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***Review Paper*****Future Priorities on Improved Livestock Production in Zimbabwe****N. Assan***Department of Agriculture, Faculty of Science and Technology, Zimbabwe Open University, Bulawayo Region, Box 3550, Bulawayo, Zimbabwe.***Abstract**

This review attempts a rapid summary of the present state of livestock production and suggest future priorities on improved livestock production in Zimbabwe. Livestock production is still very much based on traditional systems, despite the advances in agriculture which have been experienced in commercial livestock production in the past decades. The presence of many research institutions both government sponsored and private owned, faculties of agriculture in every region and an up to date veterinary medicine program, augur well for a modern approach to livestock production for future productivity and sustainability. Livestock production priority should be directed on emerging livestock farmers to promote structural change, away from subsistence to commercial livestock farming, by providing comprehensive livestock support services and incentives. The review paper therefore, concludes that in the planning for future priorities on improved livestock production should be based on premise that livestock farmers make rational and effective use of resources, but that livestock production efficiency remains low because of limited technical, institutional and economic opportunities.

Keywords: *Livestock, Training, Research, Breed Societies, Zimbabwe***Introduction**

Livestock have diverse economic and social functions in African farming systems (Peters and Thorpe, 1989). Livestock production is valued as one of the main global drivers of agriculture as well as one of the sectors having enormous potential for poverty reduction (FAO 2006) and has been highly dynamic globally in response to rapidly increasing demand for livestock products (Thornton, 2010). It is estimated that about seventy five percent(75%) of Zimbabwean population depend on agriculture as means of support (Moran and Nyamapfende, 1986). Livestock numbers in the communal areas have generally increased over the last four decade. In the year 2000, communal farmers owned 68% of all cattle, 98 of goats, 84% of sheep, and 60% of pigs in Zimbabwe (Agrisystems, 2000). Livestock scoping study confirmed great opportunity for livestock production to improve livelihoods among the rural households, provided that livestock productivity is enhanced and appropriate input and services can be availed (Sibanda, 2005). The country has 4.4 million goats mostly kept by small scale farmers (van Rooyen et. al., 2007) compared to 5.3 million cattle and 0.3 million sheep both declining (CSO, 2000). Poultry and pigs are estimated at 11 million and 11,795, respectively, (Hagreveas, 2004). The purpose of livestock production goes beyond their direct output functions and includes other significant economic and cultural roles. These include savings, insurance, cyclical buffering, accumulation and diversification, as well as various cultural roles related to status and the obligations of their owner (Anderson, 2003). Livestock production if properly planned and designed has considerable economic potential as a vehicle to promote agricultural development. This review attempts a rapid summary of the present state of livestock production and suggests future priorities on improved livestock production in Zimbabwe.

Appropriate research thrust

Research leading to sustainable utilisation of livestock genetic resources is relatively expensive and requires long term investment and commitment. The cost of crucial livestock research remains beyond reach of most developing countries such as Zimbabwe, unless national capacity is strengthened. There has been a misconception on the direction of livestock research in this country where most scientist were engaged in livestock nutritional studies. This was prompted by the availability of funding for such studies from donor organization. Livestock research thrust as perceived by donor communities sometimes is misleading. Imposed research has failed to give solutions to our livestock production systems. Previously, despite having more animal nutrition specialist from donor funding, the impact on livestock production has been minimal. Most studies had low level of adoption in the smallholder sector where they supposed to be used. Most nutritional studies have been targeting indigenous livestock despite their low genetic potential for growth. The starting point of research programs should be the improvement of the indigenous livestock to enhance their productivity.

Promotion of indigenous livestock production through new approaches and technologies

Livestock has been undergoing constant genetic change which is the normal state of any animal genetic resources in general. Livestock development is a dynamic process of genetic change driven by environmental conditions and artificial selection ((Hiemstra et al., 2006). While most gains in the use of new approaches and technologies have occurred in developed countries, there are considerable same opportunities to increase livestock productivity in developing countries. Barret (1992) reported that

the contribution of communal livestock production to the national animal protein yield was greater than that from commercial ranching enterprises in terms of kg of protein production per hectare per year. This may mean that any intervention which influence changes in value and attitude of smallholder livestock producers from the present consideration for number of stock as status symbol, would provide solutions to more important objectives of higher productivity and socioeconomic benefits which are business oriented. The sustainable use of indigenous livestock species in the mainstream economy should not be over emphasized. The current contribution of indigenous livestock to the national economy is regarded as low. Among some of the reasons given for unsatisfactory contribution by local livestock is their low genetic potential. Indigenous livestock species are essential due to their potentiality for multipurpose use, disease tolerance and low maintenance requirements. Future priorities of animal production will rely on a wide use of indigenous livestock genetic resources that can survive and produce under harsh semi arid conditions with limited resources. Most livestock programs in the past have focused on promoting specific technologies and have largely failed because they ignored socioeconomic and institutional issues (LID, 1999). Hence future strategies on livestock production should drive livestock farmers especially in rural supply areas towards commercialization. A number of on the shelf technologies are available, and appropriate for livestock production (Saunders, 1997). However, there is need to consolidate these technologies and develop extension packages as well as train extension staff to realise maximum benefit.

Adoption of a series of development in biotechnology to support the local livestock production are expected to speed up on going developments in the livestock sector, with major potential on increased productivity. New approaches and technologies about livestock production based on: the use of genetic engineering to improvement on the genetics of various local livestock species for higher output, embryo transfer, and immune-genetics; artificial insemination and cross-breeding for quick genetic gain in hybrid vigour; improvement of reproductive efficiency through which has enjoyed vast use in developed world could be effective in improving the genetic potential of indigenous livestock genetic resources in developing countries, without compromising the adaptive traits.. Under these new approaches in livestock production local superior genotypes can be distributed and used across the country more easily which may positively affect production of local livestock. The tools of molecular genetics are likely to have considerable impact in future. For example, DNA-based tests for genes and markers affecting traits that are difficult to measure currently, such as meat quality and disease resistance, will be particularly useful (Leakey et al., 2009). The new developments in livestock production will enable to explore and possibly utilize livestock in a manner that were not possible before. However, the application of new development in biotechnology require sufficient resources in form of trained manpower, equipment and supplies. Previously, the use of new technology in livestock production may have not been viewed as a priority by either government or farmers and this should change for complementary use of different new technology in livestock production to enhance productivity. Use of various technology to support livestock production have a great impact in increasing productivity in indigenous livestock species.

Livestock production in the developed world has advanced to the current stage mainly due to the presence of adequate and appropriate infrastructure and rapid technological developments. In contrast, infrastructure and application of new technology for national livestock production are lacking in Zimbabwe. However, the need for such technologies and facilities is paramount for successful improved livestock production programs. State sponsored research institutions should be part of the drive for technological innovation and indigenous livestock production. On station breeding units may provide the centres for rapid distribution of superior indigenous genotypes through improved technologies, which as Smith (1988) states, are area model for the role of sophisticated technology in improving indigenous breeds and developing production systems. The results of new developments in reproductive physiology which makes various manipulations possible opens up entirely new horizons for increased production in indigenous livestock genetic resources utilization. New technology can achieve immediate improvement through selection of foundation livestock from local populations and attain faster and more effective performance improvement. The pace of technological change world over is now so rapid that universities must endeavour to train students for careers which do not even exist at present. Education which develop ability to think, read and observe will enable graduates to change within a fast livestock production changing world. The diversity of career opportunities occupied by livestock production specialists which encompasses fields as varied as molecular biology, genetics, reproductive physiology and many others provide hope for the future in the knowledge of that livestock production specialists does indeed posses that unique quality- the ability to adapt.

National collaborative networking of public and private sector in livestock production

The government and the private sector both play important roles in the livestock industry. The stakeholders in livestock production include all groups involved in livestock production chains, which include livestock farmers and their communities, specialised breeders, consumers, scientists, policy makers in livestock production and any groups that aim to influence policies in livestock production with backgrounds in environment, development, commerce and culture. Economic viability through greater productivity in livestock production may be the solution to engaging in national collaborative networking of public and private sector in livestock production. The private sector was developed with multiple players at each level of the food chain-producers, abattoirs and processors, retailers, and as well as a well developed service industry. Developing specific value chain can enhance efficiency in livestock production and marketing, through participation of public-private sector partnerships between major players in livestock production such government institutions, private organizations, non- institutions governmental and independent research organization. The smallholder livestock has been operational from time immemorial and consists of numerous smallholdings with small numbers of livestock. It forms a very small component of the national livestock industry because of the low offtake because their prime objective to livestock farming is food self sufficiency for the household.

In the past the government have been active in the communal livestock production sector and in 2004 of the 609 registered NGO's only a handful dealt with agriculture and fewer still are involved in livestock production (Hagreaves, 2004). The concerted

effort from these parties should aim at empowering both small and large scale livestock producers and transform them into well informed participants in market oriented livestock production. This would improve competitiveness of livestock production and consequently contribute to poverty alleviation and economic growth. National government is responsible for policy development in livestock production and have to balance livestock production needs with other priorities of the country. Livestock production programs have been usually financed and executed by relevant government ministries with occasional assistance from donor funding. National government was also the main source of short and medium term livestock production activities. There is need to partner with other stakeholders on long term livestock research, because of the high costs which are involved. Most of external participation from donors shy on station work prefer on farm programs. Strategic research in collaborative networking on on-farm can assist in performance improvement location specific livestock production systems.

Research coordinated by networking should cover a lot of aspects of livestock production. Government departments which coordinate and give technical support should be strengthened. Collaborative research in livestock production should be active in all aspects of animal production. Periodic assessment should be done to measure progress resulting in planning of future research targets and livestock development programs. As regards to national collaborative networking of public and private sector in livestock production, the greatest difficult is the shortage of funding. Financial budget allocation from government on livestock production is inadequate, while the interest of private players in livestock production and the meat industry has so far not reflected any interest in supporting livestock production in smallholder farming sector. In view of the present status of livestock production and of uncertainty of breeding material markets, livestock production private enterprises are not prepared to set aside investment for this purposes.

Education and training in livestock production

There is a general agreement on the high priority to be attached to education and training in livestock production. The need to set up livestock training programs with well defined goal should be one of the future priorities in livestock production. Sharing of expertise with experts but at the same time balancing this with local personnel with good knowledge of local livestock production systems. Before embarking upon a discussion on training as a priority to support livestock production, a brief comment on livestock industry is necessary. The livestock industry in general ranges from small subsistence farming to modern commercial livestock farming practices existing side by side. In the last two decades the industry has been able to feed the rapidly expanding population, and Zimbabwe was generally considered to be livestock products exporter even to the EU. On the basis of the above mentioned scenario no one will therefore deny the great importance of livestock production.

Zimbabwe has an agro-based economy and training in livestock production at all levels should be aimed at developing a human resource base capable of making a living out of agriculture and working in improving livestock related institutions to support the country's economic growth. It is logical to assume that competent livestock training is the key factor in developing the sector. Training personnel and providing technical equipment in livestock production should be the fundamental bases for acquiring knowledge, skills and techniques for animal production management and improvement that are needed to translate a livestock enterprise for higher productivity and profitability. It is considered, therefore, that the introduction of suitable designed courses at college level could serve as a basis for both university and college training and would have the benefit of bringing potential good students into direct contact with realities and problems of livestock production at an early stage and will provide an insight into applied livestock production. Graduates churned from colleges should be able to apply principles and tools of animal management for the husbandry of various classes and types of livestock namely cattle, sheep and goats, pigs, poultry, and rabbits. On completion of livestock production courses beneficiaries should have been sufficiently equipped with knowledge on concepts of the subject, interrelationship between traditional scientific methods of producing livestock, roles, constraints and strategies associated with animal production. Various universities, colleges and institutes offer tertiary training courses in agriculture production., but only the Mazoe Veterinary College offers a livestock specific curriculum. There are also various courses available for farmers in commercial livestock production. In general these programs favour cattle production, there is little emphasis in other livestock species or on communal production system (Hagreaves et al., 2004). Most courses require students to be attached for a period to work with livestock on a large scale commercial farm, but this is now no longer available. Consideration needs to be given to more rapid training throughput to meet the growing demand for livestock production sector. There is need to broaden the curriculum to include non-cattle species and communal livestock production system. This may require retraining of current staff in modern livestock production systems.

In the developed world the direction of livestock production has changed due to new establishments in livestock biotechnologies. The integration of such issues into the curricula of animal production is lacking at tertiary level in most developing countries. Most lecturers and trainers are not well versed on issues of new approaches to livestock productions. This has created information gaps on livestock production in general, which means systematic and planned courses on new technologies in livestock production are called for at university level. Zimbabwe should take advantage of the inventions in livestock biotechnology which provides a technical and operational framework for assisting livestock farmers to increase production. The training of new young scientist in new livestock technologies will exposed beneficiaries to the demands and challenges in modern livestock production. The failure of most animal breeding programs was a result of lack of qualified personnel in new concepts in animal breeding. The introduction of marker assisted selection could be a future strategy for the discontinued livestock selection programs. Well equipped scientists in new approached will tasked on resuscitated the failed livestock programs for the benefit of future generations. If the livestock specialist is to effectively tackle the thorny issue of increased livestock productivity, must either be a broadly trained professional with knowledge of sociology, economics, land use planning and integrated rural development as well

as modern livestock production issues. It has been noted that livestock production programs offered by many universities are obsolete and may not prepare livestock production scientists essentially to meet the demands of the developed livestock sector, and has little, if any, exposure to the demands and challenges in new approaches to livestock production. This aspect needs possibly to be addressed at university level by revisiting the livestock production curricula, and this should be a prerequisite for an effective extension services. The private sector service industry which traditionally served the large scale livestock producers has shrunk rapidly over the last decade due to decreased viability. This has also resulted in declining support for livestock production in communal areas.

Resuscitation of national breeding programs and breed societies

Genetic potential of indigenous livestock species is low yet hardly exploited because the common objective has been to meet the limited smallholder household requirements. In livestock improvement so far cattle breeding have been favoured, although not much success has been achieved. It was when results of research and performance testing were published that the value of local cattle breeds such as Nguni, Tuli and Mashona were acknowledged (Ward, 1978; Brownlee, 1977; Khombe, 1994). This resulted in an interest in these breeds from commercial farmers and led to the establishment of breed societies. The challenge was that the societies were established but no pedigree information was available to establish herd books. Makoholi Experiment Station was holding the largest government herd of Mashona breed that was registered with the Mashona Breed Society. The biggest Tuli herds were kept at Matopos Research Station and Grasslands Research Station, these were registered with the Tuli Breed Society. In 1946 a Nguni herd was also established at Tsholotsho sub-station as part of a national program to conserve and improve the indigenous cattle resources of the country (Ward, 1978). The development and management of the herds were described by Brownlee (1977). The interest in indigenous cattle from commercial breeders started when the only source of indigenous cattle was the tribal remote areas where the influence of imported breeds was less prevalent. There are now few pockets of pure cattle in the communal areas however these are under threat from indiscriminate crossing. Farmers have been led to believe that their cattle are inferior due to their size as a result many farmers are preferring the Brahman cattle breed. The fragmented land size and the failure to improve the grazing areas due to land tenure problem have affected the productivity of large cattle breeds.

The fact that there is still some high quality of indigenous cattle in the communal areas and other recognized producers there is need to reestablish the cattle breed societies. Animals which meet the minimum standards should be registered. The system should cater for the emerging farmers who want to become stud breeders unlike the previous societies which were discriminatory. The same approach can be for other unimproved livestock species which can be developed for commercial use. However impact studies need to be carried out before a breed/strain of livestock is registered or recognized. The future breeding priorities should not solely focus on output while neglecting the relationship to other traits such as reproductive performance and health. In a harsh environment the realized response in livestock improvement may be well below expectations, if traits affecting the functional efficiency are not included in the aggregated genotype.

Final comments

New baseline information on population dynamics and productivity is urgently needed as they are fundamental for sound planning and development of future priorities on livestock production. Zimbabwe needs to follow a more integrated approach by investigating challenges and opportunities from production to consumption along a value chain, while also addressing policy and institutional parameters which influence livestock production. There is a considerable potential for increased livestock production if livestock intervention programs are accessible to all livestock producers, encouraging the emergency of sound economic production practices. Many policy makers have only limited awareness of the importance of improved livestock production hence realisation of potential policies affecting livestock production is general low. Furthermore the benefits of livestock production are achieved as a result of macroeconomic intervention, regulatory and pricing policy, investment policy and institutional policy. Livestock production in developing agriculture displays a duality, in that activities can be grouped into livestock production as a commercial activity on the other hand, and livestock holding aimed at household needs and social security on the other hand. While both activities are economically rational responses to the prevailing conditions in farming households, different incentives and support actions may be required for these two categories. In view of the significant potential for economic livestock production in Zimbabwe, the promotion of comprehensive and broad based support programs to livestock producers should receive priority in agricultural development policies and strategies. Training and extension services need to be improved and possible greater emphasis given also to non cattle species. New approaches to livestock production must be identified, tested and promoted among communal areas. Revised curricula need to be considered which focus on small scale production sector.

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