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# Small Livestock, Food Security, Nutrition Security and HIV/AIDS Mitigation

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## 1. Introduction

Livestock contribute to people's livelihoods in many ways, and their contributions tend to be particularly important for poorer people. These include source of cash income, liquid asset, inputs to crop production (draught power and manure), diversification of risk/ buffer to crop production, cultural value (livestock may be sacrificed at the time of a certain festival) and source of food (Conroy, 2005). Sale of livestock and their products can be a valuable source of income. For example, animals, especially small livestock (i.e., goats, sheep, poultry and rabbits) can be sold to meet immediate family needs such as food, clothing, medical expenses, school fees etc.

Livestock play an important role in supporting the social and economic safety nets of households and communities. They are central to people's livelihoods, food security and nutrition; they act as a "bank" to be called upon in times of stress or need (either sold, traded, or slaughtered). Also, livestock are central in many of the major events of life, i.e. birth ceremonies, weddings and funerals. However, it appears that little is known about how traditional community institutions, particularly around livestock production (e.g. women's poultry groups, grazing support and dairy cooperatives) are holding up under the stress induced by HIV and AIDS and related chronic illnesses (FAO, 2003). The study of Mutenje et al. (2008) in the Muzarabani and Bindura districts of Mashonaland Central Province in Zimbabwe found that livestock, particularly poultry and smallstock (sheep and goats), play a significant role in smoothing income fluctuations due to HIV and AIDS. The workers reported that about 90% of HIV and AIDS-afflicted households, headed mainly by women or children, used poultry and goats as consumption-smoothing strategies when faced with negative income shocks.

Africa is the hardest hit continent in the world in terms of HIV epidemic (Topouzis, 1999; FAO, 2005). The HIV and AIDS pandemic in sub-Saharan Africa is widely recognised as development disaster threatening poverty reduction, economic growth and not merely a health issue (Mohiddin & Johnson, 2006). HIV and AIDS affects households' nutrition by decreasing food consumption and impairing nutrient absorption (Hanze et al., 2005). According to FAO (2005), people that live with HIV and AIDS (PLWHA) have special nutritional needs to assist them to remain active and productive workers and to ward off the opportunistic infections that accompany the disease and in prolonging their lives. The PLWHA need good nutrition to stay

as healthy as possible. However, good nutrition cannot cure AIDS or prevent HIV infection, but it can delay the progression from HIV to full-blown AIDS and related diseases, and improve the quality of life of PLWHA. Slater & Wiggins (2005) argued that households may sell off large livestock, such as cattle, and use smaller stock units, such as goats and chickens, that can be reared closer to the homestead, and that can be sold off in small quantities to release cash for purchase of medicines for the sick or basic needs where regular sources of income are lost. Small livestock, especially village chickens (also referred to as family chickens) are the most significant livestock species in terms of levels of ownership, supply of protein, and the potential for earning cash income. It has been demonstrated in Botswana, Lesotho and Zambia that livestock, especially village poultry can play an important role in mitigating the impacts of HIV and AIDS on household and community food security and nutrition, as well as, economic empowerment of the vulnerable groups.

As women are the main carers of sick people, chickens can play an important role in providing them with additional resources to perform the important task of caring for people living with HIV and AIDS (Alders et al., 2007a, 2007b). In Mozambique, Alders et al. (2009) reported that village chickens play an important role in households where there is lack of able-bodied workers, such as those affected by HIV and AIDS or those family members living with disabilities. In households headed by widows, children or grandparents, chickens represent the easiest species to raise for sale and home consumption, providing high quality protein and micronutrients, which play an important role in the nutrition of HIV and AIDS patients. Furthermore, village poultry production also provides women and children with experience in small-scale business management and improved knowledge about human nutrition (Alders et al., 2009).

Among the small livestock species reared by individuals and communities in the rural villages, village poultry predominates; hence the emphasis of this chapter is on village poultry. Livestock, especially poultry species, have shown to provide an effective first step in alleviating abject rural poverty (Mack et al., 2004). According to Rural Self-Help Development Association (RSDA) (2011), throughout Africa village poultry are a valuable asset to local populations as they contribute to food security, poverty alleviation and promote gender equality, especially in the disadvantaged groups (HIV and AIDS infected and affected people, women, poor farmers etc.) and less favoured areas of rural Africa where the majority of the poor people reside. The study of Moreki et al. (2010a) in Chobe district of Botswana reported the main reasons for rearing village chickens to be family consumption (75%), source of income (75%), prestige (36%), traditional healing ceremonies (6.82%) and barter (6.82%). These findings clearly show that village poultry have a bearing in the lives of rural populace. Pica-Ciamarra & Otte (2009) in India concluded that backyard poultry farming remains important for rural households, as it ensures a steady flow of high quality food and, through cash income, reduces vulnerability.

## 2. Advantages of small livestock over larger stock

Unlike larger stock such as cattle, small livestock require less space; they are less capital intensive and are easy to manage as they can be reared within or near homesteads. This makes it much easier for women who are mainly carers of sick people and children to look after both the sick and small livestock simultaneously; hence cutting on labour costs. The rearing of small livestock near or within homesteads ensures regular supply of food to the families in terms of eggs, meat and milk. Lengkeek et al. (2008) argued that PLHWA are less able to perform heavy

work, to work for long periods or follow strict work schedules; hence the need to rear smallstock such as a poultry which are easy to keep as they require few inputs. According to Winrock International (1992), livestock contribute directly to the sustainability of the farming systems by providing manure, which is the principal soil amendment and fertilizer available to large numbers of African farmers. A recent study of Simainga et al. (2010) in Zambia reported that the majority of the respondents in Mongu and Kalabo districts used manure from village chickens to fertilize gardens in order to produce vegetables for the households. Figure 1 shows vegetables that were fertilized with chicken manure in Botswana.

According to Sitholimela (2000) in South Africa, the advantages of goats over cattle include: they are easily handled by women and children, e.g., they can be easily milked, dewormed and vaccinated; they require less feed; produce significant quantities of meat and milk for households' consumption; have a short generation interval and produce more progenies. In addition, they are easy to sell to meet immediate households' needs and can be bartered for household commodities such as grain and seeds. To the majority of rural communities in the developing countries, livestock is regarded as "a walking bank" or "a bank in the hoof" because they provide readily available petty cash in times of need.




Fig. 1. Tomato plants fertilized with manure

## 3. The first rung on the livestock ladder

Small livestock, especially village poultry can provide the start of the owner climbing the "livestock ladder", leading to other livestock species such as goats and cattle (Dolberg, 2003). Botswana Network of People Living with HIV/AIDS (BONEPWA) (2010) reported that from October 2005 to October 2010, the beneficiaries of a chicken project supported by Swedish International Development Corporation Agency (SIDA) purchased 250 goats from the proceeds of chickens. Figure 2 shows chickens that were sold to buy goats while the purchased goats are shown in Figures 3 and 4. In a recent field day held in Bobonong in

Botswana, one beneficiary of SIDA supported project reported having bought a cow from the chicken proceeds. This clearly indicates that the rearing of small livestock enables rural families to start owning larger livestock such as cattle, which are considered status symbols in most African countries. BONEPWA (2010) concluded that the rearing of small livestock provides their owners the opportunity to climb the societal ladder by owning larger stock.



Fig. 2. Part of the chickens that were sold to buy goats



Fig. 3. Some of the goats bought with money from chicken sales



Fig. 4. Goats being appreciated by development workers in Botswana

## 4. Nutrition and household income generation

The roles played by small livestock in household nutrition and income generation are briefly discussed in the sections below.

### 4.1 Nutrition

Livestock products such as meat, egg and milk products supply proteins, vitamins and minerals and extra energy, and help to strengthen muscles and the immune system. People with weak health (immune system) are more vulnerable to infections, including diseases transmitted by animals or through contaminated food and water. Even people with access to anti-retrovirals need a balanced diet to fully benefit from such treatment (FAO, 2005).

As shown in Figure 5, goats provide milk which is a balanced diet. Milk is a rich source of nutritionally available minerals (Allen & Miller, 1981) and it contains more of calcium and phosphorus than cow and human milk (Jenness, 1978). From human nutrition's view point, milk and milk products are a source of selenium which plays an important role in the immune system. Goat milk increases the resistance of the body against AIDS. Selenium helps to protect the organism against oxidation stress, participates in the synthesis and metabolism of thyroid hormones, proteosynthesis, it is important for reproduction and its anti-carcinogenic effect plays an important role as well (Schrauzer, 2000). Melse-Boonstra et al. (2007) reported that observational studies on selenium and HIV and AIDS consistently show a positive association between selenium status and delayed disease progression or increased mortality. The study of Barrionuevo et al. (2003) showed that goat-milk has an important and beneficial effect on the bioavailability of copper, zinc and selenium. Belewu and Adewole (2009) concluded that goat milk is affordable, available and nutritious; hence a wide variation of knowledge on the nutrition and hypollergic characteristics of goat milk could promote the direct use of the milk in the nutrition of orphans and vulnerable children.



Fig. 5. A woman milking a goat in Bobonong, Botswana

Good nutrition is crucial for PLWHA who need more calories and protein than uninfected individuals. Malnourished HIV-infected people progress more quickly to AIDS and nutrition is critically important to people on retro-viral therapy. The ways of improving the nutrition component of mitigation strategies include promoting block farming, school gardening, community kitchens for orphans and vulnerable children, home-based care nutrition support and nutrition campaigns and training (Economic Commission for Africa, 2006). The rearing of village poultry in Botswana, Lesotho and Zambia has also demonstrated played by village chickens a crucial role in nutrition and food security among PLWHA. RSDA (2011) in Lesotho reported that some people consider village chickens as an option to mitigate HIV and AIDS after realizing that chickens can be the easiest way of obtaining daily nutritional requirements. Moreki et al. (2011) in their study in Botswana reported that all the respondents (46) acknowledged the contribution of chickens in human nutrition. In that study, the respondents said chickens provided relish and hence were the main supplier of good quality protein to the households. Furthermore, the sale of chickens contributed to improved habitable shelter. The proceeds from the sale of chickens contributed to the purchase of building materials for construction of houses. Figure 6 shows the house that was painted following sale of chickens in Nata in Botswana.

Eggs, in particular, offer a great nutritional bargain: they contain approximately 315 kilojoules and are one of the best quality food sources known. Eggs supply an array of vitamins such as A and B12, and they are one of the best food sources of vitamin K, a bone-boosting nutrient. In addition, eggs provide choline, a B vitamin that plays a role in brain development (Alders et al., 2003). Also, eggs are an ideal carrier for enriching human diets with important dietary minerals such as selenium and iodine. Jacques (2006) stated that selenium is involved in the proper functioning of the immune system or inhibiting the progression from HIV to AIDS. The disease is reported to be less prevalent in countries with high selenium soil content than those with low selenium content. Selenium is involved in the conversion of thyroxine (T4) to triodothyronine (T3), indicating its importance in the functioning of the thyroid gland. Seafoods are a rich source of selenium, as are some livestock products, including eggs and chicken meat.



Fig. 6. House painted using money from chicken sales in Botswana

Some of the mitigation strategies mentioned previously attempted to provide some ideas for those working with livestock and communities to mitigate the impact of HIV/AIDS on livestock production and household food security. In addition to these potential interventions, it is important to consider the nutritional needs of the affected individuals and households, review existing support institutions (whether it be extended family, community-based organisations, etc.) and assess, with the community, and particularly those affected, the best way forward to ensure livestock production within, or for, those households. Labour and financial constraints of households must be considered before strategies are discussed or plans developed.

### 4.2 Income generation

Small livestock can provide income generation for family activities such as education, nutrition, health and clothing. Copland and Alders (2009) stated that village poultry have constantly commanded a price premium over commercial birds and there is a wide market demand for village poultry products. In Zambia, Simainga et al. (2011) reported that income from sale of chickens and eggs was used for groceries, school fees and uniforms, transport to hospitals or medical facilities, medication and talk time (air time).

## 5. Ownership of small livestock

Generally, small livestock are owned by women. In Botswana, Mrema & Rannobe (1996) reported that women own more goats than their male counterparts who have more resources and can afford to own cattle. Furthermore, village poultry are owned and managed by women and children and are often essential elements of female-headed households (Alders et al., 2003; Guéye, 2004; Bagnol, 2005). The study of Moreki et al. (2010b) showed that 83.2% of women owned chickens compared to 16.8% for men. A recent study (Moreki et al., 2010c) also showed that 73.5% of women own goats. The authors argued that, chickens are generally regarded as livestock that women raise mainly because they are perceived to be of less commercial value than other livestock such as cattle. In the opinion of Moreki et al. (2010b), in Botswana men tend to be responsible for cattle and larger animals and women for smaller animals such as sheep, goats and poultry. These results led Moreki et al. (2010c) to conclude that sheep and goats rearing plays an important role in food security, in addressing issues of gender imbalances, as well as, in poverty eradication in furtherance of the Millennium Development Goals (United Nations, 2010).

## 6. Marketing

Small livestock and products are sold on a one-on-one basis, which is referred to as direct marketing. Usually, small livestock are sold when there is immediate need for cash. Unlike in commercial livestock, no cold chain is required as stock is sold live and products raw. Recently, Simainga et al. (2011) in Zambia reported that women, especially mothers are involved in chicken sales than men, indicating that women owned chickens and decided on their sales, as well as, how money was used. However, it is likely that women consulted their spouses on how the money was used.

## 7. HIV and AIDS and small livestock production

Smallstock play a vital role in many rural livelihoods, providing food, income and security. The products of smallstock are rich in protein, minerals and vitamins. They are sources of income and manure for use as compost or fuel, and a store of wealth and insurance. Small livestock may enable women to have more economic independence if they control the income earned from the sale of livestock and their products. Tending to the ongoing every-day requirement of smallstock can normally be integrated into the time and labour constraints facing many HIV/AIDS affected households (Anon, 2006).

According to BONEPWA (2010), the majority of support group members infected and affected by HIV and AIDS in Botswana has attested that through ownership and sale of small livestock (i.e., chickens, guinea fowl and goats), they were able to reduce the number of patients that default from taking anti-retroviral drugs, as they are able to sell chickens to buy medication and food, and also pay for transport to the hospitals for treatment. The effects of HIV and AIDS scourge at household level has reduced since beneficiaries are now able to feed their households resulting in reduced dependency on government hand-outs, family members and relatives. Some of the patients who were bedridden due to AIDS have recovered and are caring for their livestock. This has led to one support group member to say "*we are finding ourselves to be useful members of the community since we are back into our productive lives after spending a long time in sick beds*". This indicates that small livestock production plays a pivotal role in food and nutrition security, as well as, restoring self-esteem among the affected community members.

## 8. Conclusion

This review has demonstrated that small livestock have an important role to play in poverty alleviation, improving food and nutrition security, as well as, in economic empowerment of PLWHA and other vulnerable groups. Successful HIV and AIDS mitigation strategies involving goats and chickens in Botswana, Lesotho and Zambia indicate that small livestock play a vital role in the fight against the HIV and AIDS scourge, mainly through provision of nutrition and income generation. Therefore, support from government and non-governmental organizations is crucial if the benefits are to be extended to the rest of the rural communities, the majority of whom are poverty-stricken

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## 10. References

Alders, R.; Cambaza, A.B. & Harun, M. (2003). Village chickens, food security and HIV/AIDS mitigation. Retrieved from www.kyeemafoundation.org/content/.../HIV-AIDS%20paper%20Nov03.pdf

Alders, R.; Bagnol, B.; dos Anjos, F. & Young, M. (2007a). Promotion of HIV/AIDS mitigation and wildlife conservation through improved village poultry production in Southern Africa, Retrieved from

http://www.fao.org/AG/againfo/home/events/bangkok2007/en/background_4.html

Alders, R.; Bagnol, B.; Harun, M. & Young, M. (2007b). Village poultry, food security and HIV/AIDS mitigation. LEISA Magazine 23.3 September 2007.

Alders, R.; Bagnol, B.; Chicamisse, M.; Serafim, J. & Langa, J. (2009) The role of village chickens in HIV/AIDS mitigation in Manica and Sofala provinces of Mozambique. In, Alders R.G., Spradbrow P.B. and Young M.P. (eds) 2009. Village chickens, poverty alleviation and the sustainable control of Newcastle disease. Proceedings of an international conference held in Dar es Salaam, Tanzania, 5-7 October 2005. ACIAR Proceedings No. 131, 235 pp.

Allen, J.C. & Miller, W.J. (1981). Transfer of selenium from blood to milk goats and non-interference of copper with selenium metabolism. Journal of Dairy Science 64: 814-821.

Anon (2006). HIV/AIDS and small livestock development. Retrieved from http://www.smallstock.info/issues/HIV.htm

Bagnol, B. (2005). Improving village chicken production by employing effective gender-sensitive methodologies. Retrieved from http://aciar.gov.au/files/node/11133/PR131%20part%201.pdf

Barrionuevo, M.; Lopez Aliaga, I.; Alférez, M.J.M.; Mesa, E; Nestáres, T. & Campos, M.S. (2003). Beneficial effect of goat milk on bioavailability of copper, zinc and selenium in rats. Journal of Physiology and Biochemistry 59: 111-118.

Belewu, M.A. & Adewole, A.M. (2009). Goat milk: A feasible dietary Based approach to improve the nutrition of orphan and vulnerable children. Pakistan Journal of Nutrition 8: 1711-1714.

Botswana Network of People Living with HIV and AIDS (2010). Annual Technical Report – October 2009 to September 2010: Village chicken component. Gaborone, Botswana.

Conroy, C. (2005). Participatory Livestock Research: A Guide. ITDG Publishing. The Netherlands. 3-4. ISBN 1-85339-577-3.

Copland, J.W. & Alders, R.G. (2009). The comparative advantages of village poultry or smallholder poultry in rural development. In, Alders R.G., Spradbrow P.B. and Young M.P. (eds) 2009. Village chickens, poverty alleviation and the sustainable control of Newcastle disease. Proceedings of an international conference held in Dar es Salaam, Tanzania, 5-7 October 2005. ACIAR Proceedings No. 131. 207-209.

Dolberg, F. (2003). Review of household poultry production as a tool in poverty reduction with focus on Bangladesh and India. FAO Pro-Poor Livestock Policy Initiative Working Paper No. 6. Food and Agriculture Organizations of the United Nations. Rome.

Economic Commission for Africa (2006). Mitigating the impact of HIV/AIDS on smallholder agriculture, food security and rural livelihoods in Southern Africa: Challenges and action plan., Retrieved from www.uneca.org/sros/sa/publications/HIV-AIDSandAgriculture.pdf

FAO (2003). Measuring impacts of HIV/AIDS on rural livelihoods, Retrieved from http://www.fao.org/sd/2003/PE0102_en.htm

FAO (2005). Ministerial Seminar on *Education for Rural People in Africa: Policy Lessons, Options and Priorities* hosted by the Government of Ethiopia 7-9 September 2005, Addis Ababa, Ethiopia. Retrieved from http://www.fao.org/hivaids/publications/Addis_ERP-AIDS.pdf

Guèye, E.F. (2004). Gender aspects in family poultry management systems in developing countries. http://www.fao.org/ag/AGAinfo/themes/en/infpd/documents/papers/2004/12gender318.pdf

Hlanze, Z.; Gama, T. & Mondlane, S. (2005). The Impact of HIV/AIDS and Drought on Local Knowledge Systems for Agrobiodiversity and Food Security. Retrieved from ftp://ftp.fao.org/docrep/fao/009/ag251e/ag251e00.pdf

Jenness, P.E. (1978). The nutritive value of dairy products. Dairy Industries International 43: 7-16.

Lengkeek, A.; Koster, M. & Salm, M. (2008). Mitigating the effects of HIV/AIDS in small-scale farming. Agromisa Foundation, Wageningen. ISBN Agromisa: 978-90-8573-090-3. Retrieved from http://www.anancy.net/documents/file_en/Agrodok-45-Mitigating_the_effects_of_HIV_AIDs_in_small-scale_farming.pdf

Jacques, K.A. (2006). Zoonotic disease: Not just from birds, not just in the flu. In, T.P. Lyons, K.A., Jacques and J.M. Hower (eds.) Nutritional biotechnology in the feed and food industries: Proceedings of Alltech's 22nd Annual Symposium, Lexington, Kentucky, USA. 23-26 April 2006. Nottingham University Press, UK. 149-159.

Mack, S.; Hoffmann, D. & Otte, J. (2004. The contribution of poultry to rural development, Retrieved from http://193.43.36.103/AG/AGAInfo/themes/en/infpd/documents/papers/2004/contribution1618.pdf

Melse-Boonstra, A.; Hogenkamp, P. & Lungu, O.I. (2007). Mitigating HIV/AIDS in Sub-Saharan Africa through selenium in food. Farmer Publication, Lusaka. Golden Valley Agricultural Research Tust (GART). 11.

Mohiddin, A. & Johnston, D. (2006). HIV/AIDS mitigation strategies and the State in sub-Saharan Africa – the missing link? Retrieved from http://www.globalizationandhealth.com/content/2/1/1

Moreki, J.C.; Dikeme, R. & Poroga, B. (2010a). The role of village poultry in food security and HIV/AIDS mitigation in Chobe District of Botswana. Retrieved from http://www.lrrd.org/lrrd22/3/more22055.htm

Moreki, J.C.; Mokokwe, J.; Keboneilwe, D. & Koloka O.A. (2010b). Evaluation of the Livestock Management and Infrastructure Development Support Scheme in seven districts of Botswana, Retrieved from http://www.lrrd.org/lrrd22/5/more22087.htm

Moreki, J.C.; Thutwa, M.; Koloka, O.; Ntesang, K. & Ipatleng, T. (2010c). Utilization of smallstock package of Livestock Management and Infrastructure Development Support Scheme, Botswana, Retrieved from http://www.lrrd.org/lrrd22/12/more22232.htm

Moreki, J.C.; Poroga, B. & Dikeme, R. (2011). Strengthening HIV/AIDS food security mitigation mechanisms through village poultry. Retrieved from http://www.lrrd.org/lrrd23/2/more22055.htm

Mrema, M. & Rannobe, S. (1996). Goat production in Botswana: Factors affecting production and marketing among small-scale farmers. In, Lebbie S H B and Kagwini E (Editors) Proceedings of the Third Biennial Conference of the African Small Ruminant Research Network UICC, Kampala, Uganda. 5-9 December 1994. Retrieved 12 February 2010, Retrieved from http://www.fao.org/wairdocs/ilri/x5473b/x5473b0v.htm

Mutenje, M.J.; Mapiye, C.; Mavunganidze, Z.; Mwale, M.; Muringai, V.; Katsinde, C.S. & Gavumende, I. (2008). Livestock as a buffer against HIV and AIDS income shocks in the rural households of Zimbabwe. Development Southern Africa 25. Abstract, Retrieved from http://www.informaworld.com/smpp/content~db=all~content=a790526994

Pica-Ciamarra, U & Otte, J. (2009). Poultry, food security and poverty alleviation in India: Looking beyond the farm-gate. Pro-poor Livestock Policy Initiative – A Living from Livestock Research Report. Retrieved from www.fao.org/ag/AGAInfo/.../en/pplpi/.../rep-0902_indiapoultry.pdf

Schrauzer, G.N. (2000). Anticarcinogenic effects of selenium. Cell Molecular Life Sciences 57: 1864-1873.

Simainga, S.; Banda, F. & Sakuya, N. & Moreki, J.C. (2010). Health management in village poultry in Kalabo and Mongu Districts in the Western Province of Zambia. Livestock Research for Rural Development 22(9), Retrieved from www.lrrd.org/lrrd22/9/sima22171.htm

Simainga, S.; Moreki, J.C.; Banda, F. & Sakuya, N. (2011). Socio-economic study of family poultry in Mongu and Kalabo Districts of Zambia. Livestock Research for Rural Development 23(02), Retrieved from http://www.lrrd.org/lrrd23/2/sima23031.htm

Rural Self-Help Development Agency. (2011). The study on socio-economic status of village chickens at Ha Molemane (Berea), Phamong (Mohales' Hoek), Tebang, Ha Notsi, and Ribaneng (Mafeteng) of Lesotho. Maseru, Lesotho. pp.111.

Sitholimela, I. (2000). The effect of land tenure system on goat production in Kwazulu-Natal. M. Inst. Agrar. (Animal Production) Thesis. University of Pretoria, Republic of South Africa.

Slater, R. & Wiggins, S. (2005). Responding to HIV/AIDS in agriculture and related activities. Natural Resource perspectives, Number 98, March 2005. www.odi.org.uk/resources/download/1237.pdf

Topouzis, D. (1999). The implications of HIV/AIDS for household food security in Africa. United Nations Commission for Africa, Food Security and Sustainable Development Division, October 1999. Retrieved from www.uneca.org/popia/gateways/Women_Back_doc_4.pdf

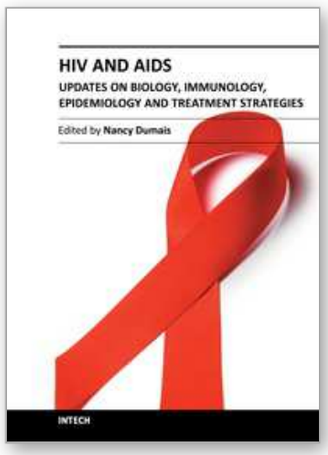
United Nations (2010). The Millennium Development Goals Report. The United Nations Department of Economics and Social Affairs (DESA) – June 2010. Retrieved from

http://www.org/milleniumgoals/pdf/MDG%20Report%202010%20En%20r15%20-low%20res%2020100615%20-.pdf>

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