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THE INTRODUCTION OF EXOTIC CATTLE FOLLOWING  
TICK CONTROL IN UGANDA

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THE INTRODUCTION OF EXOTIC CATTLE FOLLOWING TICK  
CONTROL IN UGANDA \*

Donald S. Ferguson \*\*

Innovation among livestock owners has usually been assumed to be more difficult than among crop farmers. Pastoralists in particular were presumed to have an inherent conservative nature which led them to "love the nomadic way of life" and to value "quantity more than quality". This and other decidedly un-European habits such as bride price paid in cattle, were said to lead the pastoralist and semi-pastoralist to an irrational attachment to his cattle. Only recently has the pastoralists' economy received a more sympathetic hearing (1, p.55; 2p.71), but many of the prejudices toward the pastoralist even in official circles remain (3, pp.1-28).

The reputation of the semi-pastoralist, such as the Bahima, Karamajonj and of the crop farmer/livestock owner, in the higher potential zones, has fared little better. It was partially guilty by historical association with his nomadic cousins. It was true that a man gained status by owning livestock, especially cattle, as they indicated he was a wealthy person and perhaps of aristocratic blood. Cattle, though a risky investment, were one of the few investments open to the successful African farmer-businessman. They paid regular dividends in the form of milk and calves and had the advantage of being highly liquid assets. Census data on the age/sex composition of the herds will not support the allegation that there are large numbers of cattle held in the herds simply as a mark of prestige (4). Evidence is accumulating to prove that the average livestock owner will respond to normal economic incentives as quickly as the crop farmer, provided the historical constraints of credit, markets and land tenure can be overcome.

Assessing the typical or average livestock owner's "propensity to change" is critically important. If the livestock owner is incapable of or slow to change, the East African governments could be justified in giving priority to "transformation" projects such as ranching schemes in order to expand production. If they respond readily to new technology and management techniques, the best use of development funds would be in "improvement projects" such as universal tick control, loans to livestock producers,

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subsidies on various supplies and artificial insemination. For example, ranching schemes in Uganda cost substantial amounts but involve only a few hundred selected farmers. Schemes already planned will increase the numbers of cattle marketed per year by 28,000 - 35,000 head when fully stocked in 1976. (5 p.17) Increasing the extraction rate in the 4 million head in small holdings by only one percent would increase production by 40,000 head and benefit directly many thousands of livestock producers. This is not to imply that there is not room for both transformation and improvement projects. Ranching schemes may be important as the best use of an otherwise low potential area and can be important as an example of good husbandry. In addition they can provide an intermediate growing out stage in production and marketing.

As development funds are limited, the return to development expenditure invested in transformation vrs. improvement projects needs to be carefully considered. The average livestock owner's propensity to change will in a large part determine which is the better investment.

Over the past dozen years there has been a major revolution in the official attitudes and policies toward the prospects for development of the livestock industry in Uganda. Prior to his revolution, two factors had been seen to bar development; first, the assumed irrational and hence uneconomic attitude of the average owner and his lack of husbandry skills, and second, the tropical climate with the associated problems of animal health and productivity. Since Independence, a fact which is by no means coincidental, Uganda has been pressing forward with a vigorous program for the expansion of beef and milk production with a view toward self-sufficiency and the possible export of livestock products (6). In this paper we will examine the reasons for this revolution, particularly in respect to policies toward the introduction of exotic cattle and the control of tick borne diseases.

#### A. The History of Disease Control

An embryonic Veterinary Service began shortly after the beginning of the Colonial period with the posting to Uganda of a Veterinary Officer. By necessity, almost the entire

effort of the Veterinary Department until 1945 was in the control of epizootic diseases with the aim of their eventual eradication, the more pressing ones being Rinderpest and Contagious Bovine Pleuro-Pneumonia (C.B.P.P.). Rinderpest appears to have been eradicated, the last outbreak being in refugee cattle in 1966, and C.B.P.P. has been confined to Karamoja. Another epizootic disease, Foot and Mouth Disease, occurred in 14 of 18 districts in 1968, but is controlled through quarantine and vaccination. At one point in the early 1940's Trypanosomiasis was a threat to the entire livestock population, and the area infested by the Tsetse fly was still expanding. Through selective spraying, habitat removal and game control, the area of serious infestation has been reduced to less than 20 percent of the land area, concentrated in the West and North. Trypanosomiasis still occurs in 17 of 18 districts but is controlled by prophylactic and curative drug treatments. Over 250,000 treatments were required in 1968. (8, p.8)

The several dozen remaining diseases known to affect cattle in Uganda can hardly be written off as unimportant as they include Anthrax, Blackquarter, Haemorrhagic Septicemia and Brucellosis. However, for most the prevention and treatment are known and are effective. The major diseases which remain to be effectively controlled throughout the country are the tick borne diseases. These include East Coast Fever, Anaplasmosis, Heart Water and Red Water. In addition, a heavy tick load can result in anaemia, hide infections, tick worry and a marked reduction in overall health and productivity.

All the tick borne diseases remain major health problems but the one which assumes the greatest economic importance is East Coast Fever (E.C.F.). The primary vector of E.C.F. is Rhipicephalus appendiculatus, the brown ear tick which serves as an intermediate host and transmitting agent for Theiloria parva, a blood parasite. It should be noted that it is possible to eradicate the disease without eradicating the tick by breaking the disease cycle through weekly spraying or dripping. Occasionally twice weekly control may be required.

R. appendiculatus is found in abundance in Uganda from the lowest elevations, 2000 feet, to almost 6,500 feet. It is only excluded from the higher elevations of Kigezi, Toro Bugisu and Sebei and from the drier areas of Karamoja with less than 30 inches of rainfall. (8 p.29). Even in Karamoja outbreaks of E.C.F. occur when the highly susceptible Karamajong

cattle are forced by drought into the Hyparrhena grass lands to find water and grazing.

At the moment, there is no effective vaccine nor specific treatment. Calves in endemic areas contract the disease usually in the first few months of age and if they survive, acquire a lifetime immunity. However, depending upon the vigor of the calves, the virulence of the particular strain of Theiloria parva and the number of infected ticks they come in contact with, mortality among indigenous cattle is between 20-50 percent and has been known to reach 90 percent in individual herds in some years. Animals which do not contract the disease as calves remain susceptible and mortality among adults of all breeds is high. Furthermore, E.C.F. effectively prevents the introduction of improved stock, particularly those of European origin, as mortality in all ages approaches 100 percent. Thus, the eradication of tick borne diseases will permit a substantial improvement in productivity through the reduction in calf mortality and through the introduction of improved breeds of cattle. The major hazard is in the creation of an adult population highly susceptible to E.C.F. Through carelessness or a slackening of interest in tick control by producers, serious outbreaks of E.C.F. could result. A tick eradication program once initiated, can never be relaxed without serious consequences

#### The Introduction of Exotic Cattle and Tick Control

At least as early as 1928, small numbers of exotic cattle were introduced on research stations on an experimental basis. These soon showed distress attributed in large part to the tropical climate, and all died within a few months of one or several diseases. Trypanosomiasis or E.C.F. were usually implicated. Cross-bred calves fared little better and appeared to be nearly as susceptible to climate and disease. The conclusion was reached that through long generations of survival of the fittest, the local cattle had acquired the ability to survive E.C.F. In fact, Bahima herdsmen in western Uganda claim that E.C.F. is the only disease not introduced following the arrival of the White man on the coast (9. p.254).

After these early failures, it was concluded that because of the tropical climate and the concomitant diseases and vegetation, exotic cattle had no place in Uganda. The only way seen open for livestock improvement was through the selective

breeding of indigenous Uganda cattle. These included the small East African Zebu, the long-horned Ankole cattle of the Western region and several intermediate breeds such as the Nganda cattle of Buganda. Breeding work was started at several stations, the more important ones being, the Entebbe Livestock Experimental Station, the Mbarara Stock Farm, and the Livestock Husbandry Experimental Unit at Nakyesasa under the Veterinary Department; and the Kawanda and Serere Agricultural Research Stations. From the beginning attempts were made to reduce tick numbers, but not to eliminate ticks or East Coast Fever, in order to select for disease resistance and maintain natural immunity to E.C.F. Any superior breeding stock could then be dispersed to progressive farmers without fear of mortality from E.C.F.

Following World War II it became possible to place more emphasis on extension work, with the reduction of tick numbers as part of the program. A number of "livestock improvement areas" were set up where the hand spraying of cattle to reduce tick numbers was carried out as part of the improvement program. According to the 1948 Veterinary Department Annual Report the question of dipping of cattle in infected areas had been under consideration but it was though doubtful that the construction of the requisite number of dips to deal with the entire cattle population would be an economic proposition at that stage of development of the livestock industry. However, a research program to find the best ascaricides was begun (10. p.13). By 1949 the hand spraying of cattle in the intensive areas of Buganda was a "very popular" method of tick control and many famers and co-operative societies purchased their own pumps. (11. p.12).

In 1949, several livestock improvement projects areas were initiated in Ankole where, according to the officer in Charge, "Cattle are owned by Africans, most of whom hold extremely conservative views, especially in respect to their cattle". Tick counts occasionally identified over 1,000 adult ticks and nymphs on individual animals. Spraying with "Gamatox" reduced tick numbers by 85 percent and brought marked improvements in the health and general appearance of the cattle, presumably improved productivity, and the "routine" of regular tick control was accepted. By 1952, 40 co-operative

spray centers, catering to about 1,000 cattle each, were functioning or planned. Owners who paid a subscription of about one shilling per year were seen to be thinking "in a modern way". The officer in charge found, "the sight of a Muhima tribesman bringing his herds to the crush on his appointed day of the week and with his own hands spraying his cattle ... a significant advance". He concluded that spraying was only part of package and that the gradual acceptance, step by step, by the African, of advice and instruction and much of this can conveniently be given by example" (13, pp.19-26).

The desirability of maintaining the natural immunity of the local cattle was stressed in the Annual Reports (1950). It was also stated in 1951 and repeated with variations through 1958 that "an accumulation of evidence from many districts suggested that malnutrition and poor husbandry were a far more important cause of calf mortality than E.C.F. per se, and that if calves in East Coast Fever endemic areas are maintained in optimum conditions, mortality from the disease is markedly reduced. (13,p.3.). Therefore it was concluded that simple improvements in animal husbandry would result in substantially reduced mortality and improved productivity. The unstated presumption apparently was that the Ugandan farmer was not yet ready for a tick eradication programs which by this time had already been initiated in other East African countries. Also, Uganda did not have any large European farms with highly susceptible exotic cattle under tick eradication regimes which needed protection from ticks on African small holdings. As late as 1957, the Annual Report stated that the economic importance of tick eradication had been "overestimated" (14, p.7).

The question of whether improved husbandry alone would result in substantially lowered calf mortality from E.C.F. needs further comment. It must be presumed that some reduction in mortality would result as a healthy calf, given a fair share of its dam's milk, and free from other parasites and diseases, would be expected to have a higher recovery rate. The improvement from husbandry alone apparently was never quantified. The calf mortality in the livestock improvement areas and on Experimental Stations was undoubtedly lower, but in most instances, the tick population was reduced substantially by spraying. At Serere Agricultural Research Station in Teso, calf mortality from E.C.F. still averaged 22 per cent

among East African Zebu cattle was nearly 40 per cent in Zebu Boran crosses and 82 percent among pure Boran (15 p.6) It was 42 per cent among Ankole and Ankole/Boran cattle in Ankole (16, p. 24). It remains to be seen whether the prior reduction in mortality from tick eradication, will induce greater efforts to improve husbandry by making the returns to careful a management greater.

Suddenly in 1958 the tone of the Annual Reports began to change and it was concluded that, "the time will no doubt come when tick eradication areas can be scheduled" (17. p.8). Up until this point, import permits had been refused to all private farmers who wished to import exotic cattle from Kenya. Mr. Jamal Walji and Mr. Mugerwa, prominent Ugandan farmers, persuaded the Department that they had only their own money to loose, and were allowed to import Jersey and Guernsey dairy cattle after demonstrating that their farms were free of ticks. They were thus in a position to supply fresh milk to the growing and profitable urban market and in so doing proved that "climate" was not an absolute barrier.

In 1957, the decision was taken to begin a cross breeding program at Uganda livestock experimental stations using Jersey semen on Nganda cattle, for the first time reversing the long standing policy of breeding for disease resistance with local stock (18. p.3 ). In the same year, pure bred exotic cattle were introduced by small scale African farmers in Buganda. Here the impetus was provided by an outstanding Veterinary Assistant, who ten years earlier had organised the first cooperative milk collection centres for small scale producers. Though the cooperation of local chiefs and farmers committees, unofficial tick eradication areas, had been formed with powers to close areas to cattle not under tick control. He led a delegations of farmers to Kenya, at their own expense, to dramatize the fact that African farmers were already keeping exotic cattle in Kenya(19). The pressure for change appears to have come from the bottom up and has been prompted by the prospects for milk sales to the newly prosperous coffee farmers and to the expanding urban population.



The example of Ugandan farmers successfully maintaining exotic cattle despite the initial opposition of the Veterinary Department, soon won over even the "conservative" Veterinarians. An artificial insemination service was started in 1960 and, "insistent demands for legislation to make tick eradication compulsory" began to come in from farmers. This was after 326 communal spray faces had been established and an additional 329 farmers had private facilities. (20, p.5)

By 1961 the Veterinary Department began carrying the ball for legislation to introduce compulsory legislation in selected areas. In contrast to three years earlier when tick eradication was seen as uneconomic, the Annual Report concluded the following:

"Very little can be accomplished in terms of increased productivity until Uganda follows the lead of most other African states and introduces compulsory tick eradication. African farmers have demonstrated the undoubted value of exotic stock under isolated regimes of strict tick control. However, sooner or later the hazards of tick-borne diseases will put these people out of business unless their complacent and indolent neighbors can be compelled to take a more realistic attitude towards tick control. If Uganda is to attain the wealth from livestock it richly deserves, progressive farmers must be given every encouragement, even if it involves exclusion of the poor farmer from the better land." (21, p.5)

This quote is extremely significant for three reasons. First, compulsion was seen as being necessary to obtain compliance among the majority of livestock owners in areas to protect the progressive few. Second, at least some livestock owners were still seen as "complacent" and "indolent", which translated means conservative, lazy, and slow to change traditional ways. Third, was the controversial suggestion that "poor" farmers should be excluded from the better land, an echo from an earlier colonial period. This would introduce proper land usage

and cattle management as criterious for permission to use land and own cattle. Land tenure issues are discussed briefly later. The 1961 Report continues:

"The general apathy towards preventive medicine results in the unnecessary mortality of many thousands of livestock. So long as the average man can indulge in the luxury of regarding his cattle as a mark of his social prestige, rather than a source of income, incalculable numbers of animals surplus both to the economic requirements of the farm and available grazing, are left to die either of old age or starvation". (21. p.5 )

These statements made in the Annual Report of the Department charged with extension work among livestock farmers, indicate a curious lack of understanding of their economy. One might suppose that producers interested only in large numbers would clamor for disease control to prevent mortality. This could explain the early success with tick control in southern Ankole. An alternative interpretation of their seeming "apathy" would be that the methods of tick control, then available, did not justify the costs in money and labor, given the lack of cash markets for milk, (except in Buganda), the prevailing price of slaughter cattle, and the low inherent productivity of their cattle.

As breeding and selection work with local cattle continued, it became increasingly evident that the milk production potential of East African cattle was extremely poor, even under optimum management conditions. Individual lactation records exceeded 2,600 kilos but the herd averages for those cattle which completed lactations were between 1,000 and 1,200 kilos. Because of the long generation interval in cattle the estimates were that 2-300 years of selective breeding would be required to reach the production levels which could be obtained with exotic cattle at moderate husbandry/levels tropical countries (22, p.29). Table 1 / in shows the comparative production data of Nganda and Friesian cattle at Entebbe for 1967. The production levels for mature cows were 950 kilos for nganda and 3,200 kilos, for Friesians, quite enough to justify farmer interest in exotic cattle.

Table I

Entebbe, Livestock Improvement Station, Friesian  
and Nganda Milk Yields, 1967

(Kilos)

Breed	No. of records	Average output of Milk per annum	Average 305 day completed Lactation	Calving Interval days
Nganda Heifers	19	573	1,106	-
Nganda Cows	42	943	1,179	409
Friesian Heifers	25	3,476	3,216	-
Friesian Cows	33	3,200	4,005	487

Source. Uganda, Dept. Vet. Ser. An. Ind. Annual Report,  
1967, Table 16.

The advantage of introduced cattle for beef production over local cattle under range conditions is not as striking. The heritabilities of the important beef traits are quite high, rapid genetic improvement can be made in a few generations. The local breeds have survived for generations under Uganda range conditions. Nevertheless, there is growing experimental and practical evidence that the already improved Kenya Boran breed thrives in Uganda under range conditions as do crosses which include exotic beef blood (7 pp.33-50).

An additional impetus for a major change in policy toward livestock development came from the Report of the International Bank for Reconstruction and Development's mission to Uganda. They stressed the need for diversification in Uganda agriculture which was highly dependent on two crops for foreign exchange earnings. They strongly recommended increased emphasis on disease control and livestock development as one method of utilizing the underpopulated grassland areas in Uganda (23, chapter.7).

Following thus Report and the growing evidence of the slow progress likely to be made in the selective breeding of local cattle, change came about rapidly. Purebred Friesians were introduced at Entebbe in 1962, at Mbarara Stock Farm in 1964 and Jerseys at Nakyesasa in 1964. The programs to select for disease resistance were abandoned at all Veterinary research stations even for beef strains and spraying was carried out to eliminate ticks.<sup>1/</sup> Also in 1964, the first Ranching Scheme in Ankole-Masaka was initiated and Red Pole breeding stock were introduced at the Ruhengeri Field Station attached to the scheme. The East African Livestock Survey team was able to note that few developing countries could boast the dairy and beef production potential found in Uganda (24 p.174), a statement which could not have been made only four years earlier.

Policies regarding the introduction of exotic cattle and tick eradication had come full circle and in 1963 tick borne diseases were seen as "the greatest single limiting factor

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<sup>1/</sup> Selective for disease resistance continued at the Serere Agricultural Research Station until 1966.

to livestock development" (25, p.4). The research focus shifted from selecting exotic dairy cattle for Uganda conditions and in beef production to upgrading local cattle with Boran cattle or crossing with exotics to produce improved beef breeds. Following Independence in 1963, the Honourable J.K. Babiha, now the Vice President, became Minister of Animal Industry, Game and Fisheries, a portfolio which he still holds. Since 1963, there has been a much more positive official attitude toward livestock owners and the prospects for change and development, brought about in part by the progressive Africanization of the Ministry.

In 1964 the first large-scale compulsory tick control scheme was implemented in Kyaggwe County of Buganda. The area selected lies between Kampala and Jinja in the high rainfall "fertile crescent". The area is isolated on three sides by the River Nile, Lake Victoria and a large swamp. The initial importations of exotic cattle by small scale Ugandan farmers had been in this county and the project was assisted with supervisory staff and equipment and ascaricide by U.S.A.I.D. In 1967 about half of Uganda was gazetted for tick eradication. In July, 1968, the Minister of Animal Industry, Game and Fisheries issued an ordinance making all of Uganda a "tick free area". It is now the legal responsibility of farmers to control ticks on their cattle, and persons found not in compliance with the ordinance can be prosecuted.

Although tick control on a private and cooperative bases was well developed in Buganda and in scattered areas of the Western and Eastern Regions in January, 1967, only 10 per cent of the cattle population were regularly dipped or sprayed. This increased to 33 per cent in December, 1967 and was an estimated 45 per cent in December 1968. As of December 1968 there were 223 full plunge dips/spray races in operation and 85 more under construction (7, p.9.) There are over 1,000 crushes serviced by spray rigs which in most instances will be replaced by dips. The goal is to have 1,550 communal dips in the country by 1975 available to all cattle owners, and additional ones on private farms and ranches. Loan assistance all being provided by both U.S.A.I.D. and the British government. Each communal facility will service 2,000 cattle on average.

In most instances, the Veterinary Department provides the construction crew, subsidizes construction and the first year's spray material. Local owners are expected to provide about one half of construction costs. Considerable success has been achieved in collecting funds for the constructing costs and the costs of spray materials after the first year of operation suggesting that farmers have learned the value of regular tick control. They also recognize that moving a herd of cattle through a dip tank or a spray race is much easier and quicker task than using hand pumps in the crude wooden crushes presently in use. Thus, they are willing to subscribe money for a dip tank or spray race which will substantially reduce the labor required in tick control.

Many questions concerning the eventual success of tick eradication in Uganda remain to be answered. First, is the upsurge in tick control a genuine awakening of farmers, motivated by the economic benefits of tick control or is it in response to some degree of compulsion from the new legislation? The initial interest in tick control in Buganda was in response to increased income generating potential of cattle through the sale of milk. The newly formed Dairy Industry Corporation is rapidly building milk collection centers in most cattle areas. It is predicted that fresh milk imports, once running at 12,000 gallons per day, will be replaced within the next two years. For various reasons cotton and coffee, the major cash crops are becoming less attractive and hence farmers are taking a greater interest in improving or establishing a milk or beef enterprise. Many farmers in Buganda have uprooted coffee to establish pastures.

A second question is, can tick eradication succeed in areas where communal grazing remains the rule. It is not clear that the productivity increase resulting from tick control with East African Zulu stock is sufficient to guarantee willing compliance of all livestock owners. Much of Uganda is suited to mixed livestock/crop farming. In most areas, livestock have not been integrated into the farming system but simply graze waste areas and crop residues. Enclosure is becoming much more attractive as positive improvement is necessary before the introduction of exotic stock. One of the potentially more explosive issues of the coming years will be the small holders' interests and his rights to communal grazing vs large scale private enclosure and Government sponsored ranching schemes.

The issue could range on the average farmers' demonstrated propensity to change and to organize for the collective benefit of all.

A third question is, can the necessary extension and support systems be developed fast enough to make the eradication program work? Each of the dips or spray races will require constant supervision to assure that dip or spray wash is maintained at the correct concentration at all times. If it is not, tick control will not be complete, and there is also a greater probability that ticks will develop tolerance to the ascaricide in use. Many of the facilities will be catering to from 3-5,000 cattle per week and the problems of organization, of collecting fees, replacing the fluid and the like, must still be worked out. Organisation on the ground will probably be on a cooperative basis which will present initial problems, but if successful could form the nucleus for cooperative development and marketing.

#### Summary and Conclusions

Evidence is accumulating that innovation among Ugandan livestock owners is no more difficult than among crop farmers and that livestock owners respond to normal economic incentives.

The motivation of tick control and the subsequent introduction of exotic cattle followed a predictable development pattern. First came a technological advance, not discussed in this paper, but critical to the later motivations. Modern ascaricides, which replaced arsenic compounds in the mid 1940's, were far safer, more effective and had greater residual effect. The benzene hexachloride (BHC) compounds became available in East Africa in the 1940's. Sold under the trade name of "Gamatox" B.H.C. compounds worked well in spray races but tended to precipitate out if used in dip tanks. Ticks in some areas became tolerant to these original formulations, and now toxophene which presents fewer problems in use is the the ascaricide of choice (8 p.40). Scientists must continually work to find new ascaricides before ticks become tolerant of the old ones. Second, came the development of markets. With rising rural and urban incomes, the demand for milk and meat grew rapidly. Livestock became a more attractive cash enterprise. The expansion of milk collection centers is providing

as strong incentive for enclosure, disease control and upgrading. The anticipated continued rise in beef prices, and the prospect that returns to management will be greater, should be sufficient to assure compliance in tick control measures with both dairy and beef producers. Third, was the availability of trained extension staff with a "package" of improvements which were economically worth while. Farmers demanded policy changes before the government was prepared to consider them. Improved cattle were available from Kenya, and farmers who had cash or credit began to import cattle. An artificial insemination service also was started to assist small farmers upgrade local stock and to service the imported stock. Fourth, the most rapid changes have come about where land tenure was less of a problem. As legacy of the Mailo system, many farmers in Buganda were able to enclose their farms without difficulty, hence achieve tick eradication and began pasture improvements. The development of ranching schemes is another method of getting around the land tenure problem which in turn has allowed the introduction of improved cattle.

Tick control has been described as an innovation "which is technically very feasible but practically very difficult", when introduced in areas nearly perfectly suited for rapid build up of ticks and where communal grazing is the rule. (8 p.65). However the future success of a nationwide tick eradication program will not so much be dependent on changing farmers attitudes towards livestock, as on providing the necessary technical and extension support to make the scheme work. If the farmer is shown the importance of tick control, is provided with practical methods of control, and if tick eradication is profitable, the scheme stands a good chance of success.



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