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Review article

Narrowing the socio-economic gender gap through empowerment of women in micro livestock farming : opportunities and challenges

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ABSTRACT

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Micro livestock appears to be the most sustainable means of producing high quality animal protein for the expanding populations of the lesser developing countries. Diversification in animal agriculture through inclusion of non-conventional livestock such as micro livestock species (goat, sheep, poultry, rabbits, guinea pigs, pigeon, ducks, snails, grasscutter etc) provide options that would guarantee fully participation of women in livestock production to alleviate rural households protein shortage or deficiencies. The micro livestock are likely to become increasingly important source of animal protein as a result of rapid increase in human population and in the light of dwindling land sizes and natural resources in general. This is on the backdrop that micro livestock have diverse economic and social functions in rural communities, and different types of micro livestock have been associated with women due to their significant potential for alleviating malnutrition and food insecurity. Therefore, supporting micro livestock should be considered as a means to empower women in rural development which has the capacity to improve household nutrition and food security. This discussion looks at the opportunities of empowering women through micro livestock as a mean of alleviating poverty and solving the food insecurity challenges in rural communities. The challenges which

women might face in engaging in micro livestock are also highlighted. The basis of micro livestock farming may be taken from the perspective of animal products supply being outpaced with the increased human population in Africa. In this case, alternative sources of animal protein such as micro livestock need to be promoted, and if not, livestock products will be beyond the reach of the majority of the ordinary persons. The space for classic livestock rearing have decreased, and this scenario will suit the keeping of smaller animals which are prolific and easy to manage. This warrant serious consideration of micro livestock farming as one of the major component of the livestock production systems where women can be empowered in rural areas. Micro livestock farming has greater opportunities in improving livelihoods among the rural poor households, provided that productivity is enhanced and appropriate input and services can be availed. Gender sensitive programs that promote micro livestock farming contribution to optimization of animal product supply and enhance food security on sustainable basis are recommended. In most cases livestock professionals such as veterinarians and animal scientists often do not have the necessary familiarity and competence with gender analysis and participatory skills to implement a gender balanced assessment or response in livestock production issues.

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1. Introduction

Gender differences matter in livestock production in various farming systems all over the world, where the ownership and management of household farms and natural resources by men and women are often defined by culturally specific gender roles (IFPRI, 2010). Much valuable research already exists on the different roles of women and men in various agricultural activities. There is recognition that men and women often have very different rights, responsibilities and ownership with respect to different livestock species. Empirical evidence show that women do play a greater role in livestock farming in general, however own most micro livestock species (Barwa, 2009; Hardouin 1995). Micro livestock can be valued as one of the livestock sub sectors having enormous potential for enhancing food security in the rural communities (Smith et al., 2013). Considering the problems of human protein malnutrition, Devendra (1976) is of the opinion that a well planned research programme closely linked to improved husbandry practices of micro-livestock can greatly enhance the already existing contribution of micro-livestock to combating animal protein deficiency. Viemeyer (1984) considers micro-livestock such as rabbit, guinea pig, grasscutters, rats, iguana and pigeons as a rapid means of obtaining animal proteins. Micro livestock encompasses small indigenous vertebrates and invertebrates which can be produced on a sustainable basis for food, animal feed and as a source of income (Hardouin et al, 2003). Most animal species that belong to the micro livestock group require little capital, equipment, space and labor, which makes them appropriate for women. Micro livestock production can be a major contributor of a more balanced diet for rural communities (Barwa, 2009). Given women's lack of productive resources, then it is reasonable to argue that engaging women in micro livestock deserves even greater attention to improve women community status. Micro livestock farming is a sustainable solution to engage women in contributing to food security and opportunities for livelihood diversification to address the problem of greater household food demand which is expected to increase due to increase in human population on the continent. The drive for alternative sources of animal protein supply to reduce the current animal product demand supply gap is imperative.

2. Benefits which can be accrued by women engaged in micro livestock farming

There is an urgent need to fully characterize micro livestock species as an important livestock genetic resource, this will greatly contribute to the well being of women subsistence farmers in rural areas. Micro livestock production if properly promoted may constitute a very important agricultural activity at household level. Micro livestock production is sustainable and can be handled conveniently by women and children (Barwa, 2009). Its small indigenous and flexible nature makes it a suitable livestock production that can be handled by women and children (Hardouin et al, 2003). Micro livestock production can be practiced in rural and urban settlements considering its small size, low-cost management requirement and low capital investment. Their smallness entails easy management for disadvantaged groups and rural household may derive ready income from sale of micro livestock. Micro livestock production can be sustainable in long term by adopting adequate adaptive measures against climate change in response to adverse environmental effects. They represent a genetic resource which is resilient to climate variability and should not only be conserved for future use in the event of climate change but should also be fully utilized to serve the increasing population. As the adverse impacts become more frequent and severe on conventional livestock, farmers need for alternative source animal products to deal with climatic variability with the objective of maintaining food security. Micro livestock scoping study confirmed great opportunity to improve livelihoods among the rural households, provided that livestock productivity is enhanced and appropriate input and services can be availed. Demand for animal protein is expected to increase in developing countries hence the integration of micro livestock into main agricultural activities for the resource poor, can provide many direct and indirect benefits for food security. The success of integration of micro livestock production into the main stream agricultural activity will depend on efficient micro livestock policy formulation and implementation, proper supervision of all mini-livestock programs through the relevant arms of government. Investments in rural roads, irrigation, credit systems, and agricultural research and extension serve to stimulate food production. Research and extension should be up to date and supported by both private and public sector with proper financial programs. Per capita consumption of micro livestock products should increase, but this growth should be sustainable with introduction of modern farming practices. Micro livestock in the developing world are expanding slowly and will remain an important source of high-quality food for many of the world's poor, particularly in Africa. Strategies and program of action that will enable micro livestock farming to contribute to optimization of food production and enhance food security in Africa on equitable, sustainable and environmentally sound basis are recommended. Through adoption of alternative animal species such as micro livestock, it appears likely that growing food needs can be met in the foreseeable future, notwithstanding a growing list of technological, distributional, food safety, and health issues that require serious attention and action. The biodiversity of Sub Saharan Africa's micro livestock provides a valuable asset and sustainable resource for improvement of food security. Micro livestock have a host of benefits and opportunities that conventional livestock do not present for resource poor farmers. They can be differentiated from conventional livestock in the sense that they are inherently small by nature and may be a small species of a traditionally favored type of livestock (De Wilde, 1991). The class encompasses small indigenous vertebrates and invertebrates both domesticated and wild genetic animal resources which can be produced on sustainable basis for food, animal feed and as a source of income. In this discussion micro livestock refers to poultry, rabbits, bush rodents, bees, snails, guinea pigs, etc., reptiles, while snakes and birds have more recently been considered as eligible for micro livestock (Hardouin et al., 2003). Micro livestock production if properly executed has considerable economic potential to resource poor farmers, as well as acting as a vehicle to improved food security. Micro livestock production priority should be directed on resource poor farmers to promote food security through provision of comprehensive micro livestock support services and incentives. The purpose of micro livestock production should go beyond their direct output functions and include other significant economic and diversification activities, as well as various cultural roles related to status and the obligations of their owner. There is growing evidence that engaging in micro livestock farming has a potential to address the food insecurity in Sub Saharan Africa (Henry et al., 2012; Hardouin, 1995; Juste et al., 1995; Thys, 2001). However the knowledge about the adaptive value of micro livestock and their competitiveness versus conventional livestock is still very limited, It is postulated that most sustainable utilization strategy of micro livestock species will be achieved through their integration into the existing livestock production systems. Micro livestock many economic, social and environmental advantages over their larger counterparts or classic livestock rearing. There are a number of positive benefits for farmers who engaged in micro livestock farming. Micro livestock keeping should not be seen as a rival to classic livestock rearing, but as a complement to other livestock farming activities. However, micro livestock can be highly productive in areas that are not suitable for large animals, especially where land is limited. In some parts of

Southern Africa classic livestock rearing may not be suitable, while micro livestock may thrive. Use of micro livestock reduces the pressure to alter the environment in order to accommodate classic livestock rearing. Farmers engaged in micro livestock farming accrue multiple benefits including provision of owners with a range of products which including the major one enjoying the health benefit of animal products. Suitable for women and children, small-scale farming of certain breeds of rodent is now widely seen as a valuable weapon in the fight against malnutrition and poverty. It provides protein to the poorest families, especially children who would otherwise eat no meat at all in cultures where tradition dictates that the head of the family should take priority. Due to their small size micro livestock may be readily converted into cash and can be well integrated into the crop livestock integrated systems. Backyard micro livestock production can be a major contributor to a more balanced diet for communities. Households that practice micro livestock farming are more likely to have access to a wider variety of nutritious animal products. Micro livestock can provide people with a primary or supplementary income. They offer prospects of a regular income source once the volume of production exceeds what the resource poor farmer wishes to use for household consumption. Micro livestock keeping is an affordable solution for women, young people and landless farmers, since it generally requires little space - it can even be practiced in the corner of a room - and only needs basic equipment (a few cages) which is cheap and easy to make for resource poor farmers. Classic livestock rearing such as cattle, sheep, goats require a lot of land, which is increasingly becoming scarce in Southern Africa. Breeding micro livestock- smaller animals not traditionally used as livestock - could be the solution to scarce land. Micro livestock have considerable advantage given the current feed resources scarcity due to climatic variability, which is in turn linked to the soaring cost of commercial animal feed. Most of the small livestock can adapt well to less feed, reproduce very quickly, require little in the way of care and have good resistance to disease. Most micro livestock are prolific producers and thrive in feed scarcity farm environments. This means micro livestock can improve total yield and supply diversity of animal products in away which is compatible with limited feed resources. Vulnerable groups, mostly women and children essentially may raise the household incomes, improving access to protein nutrition and enabling local livestock products to compete better with low price livestock imports. The enjoyment of outdoors, exercise, learning about nature, working with friends and neighbors on improving their livelihood are also indirect benefits of micro livestock farming. Many types of micro livestock species remain important for the poor and landless, especially during times of famine and insecurity or conflict, when normal food supply mechanisms are disrupted and local or displaced populations have limited access other forms of nutrition. Even in normal circumstances, these small animals are often important in complementing protein supply to provide a balanced diet, and wild species may often be important in this respect. Limited research conducted on opportunities for micro livestock production have recognized the species' smallness as desirable but not much literature exists acknowledging micro livestock as part of a broader solution to food security. Basic research has explored the potential for micro livestock as major alternative protein source to complement the provision of animal product from conventional livestock. It is argued that the smaller the animal, the more likely it will be kept close to home where it will be used for the benefit of the family (De Wilde, 1991). In this way, it is expected that by encouraging the production of micro-livestock at the household level, deficiencies in protein intake can be managed in poor rural communities. Furthermore, having a diverse range of livestock production activities in which to draw an income is also essential to the vitality of rural households poverty alleviation and food security. Micro livestock often do not have to be fed, do not require substantial labor inputs and do not require access to land beyond the backyard. The sale of individual animals can provide small cash sums without threatening household capital in the way that the sale of larger animals does. Micro-livestock are believed to present an opportunity in which by-products, breeding stock, meat products and other intangibles (e.g. increased knowledge of animal husbandry) can be exchanged for cash or in-kind. Micro livestock species are associated with small body size, moderate and management (Akinus, 1998). Smaller animals tend to breed more quickly and reach sexual maturity at a younger age than large animals. The small size is undoubtedly one of their most significant assets since it makes it possible to produce and manage on small area and in cluster (Thys, 2001). They have shorter gestation interval and are prolific. High numbers of progeny are useful in ensuring both the sustainability of production, and for income generation for the resource poor farmer. Due to shorter generation interval households could sell excess young ones, breeding stock, or use older animals for home nutrition. Alternatively, due to their small size, the poor resource farmer could increase the number of animals held at a given time without necessarily needing large amounts of extra land, and sell the animals when deemed most beneficial, providing a steadier source of income. Mini-livestock can make an important contribution to increased

food security because of its small scale, indigenous and flexible nature and because women are likely to be very much involved in the routine management of the animals (Hardouin, 2003).

Micro livestock are well adapted to local conditions are partly resistant to many of the disease and parasites, and have the ability to survive limited feed and water shortage. These characteristics have become genetic for the simple reason that they have been acquired by natural selection over hundreds of generations. In my opinion these characteristics are essential for successful livestock production in the context of climate change. Africa, still has an abundant micro livestock genetic pool, however the large reserve in the smallholder sector face the danger of being wiped out by the frequent droughts as a result of climatic variability. The merit of the micro livestock apart from their ability to adapt to stressful environment are a valuable asset to the smallholder farmers as they could provide their basic needs. The group will survive the increased temperatures, feed resource scarcity. The serves to point to the fact that intensification of micro livestock production would be a viable option in the context of demand for animal protein where conventional livestock species production may be vulnerable to high input. There is need to set new standards for sustainability of mini livestock. Some of the micro livestock attributes which are not considered in these breeding situation such as smallness and low maintenance cost may be valuable to marginalized rural households. The ability to graze and browse a wide range of forage species which may be unpalatable will be a necessary adaptive characteristic in mini livestock. Micro livestock are smaller animals which have less maintenance requirement which will be paramount in the event of scarce feed resources. Despite the large numbers of micro livestock, information on micro livestock research related to climate change is scarce and often unavailable. Largely as a result of prejudice and ignorance of the importance of micro livestock to farmers in the smallholder farming sector, there had been little research on productivity. On performance alone it is difficult to understand why micro livestock has not reached a position of importance in livestock production. The choice of micro livestock production may increase the adaptive capacity of resource poor livestock farmers because the goat has a greater effect on the ecosystem than other animal species. They are numerous in Africa and could provide substantial quantities of animal protein. However their production is based on age-old husbandry system which need to be gradually modified in order to actual respond to crisis in protein provision. Given the considerable hardy characteristics of micro livestock their promotion will go a long way to facilitate livestock production coping with stressful environment as a result of limited resources. Most micro livestock require little capital or labor, provide an inexpensive, readily palatable meat, some have no odor and are suitable for keeping indoors. Rural poor farmers raise them to supplement diets based on grains and vegetables. Utilization of micro livestock can be the basis of development programs linked to human nutrition component. The previous developmental programs had no active nutritional component as part of the poverty alleviation and food security. Micro livestock production may focus on hopefully protein consumption by the vulnerable groups and income generation and increasing the intake of meat to improve quality of diet. The widespread use of poultry in Southern Africa villages demonstrates the importance of small, easily managed, household livestock. Small size, the ability to forage for themselves, and a natural desire to stay around the house put chickens, ducks, guinea fowl, and other micro livestock among the most vital resources of rural communities. Scratching a living out of the dirt, dust, ditches, and debris, these often-scrawny creature are a resource to be given greater attention if food insecurity is to be avoided. For the most resource poor farmers, micro livestock may be the only source of meat during much of a lifetime.

3. Gender role differences in livestock production

It is reasonable to assume that gender differential studies in livestock production become central in increasing and sustaining rural livestock productivity targeted at poverty reduction and food security. Although two-thirds of the world's 600 million poor livestock keepers are rural women (Thornton et al. 2003), little research has been conducted in recent years on gender roles in livestock keeping and opportunities livestock-related interventions could offer them in different societies. Information on gender roles provided through research is, therefore, vital for policymakers to be informed of the basis on which decisions are made at the micro-level. This type of information is lacking in most communities. Livestock production help poor households to increase their food security, reduce their vulnerability and start a process that will move them out of poverty (Darudec, 2003). This has necessitated the use of livestock subsector as a privileged entry point to promote gender balanced development in rural areas. However, little documentation exist as to whether distinctions between men's and women's animals can be identified. This study has identified micro livestock as a group of animal species

associated with women and seeks to explore the women roles in micro livestock production. Ownership and control over livestock may be complex, where individual household members may have claim to animals for different uses, such as milk for household consumption and animals for marrying a second wife. Understanding rural women's and men's roles and traditional knowledge of local livestock management, practices, and will assist in the development of innovations that meet households' real needs and priorities. Gender specific roles within a livestock production system is different from region to region, country to country, community to community and the distribution of ownership of livestock between men and women is strongly related to social, cultural and economic factors. Livestock provides a spectrum of benefits to rural families, however there is differential roles in performing important tasks in livestock. Despite women participation in livestock production activities, their role has been under valued and considered as an extension of domestic activities. Therefore, it is assumed that the understanding of gender role differences in livestock production is a key factor in identifying possible levers for policy intervention to improve rural livestock productivity and reduce poverty through improved livestock productivity. The fact that past livestock development projects interventions appeared not to benefit women, it is imperative to consider research on gender and livestock systems in rural areas. As a result, there is need for livestock development programs become better targeted, focusing on different animal species possible using participatory or group-based that make them, at least in theory, more appropriate for and accessible to women. Evidence on causal relations between gender and livestock production have been reported (Bravo-Baumann 2000), however recent studies have demonstrated that there remain a dearth of quantitative information on this subject, especially for the mixed crop–livestock systems which is predominant in Africa. Gender livestock roles trends are likely to vary by cultural context and over time, hence this study will provide updated information for rural livestock development policy intervention which is gender sensitive. While a number of studies have examined the gendered impact of crop production, few have examined the issue of gender differentials in livestock production. To date gender differentials and their implications for livestock productivity, poverty alleviation and food security have not been systematically captured. The present study attempt to fill the gap on gender and agricultural production, and on the understanding that livestock is generally considered a key asset for rural livelihoods, offering advantages over other agricultural sectors and is an entry point for promoting gender balance in rural areas. Against the backdrop this study was initiated to understand and analyze gender differentials in livestock production at household level for the purpose of reducing poverty and enhance food security. It is hoped that by documenting both good practices and challenges associated with gender differentials in livestock production will lead to a deeper appreciation in integrating strategies in practical livestock production which take into account the gender needs for both men and women in livestock production. The results from this study is a crucial step towards identifying some of the large gaps in our evidence base as well as some indications of the kinds of research and development interventions, made in relation to which livestock species and value chains, that appear most likely to benefit both poor men and women and their families. Therefore, it is very important to consider the roles of boys and girls, as well as that of younger and older women and men in livestock production cycles.

4. Some challenges which women may face in micro livestock farming to enhance food security

Ogunjimi et al., (2012) cited problems confronting micro livestock farmers which included inadequate credit facilities, untimely supply of inputs, inadequate information, improper management skills, low extension contact and inadequate processing technology. However, mentioned community influence, farmland acquisition, characteristics of micro livestock, personality factor, economic status, formal education, household composition, external orientation, farm characteristics, social orientation group and communication tools as factors which influence farmers to participate in micro livestock production. Constraints in snail production included non adoption of recommended practices, poor storage facilities and stagnant production technologies among farming communities (Adinya 2006). Micro livestock is a minor constituent of livestock population facing challenges which need to be addressed promptly and adequately to bring in rapid improvement in their population. Unlike some bush meat which may not be killed or touched because of religious dictates, taboos or prejudice (Vos, 1978). Small micro livestock population and their productivity per animal demand is critical. Some of the constraints which may hinder progress in the utilization of micro livestock include little support of relevant research activities to enhance productivity. Livestock production has been given an overriding emphasis as one of the core sectors to solve the current challenges on food shortage and to bring future sustainability to the world over, however the negative

impact of climate change on livestock production has been considerable. It is believed that agriculture is the most susceptible sector to climate change and also predicted that climate change will have a graver effect on Africa than on any other continent and that temperatures will rise significantly (Scholtz, 2012). Most sub populations are small in size and micro livestock species are not perceived as a valuable assets. Micro livestock as compared to ruminants tend to have higher feeding requirements per unit of body weight than larger species, which is caused by biological restraints on efficiency of food digestion. As a result, small animals tend to require food that is higher in protein, with less fibre. In most cases there is insufficient or lack of national micro livestock production policies which result in limited capacity for performance. Animal production and extension services are run through state schemes, breeding policies in livestock production often do not include micro livestock. Despite the numerous advantages of micro-livestock, there are disadvantages as well. It is important to be aware of these disadvantages in order to mitigate any constraints small animal rearing may have on the investor. Disadvantages include high energy requirements, increased labor requirements, disease, predation, lack of research, and human resistance to new and small species. Almost any household can start up a small household activity based on a few micro livestock species, but scaling up to the next level of a viable and regular output with a view to selling at market is altogether more challenging. Success will largely depend on government support services such as clear technical assistance, based on sound veterinary and animal husbandry research, and the diffusion of affordable production methods that are suited to small-scale producers. Ogunjimi et al., (2012) cited problems confronting micro livestock farmers which included inadequate credit facilities, untimely supply of inputs, inadequate information, improper management skills, low extension contact and inadequate processing technology. However, mentioned community influence, farmland acquisition, characteristics of mini livestock, personality factor, economic status, formal education, household composition, external orientation, farm characteristics, social orientation group and communication tools as factors which influence farmers to participate in micro livestock production. Constraints in snail production included non adoption of recommended practices, poor storage facilities and stagnant production technologies among farming communities (Adinya 2006). Micro livestock is a minor constituent of livestock population facing challenges which need to be addressed promptly and adequately to bring in rapid improvement in their population. Unlike some bush meat which may not be killed or touched because of religious dictates, taboos or prejudice (Vos, 1978). Small micro livestock population and their productivity per animal demand is critical. Some of the constraints which may hinder progress in the utilization of micro livestock include little support of relevant research activities to enhance productivity. Livestock production has been given an overriding emphasis as one of the core sectors to solve the current challenges on food shortage and to bring future sustainability to the world over, however the negative impact of climate change on livestock production has been considerable. It is believed that agriculture is the most susceptible sector to climate change and also predicted that climate change will have a graver effect on Africa than on any other continent and that temperatures will rise significantly (Scholtz, 2012). Most sub populations are small in size and micro livestock species are not perceived as a valuable assets. Micro livestock as compared to ruminants tend to have higher feeding requirements per unit of body weight than larger species, which is caused by biological restraints on efficiency of food digestion. As a result, small animals tend to require food that is higher in protein, with less fiber (De Wilde, 1991). In most cases there is insufficient or lack of national micro livestock production policies which result in limited capacity for performance. Animal production and extension services are run through state schemes, breeding policies in livestock production often do not include micro livestock. Despite the numerous advantages of micro-livestock, there are disadvantages as well. It is important to be aware of these disadvantages in order to mitigate any constraints small animal rearing may have on the investor. Disadvantages include high energy requirements, increased labor requirements, disease, predation, lack of research, and human resistance to new and small species (De Wilde, 1991).

5.Supporting women in micro livestock farming through education and training

There is a general agreement on the high priority to be attached to education and training in micro livestock production as a possible avenue to reduce poverty and enhance food security on the continent. The need to set up micro livestock training programs for both trainers and farmers with well defined goal should be one of the future priorities to alleviate poverty and food security through livestock production. Adekunle (1978) stated that technical and commercial education broaden the farmers intelligence and lay the basis for vocational training. In addition, it enables the farmers to perform farm activities intelligently and with full appreciation of their contribution to the final product. Education and training should promote the sharing of expertise with outside experts but at the same

time balancing this with local personnel with good knowledge of micro livestock production. Before embarking upon a discussion on training as a priority to support micro livestock production, systematic courses on planned production should be indentified. This should take into account the individual countries livestock industries which normally ranges from small subsistence farming to modern commercial livestock farming practices existing side by side. In the past decades the commercial livestock industries have been able to feed the rapidly expanding population, and some African countries such as Zimbabwe were 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.

Most African countries have agro-based economies 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 broad based micro livestock training is the key factor in developing the sector to meet the protein demands of local populations. Training personnel and providing technical equipment in micro 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 mini-livestock enterprises for higher productivity and profitability. Stewart (1975) concluded that education acquired by farmers had a positive influence on farmers labor and income. It is considered, therefore, that the introduction of suitable designed micro livestock 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 micro livestock production at an early stage and will provide an insight into applied micro livestock production. Graduates churned from colleges should be able to apply principles and tools of micro livestock management for the husbandry of various classes and types of micro livestock namely guinea pigs, rodents, snails, rabbits, poultry, lizards, birds etc. On completion of micro 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 micro livestock. Various universities, colleges and institutes on the continent offer tertiary training courses in conventional livestock production, but very few offers micro livestock specific curriculum. There are also various courses available for farmers in livestock production however these programs favor conventional livestock production, there is little emphasis in other mini-livestock species or on resource poor oriented farming. Consideration needs to be given to more rapid training throughput of micro livestock courses to meet the growing demand for animal product. There is need to broaden the curriculum to include mini-livestock species in rural communities. This may require retraining of current staff in micro 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 a systematic and planned courses on new technologies in micro livestock production are called for at university level. Africa 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 micro livestock production. The failure of micro livestock improvement may be a result of lack of qualified personnel in new concepts in small livestock. The introduction of marker assisted selection could be a future strategy for micro livestock selection programs. 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 micro livestock production issues. It has been noted that livestock production programs offered by many universities disregard micro livestock production. This aspect need possibly to be addressed at university level by introducing the micro livestock production curricula, and this should be a prerequisite for an effective extension services. The private sector service industry which traditionally served the conventional livestock producers has shrunk rapidly over the last decade due to decreased viability. This has also resulted in declining in for animal products to support the ever increasing populations.

6. Conclusion

Micro livestock is a neglected constituent of livestock population that have a potential to address promptly and adequately the food security issues in most rural areas. It is logical to assume that broad based micro livestock training for women is the key factor in developing the sector to meet the protein demands of local populations. The benefits of micro livestock are overwhelming, can adapt well to less feed, reproduce very quickly, require little in the way of care and have good resistance to disease. Most micro livestock are prolific producers and thrive in feed scarcity farm environments which make them suitable for women. With this in mind, micro livestock farming can be an avenue to engage women in sustainable solution to food security and opportunities for livelihood diversification to address the problem of greater household food demand which is expected to increase due to an increase in human population on the continent. A gender-responsive livestock development programs needs not be discriminatory, but should address women as well as men as both the clients and actors in livestock production.

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