The Poultry Surveillance Unit in Trinidad and Tobago

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Abstract

This paper describes a possible model for livestock-based extension (in developing countries), the Poultry Surveillance Unit (PSU), that uses local knowledge and practices. The PSU was able to operate successfully under structural adjustment conditions in Trinidad and Tobago. There are several reasons for the success of the PSU: it is a small unit, with its own home base and some degree of independence. Although labour costs are high, input costs (bulletins, videos, newsletters) are low. The PSU uses a participatory approach built on farmers’ indigenous knowledge and informal experimentation (based on local and foreign data). The usefulness of the technology that is introduced on-farm is continuously assessed by the PSU in weekly feedback meetings. The PSU emphasizes a whole-farm preventive approach rather than stressing the treatment of illnesses. As a result PSU staff act as ‘reflective practitioners’ and practise the art of transformative learning.

Keywords: Livestock-Based Extension; Poultry; Privatization; Trinidad and Tobago; Medicinal Plants

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Introduction

There has been widespread discussion on reducing the role of the state in extension provision and allowing for more privatization. The parties calling for a more efficient provision of services through privatization often ignore the reality that structural adjustment programs have reduced the effectiveness of many government programs by reducing budgets until they only cover labour costs (Kidd, Lamers, Ficarelli, & Hoffmann, 2000). It is our contention that further privatization of extension services in Trinidad and Tobago would be a disservice to small-scale farmers. The marginality of the livestock sector in Trinidad and Tobago limits the number of private agents willing to provide low cost services.

It is most likely that the relatively well-paid, university-trained agents of agricultural supply shops would fill any gaps in extension services with imported technology. These agents sell various types of agricultural chemicals, animal feed, medicines, machinery and equipment and monitor the performance of those products in the field (Seepersad, 2002). They maintain regular communication channels with extension services and this will be shown below in the section called ‘The PSU in Action’. The call for privatization is linked to widespread disappointment with the limited client adoption of agricultural research data and the reluctance to examine the relevance of the research that was being transferred to the farmers. For example in Trinidad and Tobago extension officers are not in touch with very low resource farmers because they are not seen as ‘serious’ but merely ‘minders’ of animals. Low resource farmers operate under what was considered to be a less productive extensive system—tethered during the day (usually on the roadside) and confined at night. These farmers identified ‘insufficient land’ as a constraint to expanding their flocks, and had problems with dogs killing their animals. Other constraints were praedial larceny, loss of crops to roaming animals, uncontrolled breeding and endoparasites (Lans, 2001).

Ruminant feedlot systems, on deep litter and on slatted floors were introduced to address the above constraints. These feedlot systems were demonstrated at the Blenheim Sheep Project in Tobago, at the Sugar Cane Feeds Centre in Trinidad and at various stations of the Ministry of Agriculture (MALMR). Blenheim has also investigated different pasture grasses. Blenheim is now state-run but was previously jointly run by both Winrock International and the Government. The Sugar Cane Feeds Centre investigates locally available by-products and crop residues for livestock rations. In the 1990s several economic evaluations of low resource sheep farmers in Barbados, Guyana and Tobago concluded that the feedlot model could not be justified for these farmers (Lans, 2001). Non-adopters were investing less time and resources and losing less money. The limitations of the Blenheim model had nothing to do with how it was disseminated by state extension, but with the false premise that grass and other forages would be easily obtained on a tropical island. Our example of the Poultry Surveillance Unit demonstrates how state extension can provide practical and useful and affordable technology to livestock farmers.

The Poultry Surveillance Unit (PSU) has the same characteristics as other developing world extension services: high labour costs and a location within a hierarchical, inefficient and under funded Ministry of Agriculture. However the PSU was able to operate successfully under structural adjustment conditions by having low input costs (few bulletins, newsletters or videos), by building on farmer knowledge and by promoting informally tested medicinal plants, which substituted for allopathic drugs (Western medicine) (Lans, 2001).
Agriculture in Trinidad and Tobago

Trinidad and Tobago is firmly locked into the globalized food system. The food import bill from January to June 1997 was $743.5 million, $720 million for the same period in 1998 and 1.8 billion for 2001 (Browne, 2002; Lans, 2001). In June 1998 employment in agriculture was 42,300 (Lans, 2001). Agriculture’s contribution to GDP declined from 6.6% in 1966-73 to 3.7% in 1988-90. The livestock industry contributes approximately 0.1% or $18.6 million to GDP. The nation is 100% self-sufficient in pigs, poultry meat and eggs. Levels of self-sufficiency in other sectors are below 25% (Lans, 2001). Trinidad and Tobago farmers generally have less than six acres of land and 25% are landless.

The removal of government subsidies resulted in an increased efficiency of poultry farming (mortality reduced from 14% to 5% and feed conversion improved from 3kg of feed to 1 kg of bird to 2.1 to 1). The majority of Trinidad’s broiler chicken farmers are contract growers who rear broilers in an all-in-all-out system for five integrators/contractors. The integrators are involved in feed manufacturing, processing and production. Under the contract system farmers are supplied with chicks, feed, medication and technical support. Technical representatives are responsible for technology transfer, monitoring supplies of feed and other inputs and providing other forms of support for the contract farmers. They visit farms twice a week or more often if required (Seepersad, 2002).

Contract farmers have broiler capacities ranging from 5,000 to 90,000. Processing plants associated with the integrators supply government institutions, supermarkets, hotels and restaurants. The integrators and a few small independent broiler operations supply live broilers to small-scale roadside pluck shops where birds are kept in floor-systems until they are slaughtered and dressed for consumers on demand. Poultry production typically fluctuates to match consumption.

Trinidadians consumed 15,454,545 kilos (34 million pounds) of poultry during the period January to July 1998 (Rampersad, 1998). Most of the broilers were sold wholesale from 174 farms. There are four large and ten small to medium sized farms producing eggs. Sale of table eggs for January to July 1998 totaled 26,604,000, of which 98.1 per cent were sold wholesale. Egg sales were estimated at $12.5 million (Rampersad, 1998). Corporate control is demonstrated by the assembly-type nature of the industry; major inputs (corn, soya, equipment, medication and some hatching eggs) are imported from the USA.

Agricultural Extension in Trinidad and Tobago

Inadequate extension work with farmers, a weak research-extension linkage, poorly trained personnel, insufficient market intelligence and limited financial support for farmer training and provision of livestock information (bulletins, newsletters, radio and TV) are listed among the constraints to livestock production in Trinidad and Tobago (Rampersad, 1998). Currently animal health information is disseminated through the CARAPHIN Newsletter of the Inter-American Institute for Co-operation in Agriculture (IICA); however this publication is used by institutions and professionals rather than by farmers.

Animal health assistants (AHAs) outside of the poultry sector are not trained to provide specialized health information. Provision of their services to farmers is constrained by the same economic factors that constrain the state veterinary service; these are the financial constraints of the Ministry of Agriculture Land and Marine Resources (MALMR) under structural adjustment, inadequate rural roads, poor telephone and transport facilities in some rural areas. The PSU is part of the Division of Veterinary Services of the MALMR and was put in place in 1981 as a veterinary and technical service provider based on recommendations from a committee of
poultry farmers who had complained about vaccine efficacy. In 1981 the staff consisted of three animal health assistants (AHAs) and a veterinarian as head of the unit. From 1983 to 1993 a veterinarian with an interest in poultry headed the unit.

The PSU provides assistance to chicken producers primarily. Guinea fowls and turkeys are seen occasionally, but Muscovy ducks are regularly serviced. The staff in 2000 consisted of eight AHAs, including two women, who were assigned to different districts in Trinidad, and one veterinary officer. Currently the PSU consists of two Veterinary Officers, one Agricultural Officer and four AHAs. In 1994 the PSU made 544 visits to 55 layer farms. The number of broiler farms visited in the same year was 165 and the total visits made were 2073. In 2000 the PSU made 450 visits to layer farms, 1277 to broiler farms, 485 visits to duck farms and 24 to other farms. Figures for 2001 are 379 visits to layer farms, 1580 to broiler farms, 658 visits to duck farms and 13 visits to other farms.

Key Concepts

Ethnoveterinary medicine in this paper refers to medicinal plants or other traditional treatments used for livestock diseases and other conditions. These treatments are often based on indigenous knowledge.

Systems thinkers believe that bringing together a broad but relevant array of stakeholders to discuss an issue is an effective means of achieving change. Systems thinkers claim that the interaction and dialogue between the stakeholders who hold different perspectives, assumptions and beliefs, creates new understanding and emergent knowledge. They claim that action plans and policies developed from the stakeholder interchange are more inclusive and likely to succeed. Systems thinkers believe that shared knowledge and discussion should precede further action in problematic and contentious situations (Jiggins & Röling, 1994).

Schon (1991) refers to tacit knowledge as knowing-in-action, which will remain implicit unless effort is used to make it explicit. Reflection-in-action is usually triggered by some ‘disorientating dilemma’ (like economic constraints coupled with disease problems). The disorientation is faced when the actions habitually guided by tacit knowledge do not produce the results expected from previous experience; problem setting and reflection are needed to bring about a paradigm shift which then determines the next action (i.e. farmer experimentation) (Hatten, Knapp, & Salonga, 2000).

Transformative learning involves reflecting on and transforming the beliefs, attitudes, opinions, and emotional reactions that underlie people’s core assumptions. The role of an extension agent involved in transformative learning (as illustrated in the PSU case below) would be to:
1. Discuss alternatives to uneconomic practices in agriculture.
2. Identify and explore alternative and low-cost agricultural practices based on farmers’ ideas and informal experiments.
3. Test the efficacy of these practices through on-station and farmer experimentation and freely discuss the results.
4. Accept the results of these informal experiments as sufficiently valid although they do not meet traditional scientific standards.

Reflective learning implies continuous learning about the farming situation by advisors (like extension agents) who then assess and suggest alternatives (like local medicinal plants) to farmers to coordinate their farming systems (reflective learning). The ‘reflective practitioner’ actively participates in the molding of knowledge and society through informed, directed and committed action (Hatten et al., 2000).
Information on the PSU was obtained as one outcome of a five-year study into ethnoveterinary medicine (1995-2000) (Lans, 2001). As part of this larger study, group and individual interviews to elicit ethnoveterinary practices were held with field-based officials from MALMR: 19 Agricultural Officers (AOs) and AHAs, including those in the PSU (50% of all employed in those categories) and 27 Extension officers (EOs) (33% of all employed in that category) from one East and two South Regional Offices in Trinidad.

Subsequent to these interviews a workshop on medicinal plants used in poultry production was held at the PSU office in September 1995 with the eight AHAs of the PSU and two knowledgeable poultry farmer-managers. A draft booklet on ethnoveterinary medicine used in poultry production was produced before the workshop based on the information obtained from the interviews with the PSU and the two farmers. This draft was discussed at the workshop.

In August 2000, the first author attended a regular PSU meeting to discuss the PSU as a useful model for extension. Six AHAs and two veterinarians (the incumbent head of unit who was on vacation and her temporary replacement) were present. The ordinary business of the PSU was discussed first. Literature on available commercial products from suppliers of imported commercial drugs, and papers on new, imported production techniques were discussed at the meeting.

There was then a review of cases seen by the AHAs since the last meeting. A case of sudden deaths in turkeys was attributed to water contamination. Mortality of broiler chicks on one farm over three days was discussed as either poor brooding and/or malnutrition. The suitability of using pig grower/finisher as an alternative diet for ducks was also discussed. A post mortem examination of dead birds from one farm suggested mycotoxin contamination from moldy feed. The AHA recommended two solutions for the mould contamination to the farmer: aloes (Aloe Vera) and charcoal tablets in the drinking water, and changing the feed. These discussions demonstrate how the PSU practices continuous learning about poultry farming. Next on the agenda was a discussion of a two-page outline of the work of the PSU written by the first author and a discussion of the implications of the PSU approach for extension elsewhere. The opportunity was taken to ask whether poultry farmers still used the same medicinal plants and if any new plants were used.

**Findings**

In the interviews conducted with the PSU in 1995, the staff stated that they learnt of folk medicinal practices from the informal experiments of farmers, neighbours and relatives. Farmers tested *Aloe Vera, Momordica charantia* and *Citrus* species for common production problems such as reduced appetite, chick mortality, heat stress and respiratory conditions. Extracts of plants were made by steeping or blending (in an electric blender) and administered to the chickens via the drinking water. The AHAs monitored the progress of these informal experiments and discussed them with the rest of the PSU at the weekly meetings. The PSU introduced strategies to enhance the possibility that pathogens that may enter the poultry farm or the bird encountered an unfavourable environment. Additionally the PSU Head of Unit and staff informed farmers of any international medicinal plant research that could be useful locally.

For example, the PSU veterinarian shared with other staff members, the Solvay™ Animal Health’s research on *Aloe Vera*; which indicated that the plant’s immunomodulatory action might be more useful if the plant product was administered in the early part of the chicken’s life (especially when given in conjunction with Marek’s disease vaccine to day old chicks) (Karaca, Sharma, & Nordgren, 1995). This also minimized the amount of plant material
necessary because of the reduced water consumption by younger birds. The PSU then suggested to farmers that *Aloe Vera* might also enhance the response to other vaccines (e.g., Infectious Bursal Disease, Avian Reovirus, Infectious Bronchitis and Newcastle Disease). When farmers started adding plant products to the drinking water no one thought about immunostimulatory activity and this effect was seen as a potential beneficial ‘side effect’ as suggested by Solvay’s research on acemannan. Some poultry producers also adopted the PSU’s recommendation of garlic to enhance productivity (garlic corms are purchased in the market or supermarket). The smaller operators who use garlic to enhance productivity (corms purchased in the market) are primarily East Indian farmers in South Trinidad.

The plant *tulsi* (*Ocimum sanctum*) was introduced to the poultry farmers by the PSU subsequent to 1995. One PSU member saw a paper by Brown and Lans (1998) and disseminated the information on *tulsi* that it contained through the PSU network. The paper described the product ‘Zeestress’ that was made by the company Indian Herbs in Bangalore, India. Zeestress contained extracts from *Ocimum sanctum* and *Withania somnifera* and was used as a drinking water additive for immunomodulation and to combat stress in poultry. The active ingredients were said to be sitonidosides and steroidal lactones. This PSU agent claimed that twenty farmers were using the plant after administering Marek’s disease and other vaccines. Indo-Trinidadian farmers already knew of the plant from its religious-cultural uses, thus facilitating the uptake of the practice.

Three criteria were used to assess which information from the farmers’ experiments should be disseminated by the PSU to other farmers: (1) the investigated medicinal plants were seen to have a positive impact on production parameters, (2) no harmful effects were seen, and (3) the farmer-experimenters were repeat users of the technology. A dose was worked out for each plant but this was offered only as a guide for farmers to work with and not as a standard. The farmer-experimenters were all intensive poultry producers using open water systems with bell or trough-type automatic drinkers that are gravity fed from overhead storage tanks. The broiler houses are typically floor systems with sides of wire mesh and bagasse or wood shavings as litter. Factors affecting the success of the PSU’s diffusion process include the similarity of all broiler systems and the simple methods used to prepare the plants for administration to the birds. In addition the plants, in some cases, were already part of the farmers’ culture and diet.

Farmers collected the plants from the wild or purchased them; on-farm cultivation of the plants was also encouraged. The impact of the technology was expressed in improved productivity and decreased mortality, both of which were easily monitored by farmers and should have a positive impact on farm profitability.

The PSU was always extension-based despite the views of some senior members of the Division of Veterinary Services, expressed at staff meetings, that the “animal health service was not about extension”. The PSU’s philosophy was always to “treat the farm”, not just the sick animals and they made routine farm visits as well as responded to calls from farmers.

Examples of ‘treating the farm’ include the following: after informal investigation of local farmer-knowledge on-station, the PSU generated data suggesting that 5% acetic acid used at a rate of 300-600 ml in 225 litres of water would reduce bacterial contamination of poultry drinking water in Trinidad. The PSU now recommends the use of vinegar to combat *Candida albicans* infection in poultry, ‘sticky eye’ (a mild conjunctivitis in ducklings associated with bacteria in drinking water and vitamin A deficiency) and to keep water lines free of slime mould.

Infectious Coryza and Fowl Cholera (two
bacterial diseases) have been reduced due to better water sanitation. Infectious Bursal Disease and Pox have declined due to better management practices (Lans, 2001). The PSU recommends management practices to control Newcastle Disease Virus infection such as minimizing stress. Aloe Vera is recommended to reduce the negative influence of coccidiosis on poultry production (Lans, 2001).

The former head of the PSU performed the majority of post-mortem examinations on diseased birds. This gave him credibility and institutionalized an interactive relationship with poultry farmers, which facilitated trust and the provision of appropriate solutions to health problems. Due to his farm visits and involvement in the post-mortem examinations the PSU head had a very good knowledge of on-farm conditions and knew which farmer-knowledge should be most beneficial under those conditions. Healthy flocks should result in a reduced need to perform post-mortem examinations and this reduced workload could then be considered an incentive for effective implementation of appropriate research. Feedback to farmers stimulated reflection, which encouraged the PSU and farmers to continue experimentation and develop new insights. The PSU ‘reflective practitioners’ are then practicing the ‘art’ of transformative learning (Schon, 1991, p. 50).

In other sections of the Government Veterinary Service the reliance on allopathic drugs (modern Western medicine) affected their performance when economic constraints in the late 1980s and in 1998/1999 limited drug availability. PSU staff never carried drugs; recommendations on which drugs to obtain were made after a farm problem was recognised. Other government veterinarians carried drugs to treat sick animals and only visited farms when called by the farmers for a specific case. These veterinarians and their support staff tended to only look at the sick animal(s), very rarely discussed the underlying farm management problem(s) and never dealt with poultry. The PSU staff gave advice on other species besides poultry and advised farmers on the management steps that were necessary to alleviate their problems.

Conclusions
Rather than advocate for less professionalization, the head of the extension unit needs to be the person in charge of diagnostic services, examining the farm problems in the laboratory or on station, providing user-oriented solutions and relevant information (Nitsch, 1991). Reflection-on-action occurs when post-mortem examinations are carried out after the use of ethnoveterinary medicines. Feedback to farmers stimulates reflection, which encourages the PSU and farmers to continue experimentation and develop new insights. The head of the PSU did not treat the AHAs as economic competitors but taught them as much as possible so that the farmers would get the best service. The PSU built knowledge alliances and shared the responsibility for knowledge production and adaptive testing with poultry farmers who were testing and ‘validating’ medicinal plants.

Recommendations
The Caribbean does not have a strong livestock extension service and in some of the islands global forces prevent the development of even the assembly-type poultry industry found in Trinidad. With a government budget that covers only labour and transport costs for regular farm visits the PSU provides an example of an extension service that Caribbean states can provide, in spite of globalized food and financial systems. This type of unit may be particularly effectual in disseminating locally generated information and may be especially effective in the formative years of an industry in developing countries if committed staff is available.
References


