal health products of poultry in the project area in order to control Newcastle disease and other diseases.

Supply chain

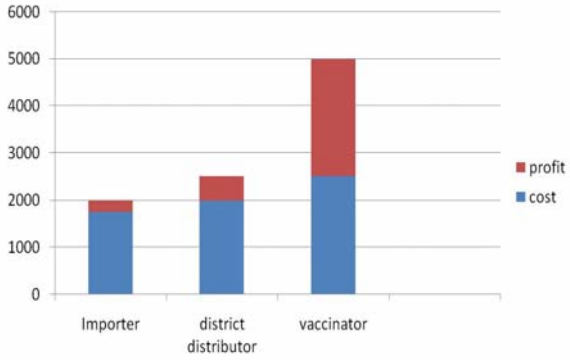
		Target	Actual
1	#Vaccinators trained	147	56
2	#Vaccination campaigns	3	2
3	#Households	49,000	25,500
4	#ND doses used	1,323,000	260,500

Strengths of the project

- **Type of vaccine:** I-2 vaccine thermostable, easy to use
- **Manufactures, Importers and availability of vaccines:** the ND I-2 vaccine is about to be registered at UEMOA which will allow it to be available in 8 countries.
- **Reliability of vaccinators:** the vaccinators are performing with the product
- **Ability and willingness of farmers to pay:** famers are ready to pay for vaccine and other products because the demand in poultry and poultry products is increasing and the prices are good.
- **Other products combination with ND vaccine:** together with the vaccine use of powder dewormer and powder antistress
- **Efficiency of vaccinations:** field testimonies
- **Actors and price structure:** all actors along the distribution chain have an obvious interest to maintain and develop the process due to the profit each part earns (private win win partnership). the profit margin is as following:

Price structure (vial 100 d)

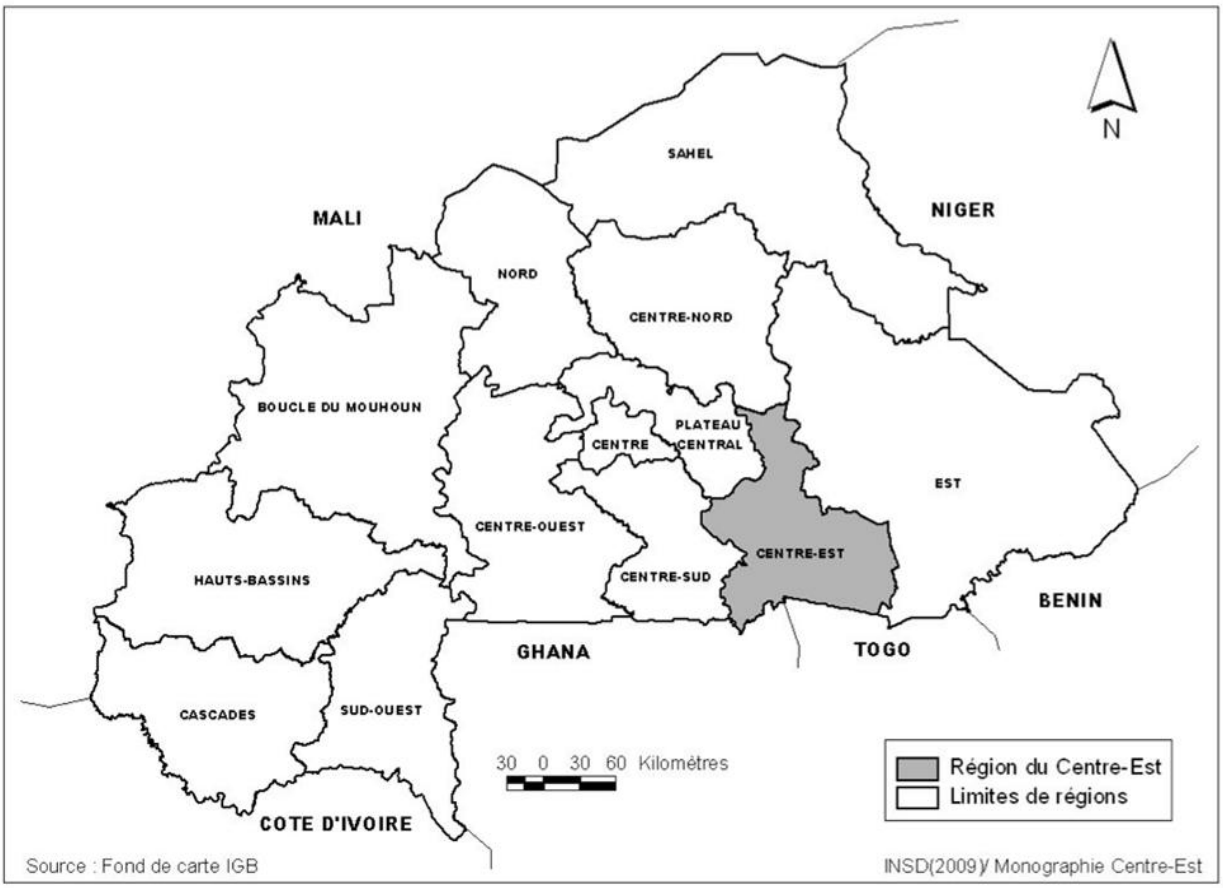
From	To	Cost	Profit
Importer →	Distributor	1750	
Distributor →	District	2000	250
District →	Vaccinator	2500	500
Vaccinator →	Farmer	5000	2500



Economic data of vaccination campaigns

Actors	Ita new/ 100 doses			
	Number of doses	Cost/dose	Amount	Margin
Manufacturer	260 500	17,5	**4 558 750**	
Importer	260 500	20,0	**5 210 000**	**651 250**
District distributor	260 500	25,0	**6 512 500**	**1 302 500**
Vaccinators	260 500	50,0	**13 025 000**	**6 512 500**
Average per vaccinator (56)				**116 295**

Geographical coverage



Weaknesses and areas need to be addressed

1. Weak geographical coverage of the project: the project covers 2 regions among the 13 of the country.
2. In the project area where new castle disease is « under » control fowl pox remain a main constraint to poultry production. (Galvmed combined vaccine?).
3. High mortality of little guinea fowls in the project area.
4. Low hatchability during hot season (45°-50° under shade April, May).

Proposed practical solutions:

1. Replication of the model to cover more areas in the country through:
   a. organise a workshop with private vets
   b. to train actors (importers, technicians, vaccinators…)
   c. to assure awareness creation in the new areas…
2. to conduct a test on raising of little guinea fowls to contribute to reduce mortality of guinea fowls.
3. to test local hatcheries for future diffusion among farmers

Conclusion

- Lessons learnt for the period of project implementation that are important to share
- A need of combined actions to promote backyard poultry health service delivery (ND, fowl pox, choriza)
- A need of field research associated to ND projects to contribute to find solution to some field constraints (mortality of guinea fowls..)

Acknowledgements

- GALVmed team
- Ministry of Livestock BF…

Vaccination Initiative in the Village Sector Poultry for Newcastle Disease in Western Countries of Kenya

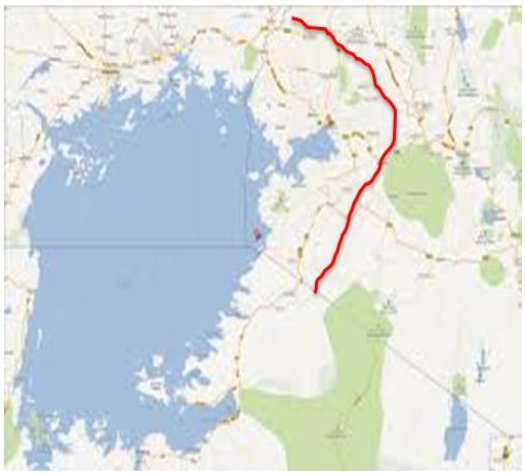
Dr. Benson Kibore
AWAPH, Kenya

AWAPH

- Organizing communities for food security and resilience
- Identified poultry as most important livestock for resilience
- NCD identified as the single most important disease limiting village poultry production.
- Mobilized communities into production groups
  - Feed production
  - Financing
    - Community banks (inputs, other economic activities)
  - Health
    - Meds (deworm, vits)
    - Vaccinations

AWAPH / GALVMED

- Partnership for NCD control
  - Started December 2014
  - Project area
    - 1.278 M Households
    - Estimated 13M chicken
    - Target 50,000 HH
    - Estimated 500,000 chicken
    - Vaccinate 50,000 birds in March/April
    - Vaccine from KEVEVAPI



- Existing vaccine delivery structures and pricing
  - 4 Main distributors (KSh. 1.50)
  - 20 Sub-distributors/Local LSPs (KSh. 1.75)
  - 80 Community-based vaccinators (KSh. 2.50)
  - 50,000 Poultry keepers (KSh. 3.00 – 4.00)
- Strengthening and linkages
- Opportunity
  - NCD elimination
    - Priority for directorate of county veterinary services: opportunity for partnership
  - Community willingness to buy: market availability
- Challenge
  - Supply gaps: vaccine, diluents, droppers
    - Mitigation?
  - Ability to buy: vaccination compete for scarce finance resources within the socio-economic setting (other inputs, food, health, education, etc.)
    - Mitigation (pilot community-based financing services)

Delivering Animal Health Solutions to Farmers

Dr. George Mukiibi Muka
BRENTEC Investments Limited, Uganda

Who we are?

- We are private company.
- Our philosophy is to deliver to farmers appropriate and affordable vaccine solutions against diseases that constrain poultry farming.

Problem Statement

- Poor rural peasant farmers know how they can get out of poverty. Practically in all communities the dream is the same.
- That dream starts with a single female chicken. If the chicken can survive and multiply the farmer will soon be able to sell some and acquire a goat; if only the goat, too, can survive and multiply, the farmer will soon be a proud owner of a cow.
- However, the farmer faces a formidable challenge in this beautiful dream right from start due to recurrent outbreaks of Newcastle Disease which is 100% fatal in chicks and 60-90% in adult chickens.

The Problem Statement c'td

- For the rural farmer, a thermostable vaccine is the answer since access to cold chain for storage and transportation would not do.
- The proportion of chickens kept by the poor rural peasant farmers is high (in Uganda it is approx. 87%).
- From a business perspective going for this market segment would also makes good sense as can be seen below:

The Journey

- In 2008 BRENTEC Investments initiated a project aimed at delivering a thermostable Newcastle Disease vaccine for rural poor farmers in Africa.
- The facility was opened in 2010
- In 2010 a thermostable Newcastle Disease vaccine adopted through collaboration with Australian scientists at ACIAR was approved by National Drug Authority.

- "KUKUSTAR" is the trade name and was launched by the President

Our experience-Registration

1. Start at construction-look at the environment as this will impact on disposal, flow of equipment, sanitation and unwanted neighbourhood.
2. Work with Engineers of all levels to ensure materials and designs.

Experiences: Production

- Usual cGMP practices of flow of activities
- Cleanliness
- Documentation
- Selection of Internationally recognized , certified Pharmacopea and stick to it
- Preparation of dossier
- Laboratory trials-
- Field trials.

Experiences: Training

- Training becomes more complicated the lower you go up to levels of farmers.
- It is continuous till some of the trainees evolve to trainers of their colleagues.
- Sometimes field staff are a problem-no change
- It is costly

Experiences: Distribution

- The difficulty with distribution is basically to be able to understand the sector.
- Get to know all their issues negative and positive.
- Design mechanisms of using the positive and an entry point while you turn around their negative into new opportunities for both of you and them.

Experiences: Marketing

- Scientists need to change and become marketers. Challenge.
- You must be visible.
- The strength you have is what you are not what someone else has. Show it out.

Experiences: M&E

- Will depend on time, money and commitment in preparation, design.
- Develop meaningful Indicators which will measure what u wish to test for.
- It is expensive
- Field staff will read what u want and give it to u anytime (False)

The Challenge

- The challenge we faced was how we would introduce KUKUSTAR in the field?
- This required new skills and new resources to engage the farmers as can be seen below:




Call Answered

- Our call was answered when AECF approved our application for a grant to enable us to deliver the vaccine to poor households while also developing BRENTEC into a viable business.
- With AECF funding we have tested a direct access model to get the vaccine to farmers at household level as can be seen.



Call Answered Ct'd

- Farmers buy the vaccine in droppers and administer it themselves. The price is affordable (For 1BP you vaccinate 40 birds).
- The distribution model was developed in a pilot study area in Eastern Uganda with AECF support. This model is working with great success.





Benefits of working with AECF

- The concurrence of philosophy of AECF and ours on bringing technology solutions to poor rural peasant farmers has been an energizing experience.
- AECF has enabled Brentec to develop an exciting and sustainable poverty eradication model based on business principles.

- AECF continues to enable the company to improve its:
  - Financial accounting system
  - Corporate governance system
  - Monitoring and Evaluation system

Market promotions

- The *New Vision Group* is to publicize KUKUSTAR on its entire platform of local newspapers, radio programmes and TV stations as a news item in several languages.
- Distributors for the countrywide distribution in Uganda are being recruited and contracted.

BRENTEC KUKUSTAR UIRI

A CALL FOR EXPRESSION OF INTEREST TO SERVE AS DISTRIBUTORS OF NEWCASTLE DISEASE VACCINE - KUKUSTAR®

Background

Brentec Vaccines Ltd is a local company currently producing the Newcastle Disease Vaccine known by the registered name of KUKUSTAR®. The vaccine is produced under internationally accepted standards and it has been tested and approved for introduction in the field by the National Drug Authority, with external quality assurance provided by the African Union approved Pan-African Vaccine Centre in Debrezeit, Ethiopia. This vaccine is heat stable, making it ideal for use by farmers including those in rural areas.

Brentec Vaccines Ltd is calling for veterinary drug shops and companies interested in serving as distribution agents for KUKUSTAR®. To ensure that this poverty- eradication tool reaches farmers in every corner of the country, we have grouped districts into 13 clusters or regions each of which is to be served by a specific distributor. These clusters are given in the table below. A distributor who has capacity to handle more than one region is free to apply to take on any specific number. It shall be the responsibility of the distributor to design a delivery system that can reach every poultry farmer in the region.

The roll-out of the distribution is to be done in phases, with Mbale, Iganga/Jinja, Soroti, Lira and Kampala clusters coming in the first phase. Effort is being made to take on the other clusters as soon as possible and certainly before end of year.

Terms of Reference

The specific TORs for a candidate are:

- Possession of registered veterinary drug and vaccine sales facility;
- Availability of suitably qualified laboratory staff and premises to handle the vaccine including its reconstitution into ready to use droppers;
- A concept of the distribution plan for the region of application, including strategies for engaging other registered veterinary drug shops in the region, and for driving both the pull and push modes for reaching both commercial and ordinary farmer who keeps a small stock
- The applicant should provide evidence of capacity to procure vaccine stocks and means of transport, including financial statements for at least 6 months.

Expression of interest should be posted to: Director, Brentec Vaccines Ltd, P.O. Box 5917, Kampala, or delivered to the *Brentec Vaccines Ltd* offices located at the Uganda Industrial Research Institute (UIRI) in Nakawa by 15th April 2014. Telephone number 0414693615.

Clusters of Districts

No.	Districts	Distribution Centre
1.	Kampala, Buikwe, Butambala, Gomba, Kayunga, Luweero, Lwengo, Mityana, Mpigi, Mubende, Mukono, Nakaseke, Nakasongola,and Wakiso	KAMPALA
2.	Kalangala, Bukomansimbi, Kalungu, Rakai, Lyantonde, Masaka, Sembabule and Buvuma	MASAKA
3.	Amuria, Ngora, Serere, Soroti, Katakwi, Kumi and Kaberamaido,	SOROTI
4.	Bugiri, Busia, Buyende, Iganga, Jinja, Kaliro, Kamuli, , Luuka, Mayuge, Namayingo and Namutumba	IGANGA/ JINJA
5.	Pallisa, Kween, Manafwa, Butaleja, Mbale, Iganga/Jinja, Tororo, Kibuku, Sironko, Kapchorwa, Budaka, Bukedea, Bududa,Bulambuli and Bukwo	MBALE
6.	Agago, Alebtong, Amolatar,Apac, Dokolo, Lira, Kole, Nwoya, Otuke and Oyam	LIRA
7.	Gulu, Pader, Kitgum, Amuru and Lamwo	GULU
8.	Abim, Amudat, Kaabong, Kotido, Moroto, Nakapiripirit and Napak,	MOROTO
9.	Arua, Maracha-Terego,Yumbe, Zombo, Adjumani, Koboko, Moyo and Nebbi	ARUA
10.	Kasese, Bundibugyo, Rubirizi, Mitooma, Kabarole, Ntoroko and Kamwenge	KASESE
11.	Bushenyi, Ibanda, Isingiro, Kiruhura, Mbarara, Ntungamo, Rukungiri, Buhweju and Sheema	MBARARA
12.	Buliisa, Hoima, Masindi, Kiryandongo, Kyankwanzi, Kiboga, Kibaale, Kyenjojo and Kyegegwa,	HOIMA
13.	Kabale, Kisoro and Kanungu,	KABALE

Provision of droppers

- AECF has encouraged us to go regional. We have opened talks with a reputable mega agrovet products distributor which has a multi-country network. Subject is to let them cover distribution in Kenya, Tanzania, Rwanda and Burundi markets.
- AECF has made it possible for us to dream big. We are ready for further investments as we drive towards the regional market for KUKUSTAR and for construction of our own manufacturing plant with capacity to take on other livestock vaccine lines.

Benefits of working with AECF c'td

- We have increased our production capacity.
- The vaccine is to be promoted for application to all the domestic birds since all of them are affected by this same disease.
- Commercial farmers are to be engaged too as this makes good business sense, but without loss of focus on rural peasant farmer.



Conclusion: Positive

- So far it has been a rewarding experience such as a child beginning to walk.
- The rural farmers are with us and need the product.
- They are even more responsive than those in towns/commercial.
- The real rural farmers evolve into vaccinators, traders etc. when they see the business

Conclusion: Challenges

- Old order field staff. No change
- Changing Govt. policies. Not explained
- Confusion between Govt. free services/ business sense.
- Political interference (other want quick popularity using your product.
- Adulterations wherever middlemen can.

Controlling N.D. in BYP by Developing a Sustainable Vaccination Network

BMPCS-ISWAR
Mayurbhanj, Odisha, India

Objective

"To control ND outbreak in BYP in the project area" through;

- Regular ND vaccination in project area by CAHWS
- Establishing a sustainable ND vaccine supply system in project area
- Awareness creation among the BYP keepers on importance of ND vaccination in BYP
- Coverage –

Blocks	Villages	Hamlets	Families
3	398	1373	60353

- Duration- 24 Months(November 2013- October 2015)
- Model of Vaccine supply chain-

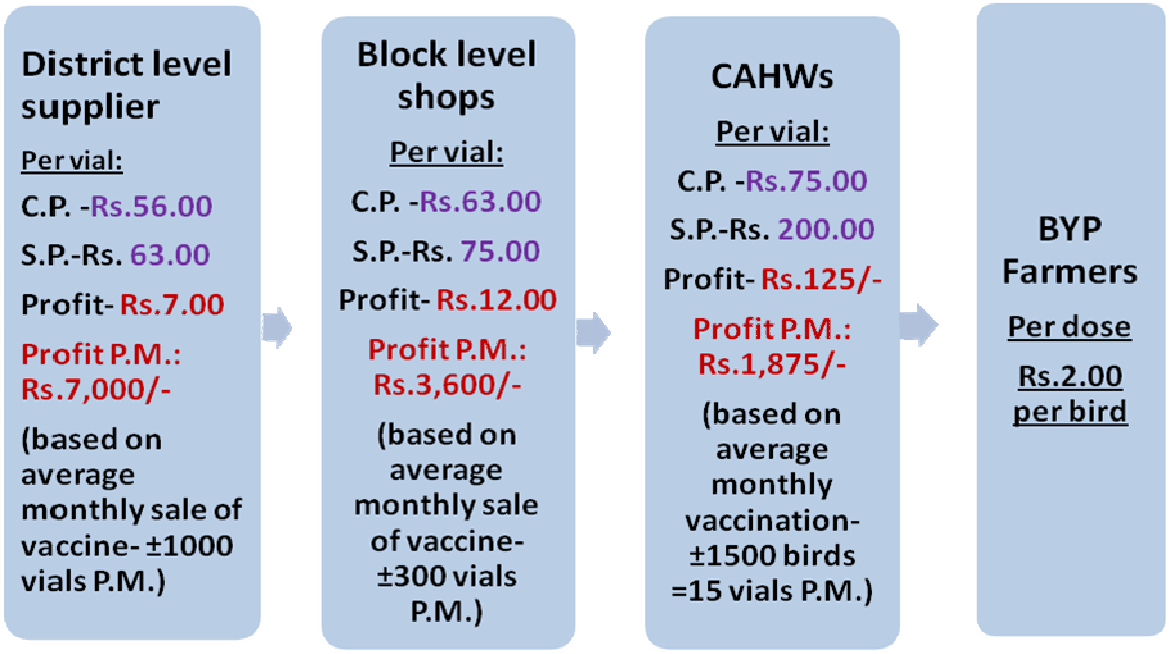
Major Activities

- Awareness creation among farmers on improved management of BY Poultry.
- Development IEC materials on BY poultry management
- Training & Capacity Building of CAHWs
- Timely Vaccination & Deworming of BY poultry
- Focus on cold chain management
- Development BY poultry model villages
- Promoting existing medicine shops to be a part in the poultry vaccines supply chain.

Present Status of the Project

- CAHWs Selected - 175
- Vaccination (Till 10th February, 2015)
  - Newcastle Disease- 4,72,723 (2 drives)
  - Fowl Pox Vaccination- 28,468
- Video Shows on Poultry Vaccination-973

Price structure of Vaccine supply Chain



Potential Monthly Income of a CAHW

(Only from Poultry vaccination & Deworming)

Average number of poultry Vaccination	Gross Income from Vaccination @Rs2.00 (in INR)	Average number of Deworming	Gross Income from Deworming @Rs1.50 (in INR)	Gross income (in INR)	Cost of vaccines (in INR)	Cost of deworm-ing (in INR)	Net income P.M. (in INR)
1500	3000	1200	1800	4800	1125	240	3435

SWOT Analysis

Strength	Weakness
▪ Video show ▪ IEC materials ▪ Trained & experienced team ▪ Motivated team of CAHWs ▪ Training & C.B. of CAHWs ▪ Model village development ▪ No major disease outbreak ▪ Timely Vaccination of birds ▪ Sustainable Supply chain ▪ Trust of community on CAHWs ▪ Increased income of CAHWs from other services	▪ Not able to cover 100% BYP under ND vaccination ▪ Irregular vaccination in Remote villages with less number of BYP ▪ CAHWs dropout ▪ High cost of vaccine ▪ Irregular supply of vaccines ▪ Non-Standardised product (TS Lasota)

Opportunity	Threat
▪ Thermo stable ND vaccine ▪ Positive attitude of veterinary department ▪ Prohibition on cock fighting	▪ Bird flu outbreak ▪ Elephant intrusion ▪ Irregular vaccine supply ▪ Mortality due to Fowl pox (chicks below 6 weeks of age)

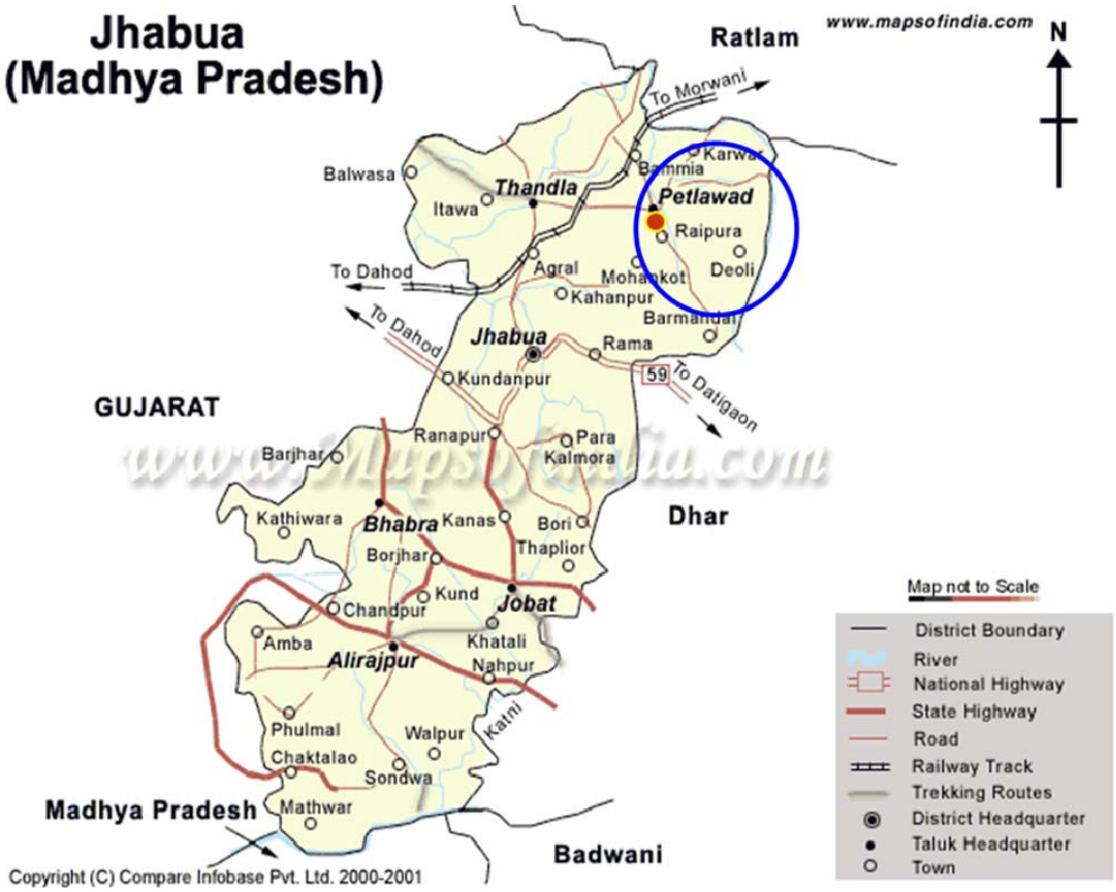
Lessons Learnt

<u>Crucial Factors for Success of the Project</u>

- ❑ Awareness of community (BYP keeper)
- ❑ Selection of CAHWs
- ❑ Knowledge & Capacity building of CAHWs
- ❑ Development of Supply Chain
- ❑ Timely Vaccination of BYP
- ❑ Trust of community on CAHW
- ❑ Cooperation with vet. Department

Prevention of Newcastle Disease for Promotion of Backyard Poultry among Tribal / Poor Families

Sampark Social Organisation, Petlavad Block, District- Jhabua (MP)



PROJECT AREA

- Project period- February 2015 to January 2017

Blacks	Gram Panchayat	Village	Hamlet	Household	Population	Estimated BYP	BYP/ HH
Petlawad	77	211	837	28831	157956	102862	3.6
Rama	55	122	726	15845	103822	137697	8.7
Total	132	333	1563	44,676	261,778	240,559	

Bhil and Pateliya are the main tribes living in the area. There are a number of sub-castes within the tribes. The locals of the area visit local weekly hats in Jhabua, Raipuriya, Kalyanpura and Rajgarh (in Dhar District) for their daily livelihoods.

- 6 medical stores
- Vaccinators- 125 (Community based Animal Health Workers)
- Number of SHG 650

PRESENT STATUS OF WORK DONE

- ❑ Appointment of Project Staff (Project Manager & block coordinator-2, Cluster coordinator -10)
- ❑ Established 10 cluster & 4 Extension Centres.
- ❑ 3 days orientation of Project staff.
- ❑ Village level Baseline survey
- ❑ Group meetings

Vaccine manufacturer

- ❑ Hester Bioscience limited, Ahmedabad, Gujarat

BASELINE STUDY WITH 430 FAMILIES

Source of livelihood of the families		
Source	**Main source**	**Additional source**
Farming	34%	65%
Agriculture labor	0.2%	0.2%
Non agriculture labor	0.2%	0.2%
Migration	64%	33%
Service	0.7%	0.2%
Livestock	0.2%	0.7%
	100%	100%

A family earns INR 371 by selling a chicken. An additional income of INR 2226 is earned from sale of 6 chickens (on an average) in a year.

MORTALITY IN POULTRY BIRDS DURING ASSESSMENT MONTH, 2013

Birds	Mortality (%)	Mortality in poultry per family
Chicks	62%	13
Chick (<3 month old)	10%	5
Hen	18%	4
Cuckoo	10%	3
Total Birds	100%	25

Note: On an average annual Mortality in poultry per family was 25, while 33 chicks were born during the same period. The annual mortality rate per family was 76 percent; main reason behind non-expansion of poultry enterprise at household level.

PROPOSED APPROACH

1. Technical training of workers.
2. Selection of vaccinator with due norms.
3. Farming poultry Extension Group development, Awareness programs to inspire payment for livestock health services.
4. Training and village level meeting to develop professional attitude of the community.
5. Tie up with vaccine manufacturers for regular supply.
6. Sharing success stories, emerging from regular poultry vaccination in the area.

Village Mapping

Village meeting with women

Saving chickens from predation

Village level meeting

Bheel tribe

Chick

Chicks

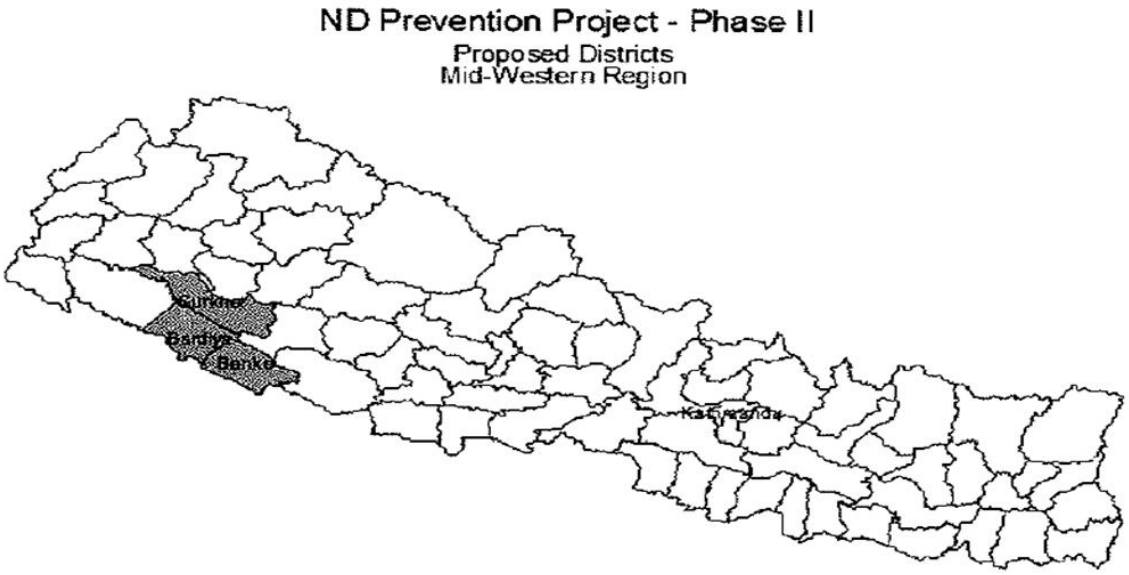
Bheel women

ND Control in Backyard Poultry in Nepal, Phase-II

Durga Bahadur K.C.
Heifer Project Nepal, Nepal

Introduction

- **Project Brief**
- **Duration:** 1 Oct. 2013-30 Sept 2015 (2 years)
- **Project Coverage**
- 50 VDCs with 39826 families in 3 districts (46 Banke, 2 Bardiya & 2-Surkhet)
- **Vaccine Supply Chain**-4 stockist, retailers, vaccinators-CAHW/Vet. JTA/JT etc.



Manufacturer of vaccine

- Central Biological Production Laboratory, Kathmandu, Nepal
- Ventri Biological
- Hester Bio-sciences
- Indovac

Importer or main distributor of vaccines

- Kantipur vet distributor, Tripureshwor, Kathmandu
- Sungava vet distributor, Tripureshwor, Kathmandu
- Krosita vet distributor, Baneshwor, Kathmandu

Vaccines Distributors in districts and wards

- 10 Nepalgunj, 5 Kohalpur, 7 Bardiya and 11 surkhet

Vaccinators

- CAVE/CAHW-96, JTs/JTAs-9
- Government vet technicians

Achievement

- Farmers aware of ND disease and vaccine through FM, wall painting, posters, hooding board, campaigns, trainings and CAHWs
- Increased numbers of BYP farmers
- Increased production and productivity of BYP (flock size , clutch, eggs and hatching chicks)
- Decreased mortality rate of local poultry
- Establishment of chain of vaccine supply in project areas
- Increasing the demand of ND vaccination from BYP farmers
- Availability of 100 dose vial of Lasota in Project Areas
- Increasing in Sale of ND vaccines
- Increased incomes and nutrition from BYP
- Heifer included ND control program in all subprojects-80

Strength of project

- Type of vaccine
  - Thermosensitive Lasota vaccine
    Type – Live vaccine
  - Thermostable Lasota vaccine
    Type – Live vaccine
- Availability of vaccine
  - Thermosensitive Lasota vaccine: Pack – 100, 200, 500 + dose
  - Thermostable Lasota vaccine: Pack – 50, 100 & 200 packs
- Reliability of vaccination
  - All the actors from poultry vaccine distribution to the administration level have been trained on cold chain maintenance
  - Vaccines are being stored, transported, and administered following standard protocols
  - Regular follow up to ensure effective and efficient conduction of vaccination campaigns
- Ability and willingness of farmers to pay
- Farmers ready to pay when they get benefit from vaccines/services
- Other products combination with ND vaccine
  - All birds are dewormed a week before vaccination

Weakness and areas need to be addressed

- Weakness
  - Limited numbers of importers
  - Lack of awareness on vaccines availability
  - Unavailability of appropriate dose of vaccines
  - Distributors and price structure
  - Lack of coordination and information between manufactures and distributors
  - Poultry farmers and payment for the services
  - Farmers preference service free of cost at initial stage
  - Require knowledge and skill through awareness, training/capacity building
  - Effective and efficient service is required
  - Able to pay service when farmers get profit/benefit from service
- Proposed practical solutions
  - Produce/availability of appropriate dose of vaccination
  - Easily available of Thermo stable vaccine
  - Train govt vet technician
  - Train to distributors and vaccinators
  - Train farmers
  - Establish information system and network between manufacture, distributors, vaccinators and farmers
- Opportunity for Controlling ND
  - Strong awareness to BYP keeping farmers about the importance of improved BYP husbandry
  - They have seen the benefits of deworming and vaccination against ND
  - Mortality has been decreased significantly, rarely reported
  - Flock size has been increased…no authentic data has been collected
  - Availability of thermo stable Lasota vaccine for the last few months has given the practical solution of ND vaccination at the field level
- Threat for Controlling ND
  - Due to control of ND in village flock, Fowl pox disease has become Visible with some mortality specially in chicks. Due to the inappropriate dose and difficult route of administration of Fowl Pox vaccine available in Nepal, CAHW find difficult to control this disease at the grass root level.

Conclusion

- Collaboration and coordination among all the related stakeholders including government veterinary office has really helped for smooth implementation of the project activities
- Mass awareness programme through campaigns, drama, posters, FM has been efficient tools to spread the massage of improved BYP techniques to wider audience
- A supply chain of poultry medicine and ND vaccine has been able to establish from market to the BYP keeping HHs
- CAHWs are very excited due to availability of appropriate dose of thermo stable Lasota vaccine

Lasota Vaccination Campaigns




Improving BYP






Improving Backyard Poultry Production in Mayurbhanj by Controlling Newcastle Disease (IBBPPM-ND)

Dr. Sushmita Parai
Heifer Project International, India

Heifer in India

- **1955-2003:** Heifer International marked its presence in India on several occasions like sending the first shipment of 20 Jersey cows to the India Ministry of Agriculture in 1955, worked with AFPRO till 1992.
- **2005 to 2007:** Heifer supported projects for the rehabilitation of tsunami victims and in Orissa, Bihar and Rajasthan with grassroots partners.
- **2008:** Heifer India registered as a representative/ liaison office in November.
- **2009:** Set up office in India and working in Bihar, Rajasthan and Odisha.
- **2014:** Registered Legally Separate Entity for India Operations under the name of ASSETW (Adharshila for Sustainable Socio Economic Transformation and Welfare)

Mayurbhanj Socio Economic Development (MSED) Project

Project Goal: By 2018, Heifer India will work to bring 20,000 small holder farmers from a state of poverty and vulnerability to sustainability and resilience through pro-poor wealth creating inclusive goat value chain enterprises.

Objective 1:	By the end of the project 20,000 families have increased income from present level below poverty line US$1.25 per day through strengthening the goat value chain and improved food security and nutrition.
Objective 2:	By the end of the project, 20,000 women empowered as leaders and entrepreneurs through organized community led institutions to rise from poverty to sustainability.
Objective 3:	By the end of project, 20,000 smallholder families have increased production and supply 200,000 K meat goats per year or 547 goats per day to market, the backyard poultry management in practice at every family has minimum 10 chickens each.
Objective 4:	By the end of project participating, families/groups have adopted environment friendly practices.

Heifer's GALVmed Project

The main aim of the project is to increase income and nutrition from backyard poultry keeping by controlling ND and improving the management.

- To vaccinate all BYP kept by 1, 00,000 project families against ND.
- Make available service through Community Agro Vet Entrepreneur (CAVE)/ poultry vaccinators for regular vaccination of BYP.
- Improve the BYP management in 1,00,000 project families by demonstrating the impact of regular vaccination and improved management in 15,000 families.
- Ensure availability of quality ND vaccine in appropriate dose pack size and other poultry health products in project area.
- To establish and manage pilot study clusters to collect adoption data with the view to determining changes in levels of adoption of ND vaccination over time.

Prevention against Newcastle Disease (PRAN)

Helen Keller
International

PRAN PROJECT

Situation in Nepal

- Addressing Newcastle disease (ND) is important in Nepal because it is widespread and causes heavy mortality (up to 100%) in village chickens
- Department of Livestock Services (DLS), Government of Nepal (GON) has given high priority to its control in their Disease Control Policy
- BUT there is little or no Government livestock and animal health services available at community level in the remote hills

Purpose

- Strengthen Government commitment to the control of ND in village chickens- *PRAN was designed in consultation with Department of Livestock Services (DLS)*
- Sustainability of public-private partnership and the development of entrepreneurship for controlling and preventing the spread of ND

OBJECTIVES

General Objectives

- To increase backyard poultry production by protecting chickens from ND

Specific Objectives

- Strengthen commitment for improved backyard poultry management through mass vaccination campaigns
- Improve skills and capacity of animal health service providers
- Build the capacity of communities and families to manage the health of their backyard poultry

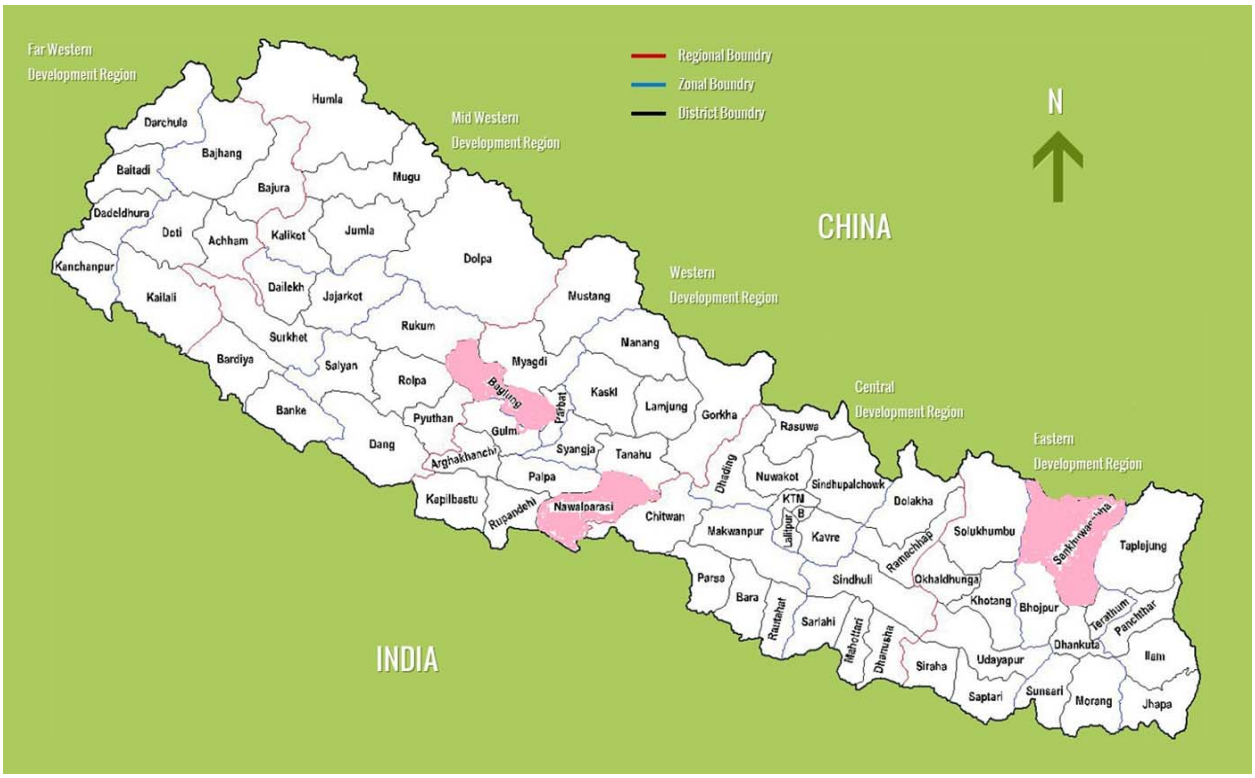
DISTRICT COVERAGE

Three districts were selected based on epidemiological findings of ND outbreaks in Suaahara program districts where BYP is a component of HFP for nutrition.

District	No. of outbreaks reported			Total number of outbreaks
	2011	2012	2013	
Sankhuwasabha	23	13	3	39
Baglung	16	16	4	36
Nawalparasi	1	6	28	35

1. Baglung:- Dhaulagiri Zone, Hill district
2. Nawalparasi:-Western Development region covers both Terai and hills
3. Sankhuwasabha:- Koshi zone of Eastern Development region

MAP OF NEPAL



Project Area

Project duration

- 15 months
- September 2014 to November 2015

METHODOLOGY

Vaccine Supply Chain

Vaccine producer → Vaccine Distributer → Main Stockist

(BPD- *Government of Nepal*) (*Sungava Vet Pharma*)

Main Stockist → Sub-Stockist → Vaccinators → Community/households

Type of vaccine & manufacturer

- Thermostable, Heat Resistant ND I 2 Vaccine produced by Biological Production Division, Kathmandu, GON

Availability of Vaccine

- Vaccine may be available on demand in required amount

Reliability of Vaccinators

- Vaccinators -Community Health Workers (CAHW) from the same community, willing to develop entrepreneurship and reliable professionals.

WORK ACCOMPLISHED

Selection of stockiest and sub stockiest

- One main stockiest and one sub stockiest have been selected in each district

Vaccinator selection and training

- 78 vaccinators- 26 Sankhuwasabha, 25 Nawalparasi, 27 Baglung
- 2-days vaccinator training
- Distribution of deworming medicine (Albendazole)

Distribution of materials

- One freezer provided to each main and sub-stockiest
- Vaccinators were provided with supplies- bag, cool box, apron, mask, gloves, droppers, Syringe and Thermometer

Distribution of Vaccines

- 240,000 doses of ND I2 vaccine were procured and supplied Sankhuwasaba 150,000, Baglung 65,000, Nawalparasi 70,000

RESULTS: Round I Vaccination

District	Total VDCs covered	Total HHs	Total poultry Population	Total HHs covered	No. of poultry dewormed	%	No. of poultry vaccinated	%
Baglung	15	13,141	43,551	7267	35,633	81%	32,479	75%
Nawalparasi	18	17,578	36,292	10,366	27,883	77%	28,564	79%
Sankhuwasabha	20	24,104	2,28,863	13,745	1,10,060	48%	1,63,087	71%
Total	**53**	**54,823**	**3,08,706**	**31,378**	**1,73,576**	**56%**	**2,24,310**	**75%**

COMMUNITY SENSITIZATION

Key points for success

- Cooperation from all the stakeholders - DLS, PNGO, stockiest vaccinators, and farmers
- Proper planning and implementation
- Support from GALVmed and HKI staff

Methods used for community sensitization

- Local FM/Radio
- News-Paper
- Flex charts
- Posters
- Group discussions - mother groups, community people, schools

OUTCOMES

- >75% birds (224,310) immunized with ND I2 vaccine
- Stockiest and sub-stockiest are interested in developing entrepreneurship and are committed to supply dewormer and vaccines to the community
- Vaccinators are slowly realizing the benefits of the business
- Farmers started realizing the importance of immunization
- First time vaccination of backyard poultry against Newcastle disease was a good learning experience.
- Improvement in weight gain after deworming

ISSUES

Community Level

- People not aware of ND so need more community sensitization
- Compensation in terms of mortality: some unwilling to pay

Vaccinators

- Geographical constraints
- Difficult to collect money for deworming and vaccination
- Free ranging system takes time for vaccinators

Field Level

- Lack of electricity in most of the remote VDC s has created difficulties in maintenance of cold chain

CHALLENGES

- Community sensitization/awareness
- Sustainability of vaccination after the project
- Commitment of the community vaccinators
- Supply of vaccine and maintenance of cold chain

OPPORTUNITIES

- Development of public-private partnership
- Establishment of business/entrepreneurship
- Development of trained manpower/service providers
- Concerned government agency is highly cooperative
- Increase in backyard poultry population, meat and eggs and income generation

SUGGESTIONS

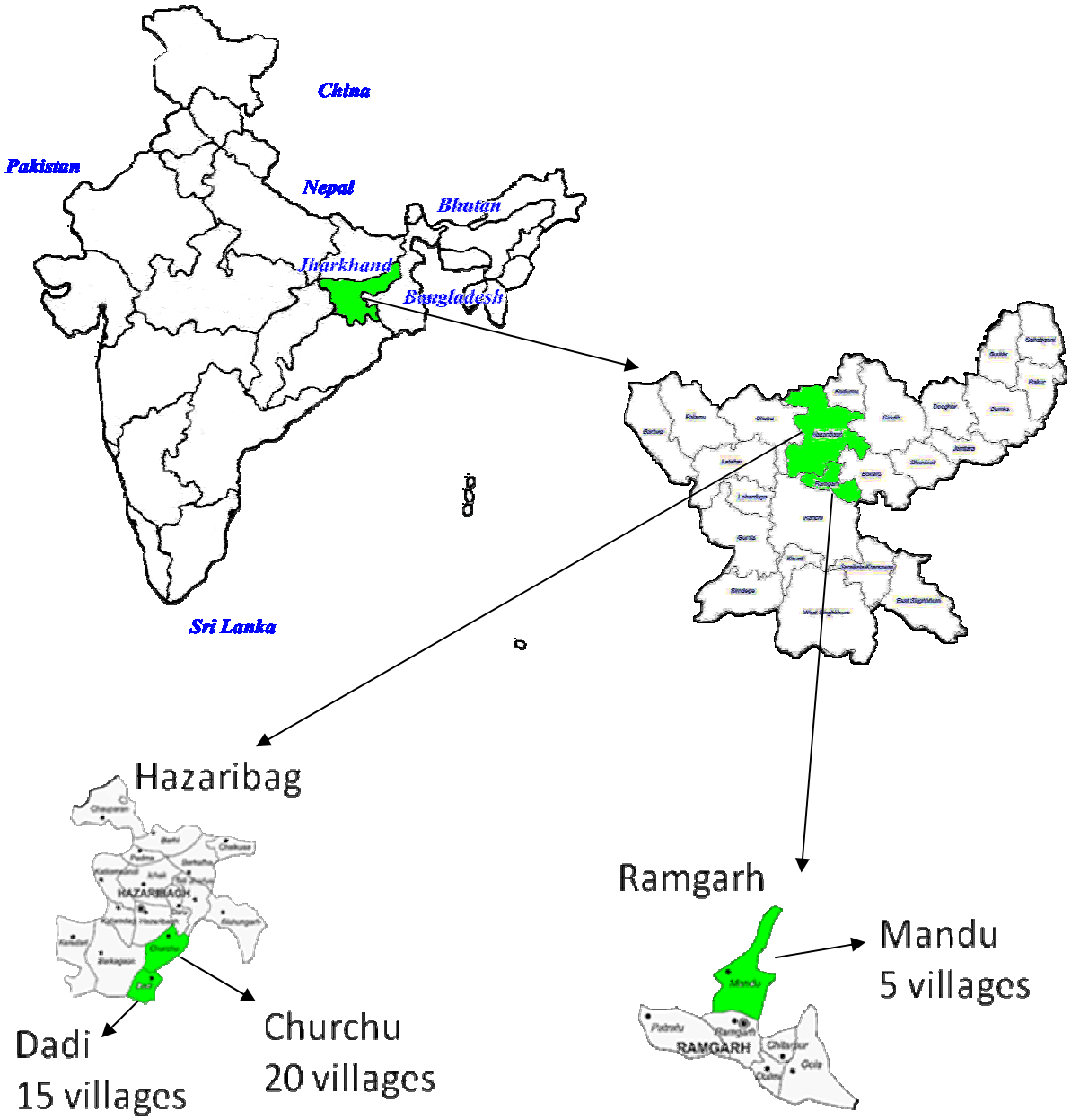
- Mass community sensitization
- Provision of financial support for vaccinators in remote areas to transport vaccine in initial stage to encourage smooth start-up
- Need to launch in adjoining VDCs to create buffer zone
- Need alternatives for electricity i.e. solar power for maintenance of cold chain in remote VDCs during summer
- Continuity of the program until the vaccination system is established

Prevention of Newcastle Disease for Promotion of Backyard Poultry among Tribal / Poor Families

SUPORT, India

Hazaribagh, Jharkhand

Coverage



Progress as on 28th Feb. 2015

Sl.No.	Activity done in a go……..
1.	Selection of Vaccinators and Para-vets done
2.	Project Inception meeting (state level - 5/8/2014)
3.	Orientation training to existing CHAW/ vaccinator (3 days- from 6th – 8th August 2014)
4.	Village level awareness on BYP vaccination against ND using documentary show (40 villages – 30/8/2014 to 24/9/2014)
5.	Half day training on backyard poultry management to community through SHGs at village level (starting date 30/8/2014)
6.	Kit distributed to all selected vaccinators.
7.	Deworming started from 8th November 2014 in 40 villages of backyard chicks/ poultry.
8.	Wall writing in 40 villages (240 paintings)
9.	650 posters has been put on walls of covering 40 villages.
10.	2583 chicks have been vaccinated.

Vaccinators

Sl. No.	Name	Sl.No.	Name
1.	Kiran Devi	11.	Santosh Baskey
2.	Rina Devi (1)	12.	Bijay Kumar
3.	Mahesh Kumar	13.	Sukhdeo Soren
4.	Baldeo Bedia	14.	Dleep Kumar Mahto
5.	Rekha Devi	15.	Reetlal Mahto
6.	Phool Kumari devi	16.	Reena Devi (2)
7.	Jainath Mahto	17.	Choleswar Mahto
8.	Mahendra Kisku	18.	Nand Kishore Mahto
9.	Naresh Kumar Mahto	19.	Panchit Mahto
10.	Savitri Kisku	20.	Basdeo Soren

Deworming

- Deworming of the backyard poultry birds started after the training.

Vaccination (ND)

- Vaccinators provide vaccination in the village, where they charge a nominal charge for their service.

Sheds constructed after awareness meetings

- Sheds were constructed by the villagers after several meetings where with the villagers on hygiene of backyard poultry.
- Staffs from SUPPORT had provided technical support.

Backyard poultry in the shed

- Before construction of sheds the birds used to stay in the same rooms with the family members.
- The birds stayed in one corner of the room.

Strength of your project

- Coverage of strong SHG and Implementation through SHG
- Most of the vaccinators are members of SHG.
- We have made Thrmostable Lasota available from Hestar India (Kolkata Branch) at vaccine sellers due to which there is less chance of wastage of vaccine in the field or vaccine failure.
- Vaccine is provided to the farmers by the vaccinators.
- As the vaccinator charges only Rs. 2/- for the vaccination dose per bird farmers don't have problem paying for it.
- Other than ND vaccine we have provided Albendazol for deworming of the birds.
- Area is already under project area of SUPPORT, so the area is under the reach of the organisation so is easier to convince farmers through SHGs planning

Weakness and areas need to be addressed

- Thrmostable Lasota is not available in Jharkhand.
- Vaccine/ cold box not available in Jharkhand.
- Difficulty in maintaining cold chain of vaccine as many project villages are far from Vaccine sellers.
- Difficulty in buying vaccine in a bulk amount due to unavailability of refrigerator.

Proposed practical solutions

- Hestar India can set up their out let in Jharkhand.
- Vaccine center at cluster level (covering at least 4 to 5 villages) where vaccinators can keep their vaccine.

Opportunity for controlling ND

- Farmers response for vaccination of their birds for ND as they have relished the loos which they have too suffer due to ND.
- After several meetings and awareness programmes the farmers have understand that only way to protect their birds from ND is to provide ND vaccine.
- If ND comes in the village after the vaccination is provided in the village then those who didn't wished to vaccine their birds also ask for ND vaccine.

Threat for controlling ND

- If ND is already present in the village and the birds are vaccine then it has an opposite affect and the farmers think that the birds have died due to the vaccine and not due to the ND virus.
- Even if the birds die due to any other reason after vaccination, even then the vaccine would be blabbed, due to which the farmers may deny vaccination.

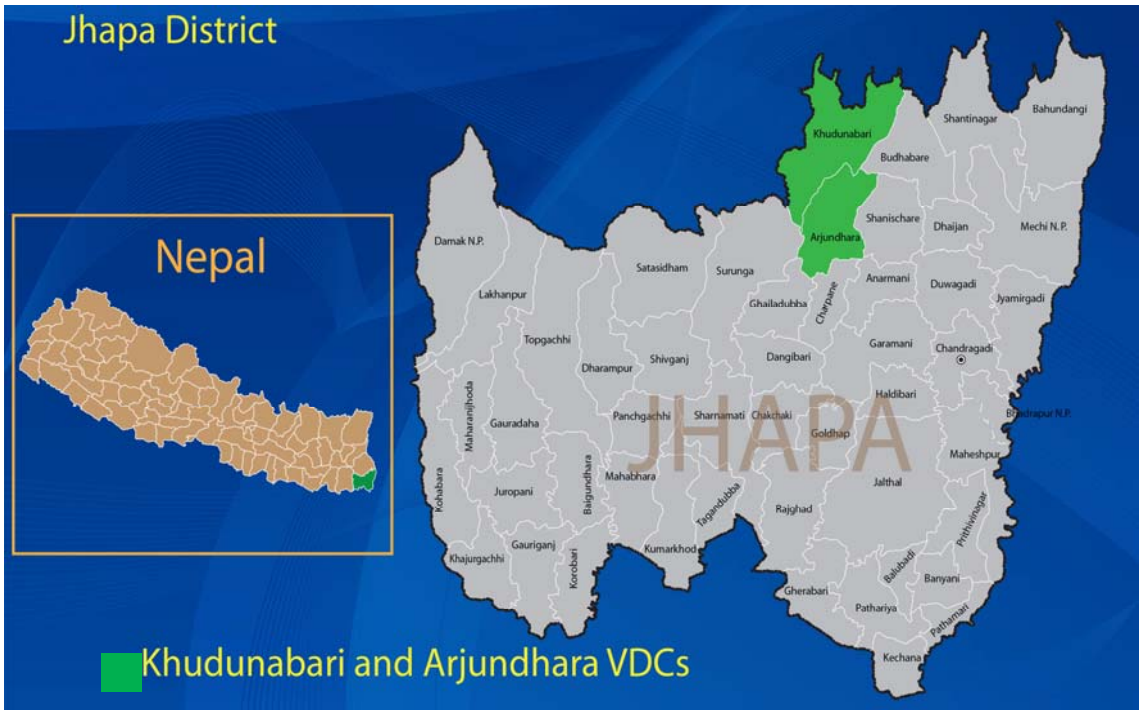
Conclusion

- Regular meetings in the village is very necessary in the villages before application/ starting of vaccination of the birds.
- Women correspond to the things suggested in the meetings more than the men in the village so prefer to work more with the women but not neglect men in the village.
- Never pressurise any one for vaccination, for if it is done and for any reason the bird dies the blame might come on the vaccinator due to which other farmers may also not prefer vaccination of their birds.

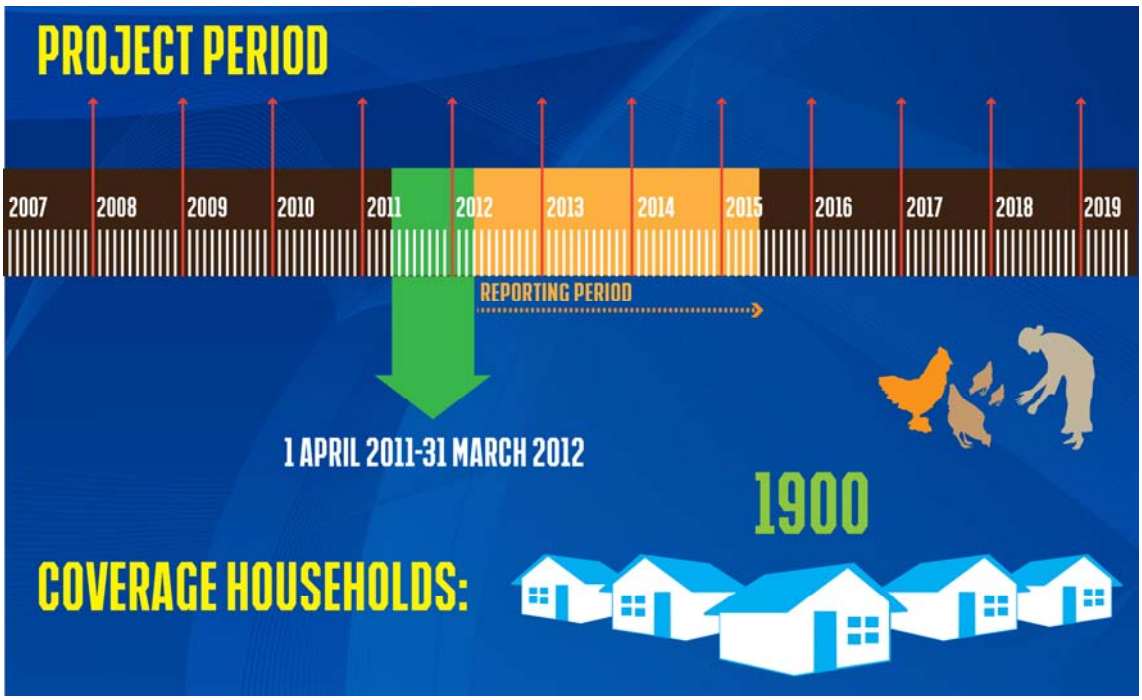
Newcastle Disease Pilot Project in Jhapa, Nepal

Dr. Pralhad Sapkota, Chairperson, Jaleshwor Sawalamban Samaj
Lokpriya Khanal, Project Coordinator, Abhiyan Nepal

NEW CASTLE DISEASE PILOT PROJECT



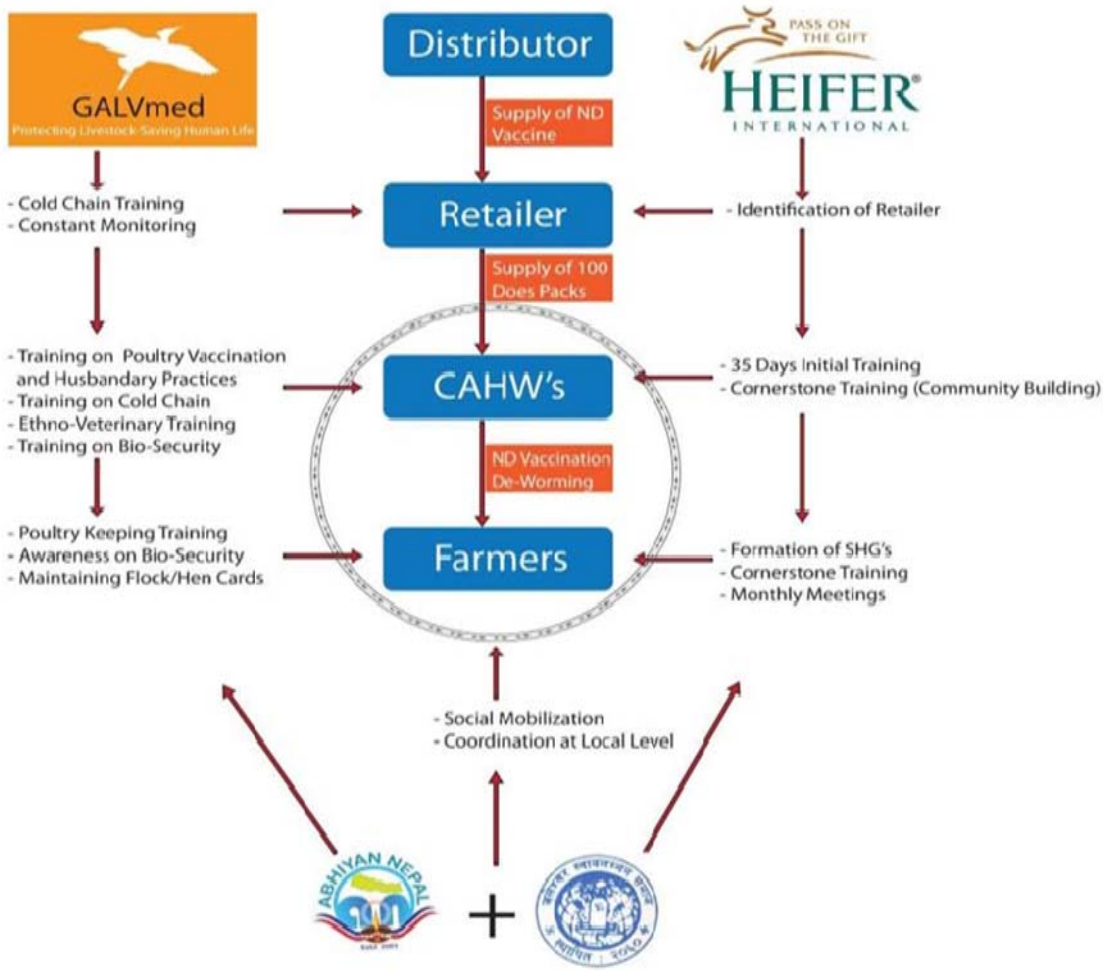
PROJECT PERIOD AND TARGET HOUSEHOLDS



INPUTS

- Human Resources
  - Project Coordinator
  - CAHWs
  - Group Mobilizer
- Capacity Building (Trainings)
  - Vet-Medicine Retailer- Cold Chain Maintain, Poultry Vaccination, Husbandry Practice etc.
  - CAHW- Cold Chain Maintain, 35day Initial Training, Cornerstone Training
  - Members of SHGs: Cornerstone Training, Poultry Keeping Training, Maintaining Flock/ Hen Cards
- Stakeholders' Meeting and Linkage
- Social Mobilization
- Technical Support

STAKEHOLDER AND THEIR ROLES IN VALUE CHAIN



SUMMARY OF PROJECT STATUS

1. Duration of project
   - ❑ 1 year (April 2011 to March 2012) Currently in Post Follow Up stage
2. Targeted Households
   - ❑ 1900
3. Households reached to date
   - ❑ 2300+
4. Vaccinations done to date
   - ❑ Number of vaccine sold- 154200 dose Till Now
   - ❑ Total vaccination target- 80000 dose (In Project Period)
   - ❑ Total chicks vaccinated- 153300 dose

VACCINES MANUFACTURERS

S.N.	Manufacturer	Available Vial / Does
1.	Ventri Biologicals (Venky's (India) Limited)	200
2.	Brilliant Industries Limited (India)	100 / 200
3.	Bio-Med Private Limited, India	100

IMPORTER AND MAIN DISTRIBUTOR

S.N.	Distributors	Location
1.	Kritika Agro- Vet Center	Birtamod, Jhapa
2.	Mechi Agro-Vet Center	Birtamod, Jhapa
3.	Niraula Multi-Agro-Vet Supplier Pvt. Ltd	Birtamod, Jhapa
4.	Agro-Trading Ltd.	Birtamod, Jhapa

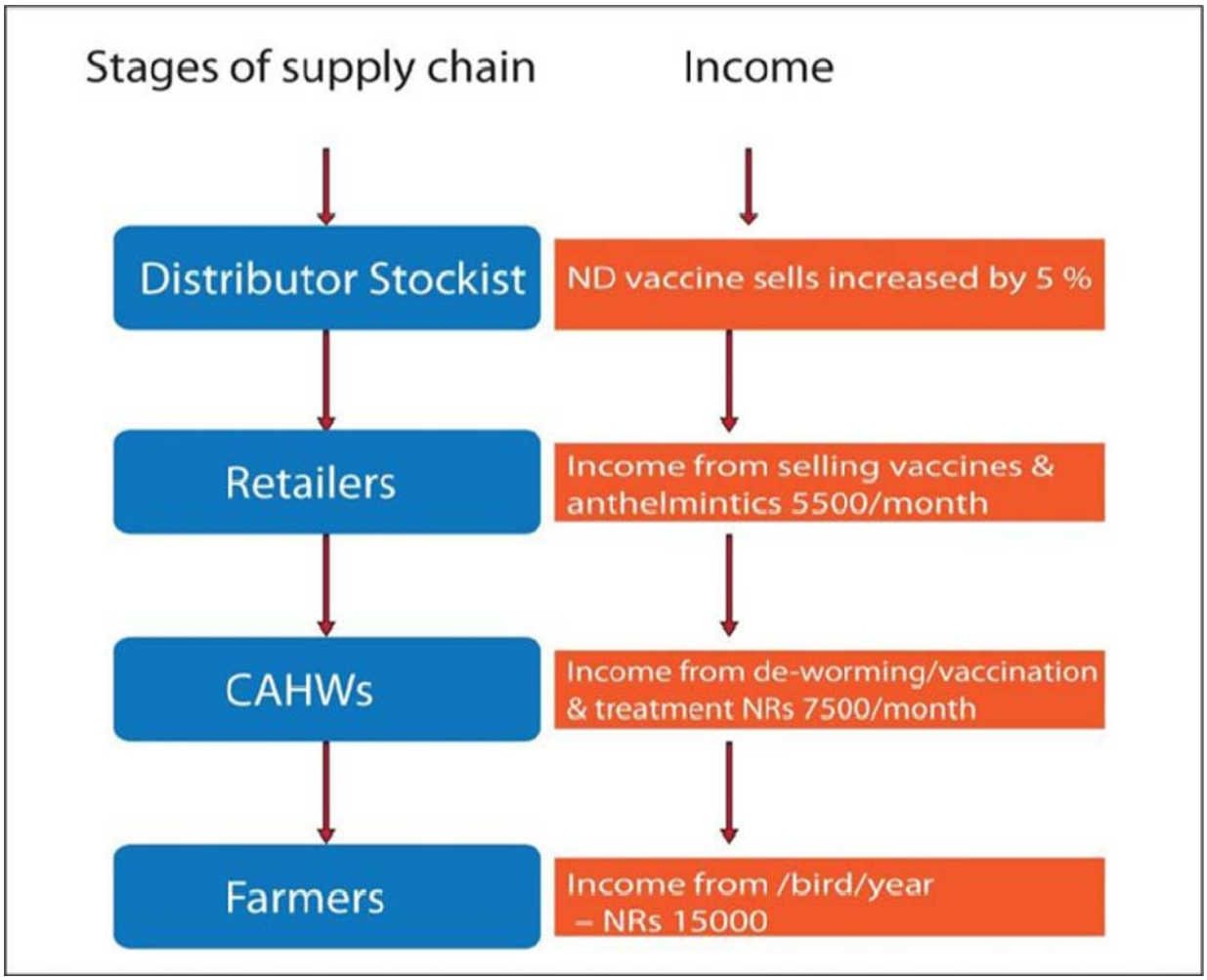
DISTRIBUTORS IN VDCS AND WARDS AND VACCINATORS

S.N.	Distributors in VDC/Wards	Location	Vaccinators
1.	Community Agro-Veterinary Shop	Shani-Arjun-3	Nimesh Thapa
2.	Community Agro-Veterinary Shop	Shani-Arjun 5	Radhika Subba
3.	Kaushila Agro-Veterinary	Khudunabari-9	Krishna Bhandari
4.	Sakuntala Agro-Veterinary	Khudunabari-6	Sakuntala Siwakoti

CURRENT STATUS OF THE PROJECT

- Neighboring villages; farmers and other organizations are replicating the model.
- Farmers are demanding not only ND vaccination but also fowl pox vaccinations from CAHWs and they are readily paying for the same.
- Traders and suppliers are approaching to farmers for supplying poultry in city area
- There is high demand of Local Poultry and consumers are ready to pay the good price for it.
- Chickens are respected as Human being regarding their shelter, food, treatment and security form other harmful animals and birds
- Local level stakeholders and veterinary officers of the government's offices are planning to replicate this model of de-worming followed by ND vaccination to more VDCs of Jhapa district.

DELIVERY PART OF SUPPLY CHAIN & INCOME IN EACH STAGE



OUTPUTS

- 2300+ Households of Khudunabari and Arjundhara VDCs are engaged in Improved BYP farming (Backyard Poultry)
- The project has been successful in making behavioral changes in the mindset of farmers to voluntarily get birds vaccinated and pay for the services.
- The retailers have begun stocking vaccine and their sales have increased post project.
- Both CAHWs and retailers are aware and practicing maintenance of cold chain while storing and transporting ND vaccine. Maintaining cold chain of vaccine has increased its effectiveness as no outbreak of ND was reported in past two year implying vaccine cold chain was not compromised.

- Working on already established social capital improved chances of adoption and expansion.
- Engaging local stakeholders in trainings and meetings have a huge impact in replication and dissemination of best practices.
- The use of Lasota vaccine intra-oculary every 3 months to all age groups of birds was really practical under field conditions.

ESTIMATED PRODUCTIVITY AND INCOME DATA

Parameters	Before project intervention	After project intervention	Remarks
No. of clutch per year	2 – 3	4-6	
No. of eggs laying in each clutch (average)	18	18	
Hatchability percentage (average)	60 %	86 %	
Mortality rate due to diseases	90%	15 -20%	
Flock size per house hold (Average)	6	30	
Income from per bird per year (Avg.)	NRs 3600	NRs 19000	

SPILLOVERS/REPLICATION

Area	Species	Disease	Organization	Media
▪ Farmers of other district (50 Kms from Jhapa) replicated the BYP keeping model after an exposure visit to project areas. ▪ Many other farmers of close vicinity replicating the model. ▪ Project area is becoming the resource center for backyard poultry farming.	▪ Encouraged farmers to vaccinate their animals against diseases ▪ Other large and small animals were de-wormed by CAHWs ▪ It linked farmers to Government Veterinary Office to establish easy supply PPR vaccines	▪ Prevention of bird flu in the project area ▪ CAHW's are being approached by more and more farmers for vaccines and treatment of other diseases	▪ BYP keeping training given voluntarily to other organizations ▪ Animal health camp under the technical guidance of government vet office ▪ HPI/N has learned a new model of controlling ND outbreaks and has already started replicating this model in a sustainable way.	Coverage by media: ▪ Kantipur Television ▪ Nepal Television ▪ Himshikhar television ▪ Local FM stations

IMPACT AND SUSTAINABILITY

- ❑ Poultry has got the recognition as the one of the major aspects of sustainable income among the small farm holders
- ❑ Everyone at various level of engagement is gaining benefits from the project. Farmers, CAHWs, retailers, and stockiest are all profiting from the outcomes of the project.
- ❑ Farmers are increasing profits through improved BYP keeping.
- ❑ A demand driven model for vaccines and medicines has been established.

- A strong relationship has been established between CAHWs & farmers– sustainable income by conducting de-worming & vaccination campaigns, by treating and vaccinating large and small animals.
- Local and regional stockist are also excited with the increase in demand of ND vaccines.
- An ethical value chain system for vaccines has been established. This model is expected to be sustainable as all stakeholders benefit from it and each is dependent on other to make it viable.
- BYP keepers have recognized that even backyard poultry farming can be a profitable business and are ready to invest in preventive health care.
- Increased health and nutrition of children and all family members through the consumption of eggs, meat produced locally
- Ranikhet was known as (Rudi) Haija and an uncontrolled disease but after they were made aware on ND vaccination that has ensured that disease could be controlled.

SUCCESS STORY

- Sakuntala Siwakoti was involved in NRD Project and got the CAHW training. She has been vaccinating regularly. Her husband Arjun Siwakoti has also been supporting her. Now they have increased their shop size bigger with the worth of 5 Lakh. Their monthly income has reached to NPR 20000 per month.

SUCCESS STORY

- Nirmala Katuwal Arjundhara VDC (Currently Shani-Arjun Municipality) 3 had a small house with 5 members in her family. Her husband was a school teacher and they had been keeping 2-3 local poultry at home. Outbreak of ND destroyed all poultry and she was not interested to keep the poultry any more.
- After the projected commenced in her locality she also joint in the group and started to keep the poultry with regular vaccination, appropriate feed supplement. Now she has 12 hens with 90 chicks. Her annual income from selling the poultry has reached to Rs. 40000. With that money she has been helping her family's health, education and daily expenses of her household.

LESSONS LEARNED

- Sustainability of the Local Poultry Farming can be ensured through the intensive awareness and skill transformation among smallholders for Improved poultry farming, regular vaccination
- Awareness on Bio-Security will prevent the epidemiological hazards of animals in the future
- Support on tools and technique of controlling other hazards like, snake biting, attacking by eagle etc will ensure the high rate of chicken survival and increase the productivity.

CHALLENGES

- Maintaining Cold-Chain for the type of Vaccine available at present in the local distributor burdening for Vaccinators as the availability of Good Refrigerator, Electricity is still difficult
- Vaccination and other technical skills should be transferred to farmer level
- Other factors rather than ND also discouraging things for the farmer like, Snakes, Wild-Life, Eagles etc.

Project Monitoring Visit

9

Annexure-B Coverage of Workshop in Media

11 रांची • शनिवार • 14 मार्च 2015 हिन्दुस्तान

निगरानी जांच की जद में आए अ

रांची | अजय शर्मा

झारखंड में कितने आईपीएस अधिकारियों के खिलाफ निगरानी जांच हो रही है, इसकी पूरी सूची केंद्रीय गृह मंत्रालय ने मांगी है। वैसे अधिकारियों की भी सूची मांगी गई है, जिनके खिलाफ निगरानी

किन पर एफआइआर : झारखंड में आठ रिटायर्ड आइपीएस अधिकारी और इतनी ही संख्या में कार्यरत आइपीएस अधिकारियों के खिलाफ निगरानी जांच चल रही है। तीन ऐसे अधिकारी हैं जिन पर घोटाले का आरोप है। चार अधिकारियों के खिलाफ कोयला

केंद्रीय गृह मंत्रालय ने

- केंद्रीय गृह मंत्रालय ने गरानी जांच क जद में आए अफसरों की सूची मांगी
- वैसे अधिकारियों की भी सूची मांगी गई जिनपर निगरानी थाने में केस है

'महामारी से नहीं मरेंगी मुर्गियां'

काम की खबर

रांची | कार्यालय संवाददाता

झारखंड के गांवों में मुर्गी पालन से जुड़ी संस्थाओं और महिलाओं के लिए एक अच्छी खबर है। अंतर्राष्ट्रीय स्तर पर काम करनेवाली गाल्वमेड संस्था ने राज्य के 10 जिलों में मुर्गी टीकाकरण के अभियान का जिम्मेदारी उठायी है।

वह टीकाकरण के लिए स्थानीय स्तर पर वैक्सीनेटर की ट्रेनिंग देगी और दवा भी उपलब्ध कराएगी। इसके लिए अहमदाबाद की एक दवा कंपनी से संपर्क किया है, ताकि टीकाकरण के द्वारा आसानी से उपलब्ध हो सके। इस बात की चर्चा होटल बीएनआर में हुई।

इसमें देश-विदेश के तमाम पशु चिकित्सा विज्ञानियों ने इसमें हिस्सा लिया। इन विज्ञानियों ने मांडू में सपोर्ट संस्था द्वारा चलाए जा रहे मुर्गी रक्षण अभियान का भी जायजा लिया।

क्या है रानीखेत बीमारी : रानीखेत बीमारी एक वायरस जनित संक्रमण है जिसमें भारी संख्या में मुर्गियां एक साथ मर जाती है। सबसे पहले भारत के रानीखेत में वायरस मिला था, इसलिए इसका नाम रानीखेत पड़ा। वैसे सबसे पहले इंग्लैंड के न्यू कैसल क्षेत्र में इसका वायरस मिला था। इससे मुर्गियों में पतले दस्त होते हैं और गर्दन ऐंठ जाती है।

शुक्रवार को होटल बीएनआर में आयोजित कार्यशाला में मौजूद पशु चिकित्सा विज्ञानी।

टीकाकरण अभियान

- राज्य के 10 जिलों में टीकाकरण अभियान चलाया जाएगा
- होटल बीएनआर में देश-विदेश के पशु चिकित्सा विज्ञानियों ने की चर्चा

कैसे होगा टीकाकरण : मुर्गियों के टीकाकरण के तीन तरीके हैं। इंजेक्शन, पानी में दवा और आइ ड्राप। गांव के महिलाओं के लिए आइ ड्राप एक सुरक्षित और सफल टीकाकरण है। छोटे और मंझोले मुर्गी पालकों के लिए आइ ड्राप से एक समय में सभी मुर्गियों का टीकाकरण किया जा सकता है।

नई दवा हुई इजाद : महामारी से बचाने के लिए पहले टीकाकरण की दवा

थी लेकिन गाल्वमेड ने नई तकनीक अहमदाबाद की एक दवा कंपनी को दी। अब यह स्थिति बनी है।

दो तीन दिनों तक टीकाकरण की दवा बिना फ्रिज के काम करेगी, इससे गांववालों को फायदा मिलेगा। महंगी और भारी मात्रा में दवा का इस्तेमाल व्यवसायिक स्तर पर होता है। छोटे मुर्गी पालकों के लिए लसोटा एंटी वैक्सीन दस डोज के पैकेट में मिलेगा।

विज्ञानी हुए शामिल : स्काटलैंड की ग्लोबल एलाएंस, लाइव स्टॉक, वेटनरी मेडिसिन, केसिओ, डा पीट जैफरीज, तंजानियां के पशु चिकित्सा विज्ञानी प्रो बांबूरा, नाइजीरिया के डाक्टर फुंसु सोमाया अंतर्राष्ट्रीय स्तर पर भारत के पशु

रांची LIVE सिटी हिन्दुस्तान

बच्चों में लिवर फेलियर का कारण हो सकती है दर्द निवारक दवा

अंधापन का दूसरा मुख्य कारण है ग्लूकोमा

घट रही मनरेगा के प्रति मजदूरों की रुचि

'फॉर्म की मुर्गियों से देसी मुर्गी ज्यादा सुरक्षित'

जेएससीए इंटर जोनल टी 20 क्रिकेट टूर्नामेंट शुरू

सचिन के गोल से अरगोड़ा एकेडमी ने एजी को हराया

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ग्रामीण डाक कर्मियों की हड़ताल जारी

हजारों की संख्या में पड़े हैं डाक के बंडल

संवाददाता

रांची। अखिल भारतीय ग्रामीण डाक सेवक संघ के तत्वावधान में शुक्रवार को चौथे दिन भी ग्रामीण डाक सेवकों की हड़ताल जारी रही। संघ ने कहा है कि जब तक सरकार उनकी छह

चार दिन से हजारों की संख्या में पड़ी हैं डाक

मेन रोड स्थित जीपीओ में चार दिन से डाक का बंडल लाखों की संख्या में पड़े हुए हैं।

रांची। राज्य के विशेष बच्चों के विकास के लिए सरकार ने कवायद शुरू कर दी है। सामान्य स्कूली बच्चों के साथ-साथ अब विशेष बच्चों के विकास पर भी सरकार ध्यान देगी। इसके लिए मानव संसाधन विकास विभाग ने इस वित्तीय वर्ष में इन बच्चों पर 16 करोड़ 21 लाख रुपये खर्च करने की योजना बनायी है। यह राशि विशेष बच्चों के इलाज, परामर्श और उन्हें उपकरण उपलब्ध कराने पर खर्च की जायेगी।

राज्य में 81,091 विशेष बच्चे : राज्य में 81,091 विशेष बच्चे हैं। हर बच्चे पर विभाग 2000 रुपए खर्च करेगा। नेत्रहीन बच्चों और कम देखने वाले बच्चों पर भी विभाग विशेष ध्यान देगा। इन बच्चों के लिए ब्रेल लिपि और बड़े प्रिंट वाली किताबों की खरीद भी होगी। इस पर 60 लाख रुपए खर्च किए जायेंगे।

कैंप और उपकरण पर होंगे नौ करोड़ खर्च : प्रशिक्षण कैंप और उपकरणों पर नौ करोड़ रुपये खर्च करेगा। इनमें बच्चों के एसेसमेंट पर 79 लाख 20 हजार रुपये खर्च किये जायेंगे। वहीं वैसे विशेष बच्चे, जिन्हें हियरिंग एड, कैलिपर्स सहित अन्य उपकरणों की आवश्यकता है, उन पर 8,08,38,000 रुपये का प्रावधान किया गया है। इसके अलावा एस्कॉर्ट अलाउंस और ट्रांसपोर्ट अलाउंस के लिए चार करोड़ 24 लाख रुपये का प्रावधान किया गया है। सभी प्रखंडों में विश्व विकलांगता दिवस मनाने का निर्देश है। इस पर 79.20 लाख रुपये खर्च करने की योजना है।

बच्चों के साथ अभिभावकों के लिए भी काउंसलिंग : विशेष बच्चों के साथ उनके अभिभावकों के लिए भी काउंसलिंग की व्यवस्था होगी, ताकि वे बच्चों को पढ़ने के लिए स्कूल भेज सकें। इनकी काउंसलिंग पर 44 लाख 82 हजार रुपये खर्च किए जाएंगे।

कर्मियों को 198 रुपये की दर से भुगतान किया जायेगा।

मुर्गी पालकों के लिए टीका उपलब्ध

रांची। ब्रिटेन की गैर सरकारी संस्था गल्वमेड और हैदराबाद की दवा कंपनी हेस्टर बायोसेंसिस मुर्गी पालकों के लिए टीका लेकर आए हैं। और दक्षिण एशिया के देशों में रानीखेत नामक बीमारी के खात्मे के यह पहल शुरू हुई है। हेस्टर दवा कंपनी के राजीव गांधी और राज ने बताया कि झारखंड में 2300 लोगों को प्रशिक्षण दिया जाता है। गल्वमेड की शर्मिला दत्ता ने बताया कि भारत में रानीखेत की बीमारी मुर्गियों में अक्सर होती है, इस कारण कम समय में अधिक मुर्गियां मर जाती हैं। यह एक संक्रामक बीमारी है। गल्वमेड के झारखंड कोऑर्डिनेटर डॉ पितांबर कुशवाहा ने कहा कि झारखंड में हेस्टर, गल्व और सपोर्ट मिलकर काम करेंगे और लोगों को मुर्गी पालन में आने वाली समस्या के समाधान में मदद करेंगे।

भाजयुमो ने चलाया सदस्यता अभियान

रांची। भारतीय जनता युवा मोर्चा ने कोकर स्थित राम लखन सिंह यादव के समक्ष कैंप लगाकर शुक्रवार को भाजपा का सदस्यता अभियान चलाया। इस दरम्यान बड़ी संख्या में लोगों ने सदस्यता ग्रहण की। इस अवसर पर मा चंद्र ठाकुर ने बताया कि प्रधानमंत्री नरेंद्र मोदी देश के सर्वांगीण विकास लिये दृढ़संकल्प होकर कार्य कर रहे हैं। अभियान में मुख्य रूप से क झा, तुषार विजयवर्गीय, निशिकांत चौहान, अरुण गुप्ता, देवेंद्र सिंह, देवराज सहित कई लोगों ने महत्वपूर्ण भूमिका निभायी।

विदेशों में पलेंगे देसी मुर्ग

मांडू | निज प्रतिनिधि

आस्ट्रेलिया, युगांडा, तंजानियां की धरती पर भारतीय मुर्गों की बांग सुनाई देगी। भारत की तरह विदेशों में भी भारतीय नस्ल के मुर्गों का पालन किया जाएगा। मुर्गी पालन का तौर-तरीका जानने के लिए गुरुवार को आधा दर्जन देशों की 42 सदस्यीय टीम रामगढ़ जिला के मांडू प्रखंड पहुंची।

स्कॉटलैंड की अग्रणी संस्था गेल्वमेड द्वारा विदेशी टीम ने मांडू चट्टी पंचायत अंतर्गत गरगाली गांव और टोलों में घरेलू मुर्गी पालन और उसके संभावित रोगों की रोकथाम की जानकारी ग्रामीण महिलाओं से ली। टीम में आस्ट्रेलिया, केन्या, युगांडा, यूके, तंजानिया और नेपाल के कई संस्था समूह और गेल्वमेड के अधिकारी शामिल थे।

टीम का नेतृत्व दक्षिण एशिया के परियोजना प्रबंधक डॉ पीतांबर कुशवाहा कर रहे थे। डॉ कुशवाहा ने घरेलू मुर्गी पालन केंद्रों के समाधान के लिए सपोर्ट संस्था को जिम्मेदारी सौंपी है।

गुरुवार को गरगाली गांव में महिलाओं से जानकारी लेते विदेशी। • हिन्दुस्तान

अच्छी पहल

42 सदस्यीय टीम आधा दर्जन देशों की रामगढ़ जिले के मांडू प्रखंड पहुंची

25 महिलाओं को प्रशिक्षित कर वैक्सीनेटर के रूप में नियुक्त किया गया

विचरण करते देसी मुर्ग और मुर्गियां।

मुर्गियों के रखरखाव का सिखाया तरीका

डॉ कुशवाहा ने टीम के सदस्यों को मुर्गियों के रखरखाव के साथ उन्हें होनेवाली बीमारियों के बारे में बताया। घरेलू मुर्गियों के बीच रानीखेत नामक प्रमुख रोग जानलेवा होता है। इसके साथ ही पॉल पॉक्स चेचक और क्रीमी रोग से भी घरेलू मुर्गी पीड़ित होती हैं। टीम के सदस्यों ने गरगाली में गंगा देवी महिला सपोर्ट संघ की सदस्यों के साथ रीना देवी के घर पर जानकारी ली।

इसी तरह ईदिराबाद में कल्याणी महिला विकास संघ के सदस्यों और पंचकियरिया में मालती महिला विकास संघ के सदस्यों के साथ घरेलू मुर्गी पालन के फायदे और रोगों की रोक थाम की जानकारी ली।

विदेशी मेहमानों का हुआ परंपरागत तरीके से स्वागत

विदेशी मेहमानों के गांव में पहुंचते ही सपोर्ट संस्था की दर्जनों महिलाओं ने परंपरागत तरीकों से उनका स्वागत किया। संस्था के सचिव वीएस गुप्ता के मार्ग निर्देशन में कार्यकर्ताओं की टोली हर जगहों पर फूल माला लेकर तैनात थे। संस्था की सदस्यों के घरों में मुर्गियों के लिए बांस के बने घरौंद को देख और मुर्गियों को अपने बच्चों के संग विचरण

करते देख विदेशी अभिभूत हो गए। इसके पूर्व सपोर्ट कार्यालय में टीम को सपोर्ट संस्था के चलाए जा रहे कार्यक्रमों से अवगत कराया गया। झारखंड में घरेलू मुर्गी पालन केंद्र का विस्तारीकरण कर पॉल्ट्री फॉर्म की शक्ल में खड़ा करने की योजना पर टीम गंभीरता पूर्वक विचार कर रही है। इससे ग्रामीण क्षेत्रों में बेरोजगारी की बड़ी समस्या का समाधान हो सकेगा। इसके लिए प्रथम फेज में 25 महिलाओं को प्रशिक्षित कर वैक्सीनेटर के रूप में नियुक्त किया गया है। इन महिलाओं के बीच कार्य क्षेत्र का वितरण कर टीकाकरण की जिम्मेदारी दी गई

9

Annexure-C
List of Participants

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