Pro-Poor Livestock Policy Initiative
A Living from Livestock
Research Report

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Control Strategy and Action Plan for Animal Diseases of Economic Importance for the Poor in Andhra Pradesh

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1. Introduction

Effective control of animal diseases is a critical element of any strategy that aims at supporting and enhancing livestock dependent livelihoods of rural poor. Over the years, the literature on delivery of livestock services has increasingly emphasized that the governments in developing countries have a public responsibility in ensuring that the incidence of animal diseases, specially those diseases that cause substantial economic losses for the poor, is reduced significantly so that the production and trade losses are minimized and private costs of treatment substantially reduced.

To inform the Livestock Service Delivery Reform process in the state of Andhra Pradesh (AP) being facilitated by PPLPI-CALPI, it was felt that, in addition to carefully assess modes of animal health care delivery, it was necessary to identify the livestock diseases that cause significant economic loss to the poor livestock keepers in the state and to review their temporal and spatial occurrence so as to help the state administration fine tune its initiatives to prevent disease outbreaks.

2. Methods

In absence of precise data/estimates on the extent of economic losses caused by different diseases in Andhra Pradesh, the diseases presumably causing the highest level of losses to poor livestock keepers were identified in a brainstorming session comprising representatives of PPLPI, CALPI, DAH, selected veterinarians and epidemiologists and NGO representatives. A

total of five diseases - haemorrhagic septicaemia (HS), Peste des Petits Ruminants (PPR), black quarter (BQ), enterotoxaemia (ET) and Newcastle disease (ND) - were identified as those probably having the highest impact on poor livestock keepers.

A retrospective analysis of seven-year (1998 to 2004) disease outbreak data of AP was carried out to delineate the spatial and temporal trends in the occurrence of these diseases. In addition, collateral information on number of outbreaks, attacks and deaths and villages affected, weather parameters, migration profiles, livestock density, and epidemiological aspects of the associated pathogens were reviewed. This was done with a view to understand specific temporal and spatial observations associated with individual diseases and their usefulness in developing control strategies and action plans.

In the specific context of this study, major importance is given to disease outbreaks as a temporal and spatial event, and relatively less credence to their actual numbers, attacks, deaths or villages affected. The long term influence of monthly and seasonal incidence of disease outbreaks e.g. monsoon periods, also formed basis for data analysis, interpretation, and identification of critical periods for vaccine interventions. The disease situation in the 22 districts of the state was analyzed in totality to prioritize disease burden in each district and this in turn, paved way to identify districts that sustained the majority of the disease burden. This was done for all the five 'selected diseases' with specific intention of introducing targeted long term action plans to reduce disease incidence and spread of infection to other locations.

The results of the analyses were then discussed with a large number of stakeholders in a series of consultative meetings so as to get a reality check on the analysis and to understand the field level difficulties in implementing the suggested control measures.

3. Results

Haemorrhagic septicaemia

HS is endemic in most parts of India and seasonal outbreaks are an annual feature. Andhra Pradesh ranks first in the total number of HS attacks reported in India in the past five years followed by Gujarat and Karnataka. In fact, Prakasam, Nellore, Guntur and Kadapa districts of AP are among the top ten districts reporting HS outbreaks in the country.

The coastal districts of Prakasam, Kadapa, Nellore, Guntur and the drought-prone Ananthapur districts are the top five high risk/endemic areas in the state, accounting for nearly 60% of all recorded cases in the state over the seven-year period.

Figure 1: Incidence of HS in AP by district (*cases per 100,000 buffalo and cattle per year*).

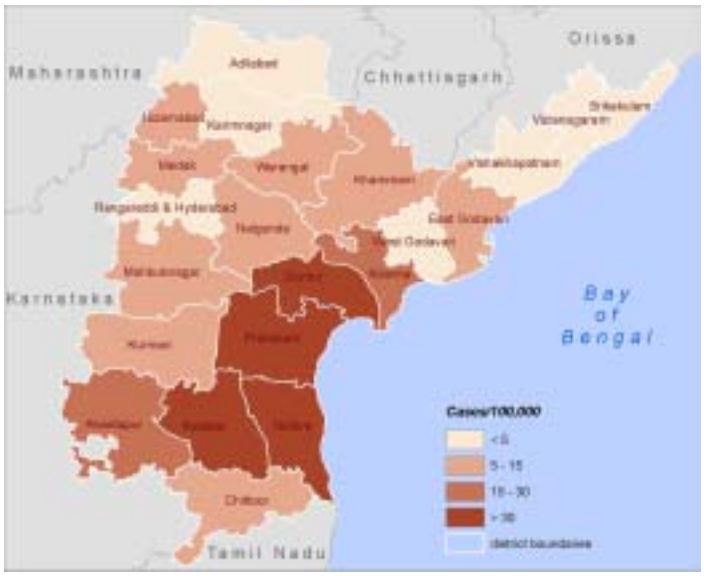
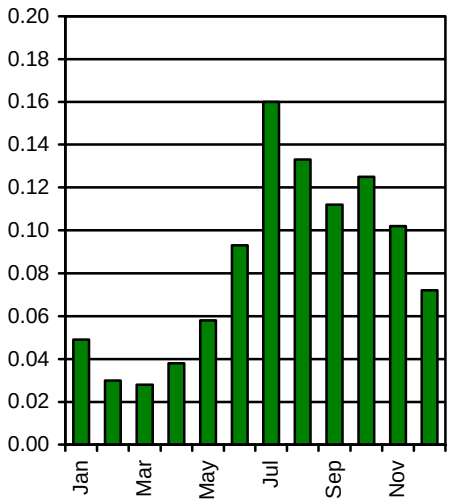


Figure 2: Temporal distribution of HS in AP (*proportion of outbreaks by month).*



Coastal districts of AP bear the brunt of vagaries of sudden or sustained adverse climatic conditions that invariably predispose livestock to HS outbreaks. Unlike other peninsular states of India, coastal AP receives most of the northeast monsoon and this decidedly adds to the disease burden. In Guntur, for example, HS is predominantly a pre-southwest monsoon activity, in contrast to Nellore and Kadapa districts where most outbreaks occur during the northeast monsoon. Ananthpur is equally affected in both monsoon periods.

All year round and erratic occurrence of HS outbreaks in many districts poses a challenge to control as the immunity produced by the presently used aluminium-hydroxide gel vaccine only lasts for four to six months. This demands more than one vaccination, unless AP changes over to oil adjuvant vaccine, which is being routinely used by many states and is commercially available.

With the present aluminium-hydroxide gel vaccine, a staggered vaccination approach is suggested, timing of district-wise vaccination campaigns to precede onset of HS outbreaks as recorded in previous years.

Peste des Petits Ruminants

During the last few years, AP has been at the centre of major epidemics of PPR and their scale has been considerably greater compared to other Indian states**,** possibly because of the large small ruminant population and the nomadic husbandry system. Better disease reporting practice among field veterinarians, actively supported by the state veterinary administration, are likely to have contributed to record significantly higher incidences of PPR than was previously the case. The sheep and goat population of AP currently consists of 9.6 million sheep and 5.2 million goats

and density of small ruminants is high in the southern half of the state and higher still in the districts of Mahbubnagar and Ananthapur. Both sheep and goat rearing are largely, though not exclusively, undertaken by low-income landless villagers providing their main source of livelihood. Sheep rearing is confined mostly to the western and southern districts but goats are kept throughout the state – both for meat, primarily.

Figure 3: Incidence of PPR in AP by district (*cases per 100,000 small ruminants per year*).

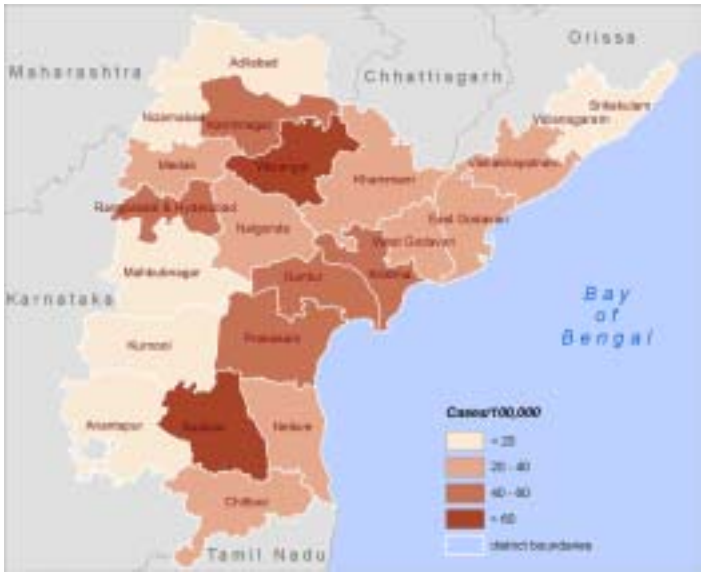
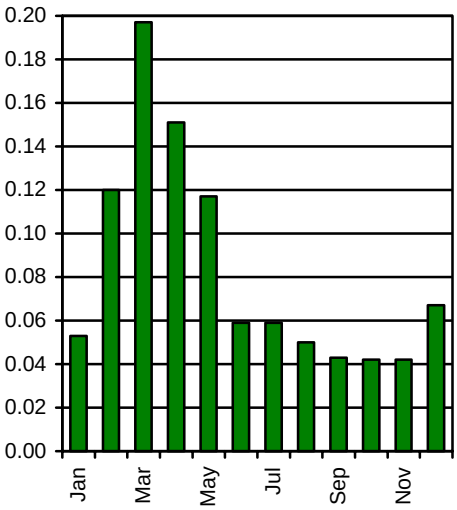


Figure 4: Temporal distribution of PPR in AP (*proportion of outbreaks by month*).



The gross disease distribution pattern within the AP is very intriguing in that it literally 'runs' in the middle/east of the state from north to south (Karimnagar, Warangal, Nalgonda, Guntur, Prakasam, Kadapa and Nellore) with disease outbreaks branching out laterally to eastern and western districts.

There is a slow and gradual build up of infection in the population starting from October to January when massive and explosive outbreaks start forthcoming. After reaching a steep peak in March, outbreaks gradually decline with the progression of ensuing summer months until June. The peak corresponds to the lambing season in AP and field investigations in recent times indicate that lambs between one and six months of age are affected most severely. In addition, PPR often occurred in sheep flocks without affecting goats living in close proximity indicating sheep appeared to be more susceptible than goats.

PPR is a virus infection that primarily affects sheep and goats and other than these natural hosts, it has no 'alternate' hosts for its survival. Also, recovered as well as the vaccinated and subsequently sero-converted animals are immune for life. Population-wide PPR vaccination in high-risk districts (which account for 80 per cent of annual outbreaks) would 'freeze' virus transmission within two to three weeks of vaccination, leaving hardly any virus to spread to other

districts. Ideal timing of vaccination against PPR in high-risk districts would be October and November (extendable up to December), which ensures temporary protection of young stock through maternal antibodies during the peak disease period and should reduce high mortality currently encountered in this vulnerable group. In addition, young stock will be free of maternal antibodies (which last six to eight months), and are ready for vaccination. Ensuing vaccination in low outbreak locations will further reduce virus circulation in the state. Annual follow-up by vaccination of young stock should pave way for ultimate PPR eradication from AP.

Black quarter

BQ, a soil-borne clostridial infection of bovines, is ranked fourth in terms of economic importance as disease of livestock in India. It is most frequent in the states of AP and Karnataka. The survival of clostridial spores in different soil types is not well understood and there seems to be some relationship between the soil type and number of rainy days for BQ to precipitate in a given location. Frequent soil contamination with infective spores due to poor carcass disposal adds to build-up of soil infection.

In the period of analysis, 1,170 BQ outbreaks affecting 1,184 villages were recoded in AP, with 4,558 cases and 2,661 deaths of cattle and buffaloes. In this period, 593,811 post-outbreak vaccinations were undertaken. The highest number of outbreaks were recorded in Mahbubnagar, Ananthapur, and Khammam, ranging from 125 to 251 (more than 50% of all recorded outbreaks) over the period.

Figure 5: Incidence of BQ in AP by district (*cases per 100,000 cattle and buffalo per year*).

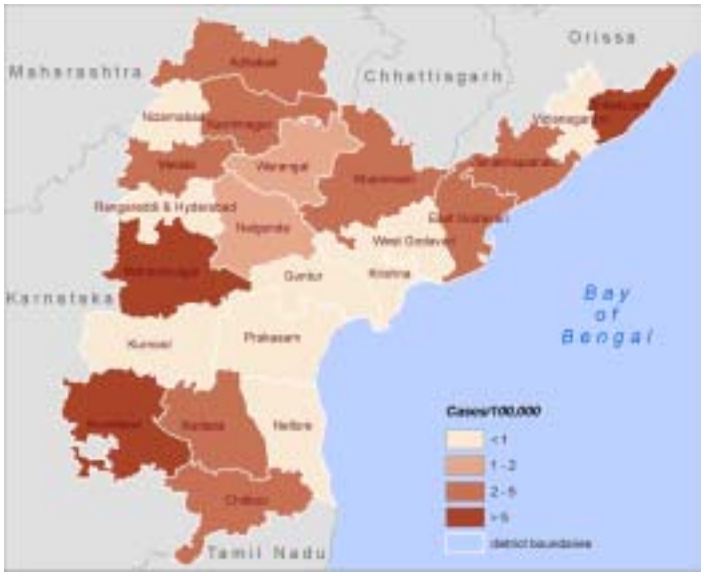
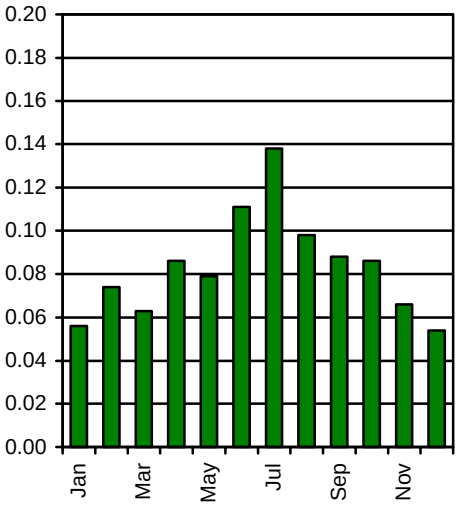


Figure 6: Temporal distribution of BQ in AP (*proportion of outbreaks by month*).



BQ occurs over the entire year with a monthly range of 63 to 163 outbreaks during the past seven years. There is a definite increase in outbreaks during June to October (104 to 163

outbreaks) possibly due to surfacing of spores following monsoon rains and subsequent infection through ingestion.

The epidemiology of BQ provides a unique opportunity to pre-empt disease outbreaks, which can only occur in locations that have a pre-deposit of infectious spores in the soil due to improper disposal of infected carcasses. This requires identification of the infected villages / Mandals and introducing zoo-sanitary measures for long term control.

'Chronically infected villages' in Mahbubnagar, Ananthapur, Khammam, Srikakulam districts (and elsewhere), which have recorded highest incidence of BQ in the past seven years, should be mapped and rigorously introduce annual vaccinations in April / May. This focused approach will save precious vaccine and increase efficiency of efforts to decrease disease outbreaks. In addition, post-outbreak vaccination should be introduced in fresh outbreak areas and BQ incidence followed up in the subsequent 3-5 years.

Enterotoxaemia

During 1998 to 2004, 21 districts of AP reported 1,827 outbreals of enterotoxaemia. These outbreaks resulted in 16,897 cases and 11,535 deaths in 1,879 villages in the state. Ananthapur, Kadapa, Nellore, Mahbubnagar and Kurnool are the top five districts with about 68 per cent of recorded outbreaks.

Figure 7: Incidence of ET in AP by district (*cases per 100,000 small ruminants per year*).

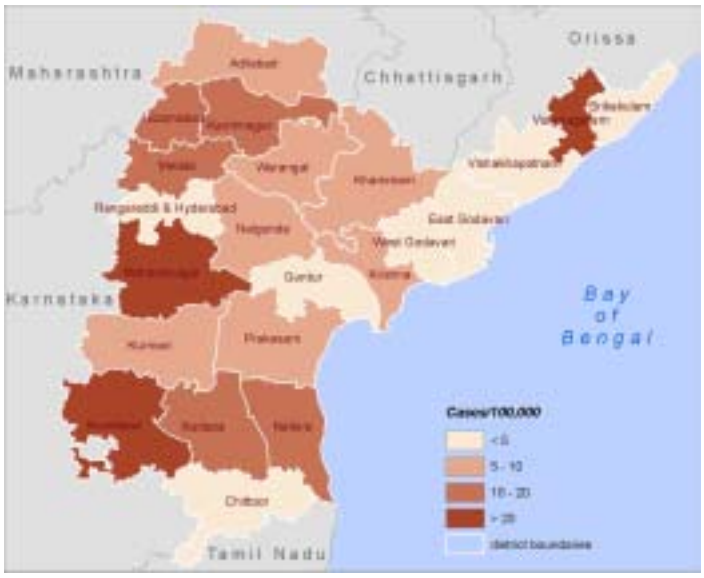
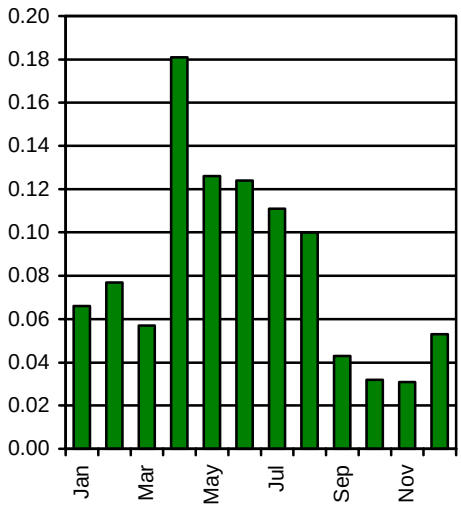


Figure 8: Temporal distribution of ET in AP (*proportion of outbreaks by month*).



Based on this seven-year data, there seems to be no specific period in the year that is most conducive for the occurrence of ET outbreaks, but the lowest number of outbreaks is reported in the months of October and November respectively with most outbreaks occurring from April to

July. This could be due to fact that the causative organism is present in the soil and intestines of healthy animals and extraneous factors such as changes in feed and feeding habits precipitate toxin production resulting in acute disease and sudden death.

With the high sheep and goat population in AP, the requirement of ET vaccine is enormous and the present production levels at the Vaccine and Biologicals Research Institute (VBRI), Hyderabad, is not commensurate with the demand. There is an urgent need to update the vaccine production technology at VBRI.

ET is an insidious disease and factors that precipitate sudden outbreaks may vary from place to place. In addition, migratory shepherd traditions that are determined predominantly by the prevailing drought / non-drought conditions make organised vaccination programmes rather difficult. Generally, shepherds are very receptive and actively co-operate in vaccinating their animals. In this context, a flexible vaccination campaign to suit the shepherd's migratory habits is required and a road map needs to be developed for this purpose for each region of AP. The shepherd 'green card', which records all details of vaccinations etc. during their migration is a big success in Karnataka state and deserves a similar attempt in AP.

Newcastle Disease

Newcastle disease, a virus infection of domestic poultry and wild free-living birds, is widespread in India. There is limited 'carrier status' in recovered and apparently healthy birds, especially in free-living wild birds, which are the source of infection to rural, domestic birds. The disease produces moderate morbidity and morality in rural poultry, which are somewhat resistant to the virus infection. The extent of ND incidence is not well recorded in AP (68 outbreaks recorded over the seven-year period, 41 of which in Ananthapur!) and during interactions field veterinarians admitted to more ND outbreaks.

Virus from wild birds and spillover from organised poultry farms initiate infection in backyard poultry – which represent around 70 percent of poultry in India. The organised poultry sector, despite vaccination, often report mild or moderate outbreaks due to a variety of complex virus and host-stress related factors. The rural scavenging backyard poultry (in smallholdings) which are more exposed to wild free-living birds, suffer from ND due to lack of owner interest in vaccination, although free vaccine is available.

Vaccination is the only way to protect rural poultry and the ongoing free ND vaccination programme of the Department of Animal Husbandry, at all the veterinary institutions in the state, is the right step towards controlling ND. But, this must be supplemented with adequate extension education and involvement of local Panchayat agencies to promote vaccination awareness among villagers, especially the women.

4. Recommendations

Broadly, the report recommends a three-pronged approach to disease control, which involves,

1. Massive annual vaccination in the top ten 'high-risk' districts in one-go at the epidemiologically best time for 3 to 5 years (or longer). This is ideal for PPR, HS, BQ and ET but not for ND.
2. Restricted vaccination in previous outbreak locations and post outbreak 'ring vaccination' in villages / Mandals reporting fresh outbreaks in 'low-risk' districts. Areas without previous history of 'selected diseases' outbreaks to remain unvaccinated.
3. No-vaccination strategy in districts which have either very low incidence or not reported disease outbreaks at all in the past to allow 'lurking' disease if any, to reappear. Limited vaccination can be initiated as and when outbreaks occur.

These approaches stand in contrast to the present ritual of annual vaccination, whether or not a village / Mandal has a history of disease outbreaks. This approach to deploy vaccine where it is most required, cuts costs and conserves veterinary human resources. However, as disease outbreaks are unforeseen and non-predictable, ring vaccination is to be resorted to, supported by other containment procedures.

It is further argued that the proposed disease and time targeted vaccination approach for each district will help VBRI to rationalize its production and achieve optimal and sustained supplies.

5. Contacts and Further Information

This research report is an excerpt from the full report submitted to PPLPI-SA and CALPI. For additional information, please contact:

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