



**SMALLHOLDER DAIRY FARMING: A TOOL FOR HIV/AIDS  
MITIGATION AND FOOD IN-SECURITY**

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## SUMMARY

Golden Valley Agricultural Research Trust (GART) a self-sustainable Public Private Partnership (PPP) initiated institution in Zambia is engaged in agricultural research and development, food security, knowledge transfer and HIV/AIDS mitigation through agriculture.

AIDS is believed to have made a major contribution for the food shortage that hit Zambia in 2002. Poor nutrition makes HIV-positive people more vulnerable for infection and hastens the progression of AIDS. HIV/AIDS has major negative impact on smallholder agriculture and food security in Sub Saharan Africa.

GART started a smallholder dairy development program in Southern province to improve household food security, income generation and HIV/AIDS mitigation since year 2000. The experience of this dairy farming as a non - clinical tool to mitigate the HIV/AIDS effect and improve food security is described attempting through knowledge transfer, production and sale of dairy crossbred in-calf heifers and improved goats, linkage of farmer groups with milk market and micro-finance institution and strengthening the farmers group capacity. Dairy farmers number increased five times, milk delivery to milk bulking points six times and income fourteen times. The milk consumption per person per year increased from 10 Kg in 2000 to 17 Kg in 2005.

The smallholder dairy farming has demonstrated the mitigating effects of HIV/AIDS on income generation and food security among 600 smallholder dairy farmers in Zambia. To improve nutritive food requirement and expanded milk consumption among rural poor population, mostly protein of higher bio-availability including selenium an important trace element to fight HIV/AIDS, increase income and disease tolerance, investment in smallholder dairy farming is probably the answer. Improved milk consumption resulting in improved nutrition will possibly be resilience to opportunistic infection and can be a first line of defense in HIV/AIDS mitigation. Dairy is a practical and profitable route out of poverty and worth considering replication to counteract the effects of HIV/AIDS as a non-clinical tool to mitigate HIV/AIDS.

There is need to make a collaborative approach by donor agencies, organizations and institutions involved in human nutrition program for HIV/AIDS affected families more aware of the contributions that livestock particularly dairy can make to household diet and food security on most smallholder farms with milk market opportunity in Sub-Saharan Africa.

## **INTRODUCTION:**

Golden Valley Agricultural Research Trust (GART) a self-sustainable Public Private Partnership (PPP) initiated institution in Zambia, is engaged in agricultural research and development, food security, knowledge transfer and HIV/AIDS mitigation through agriculture. It is a center of excellence for conservation agriculture, smallholder dairy, goats and innovative farming systems in Zambia and in Southern region. It is a part and parcel of the National Agriculture Research and Extension System. GART's mission is to contribute to the optimization of the production and trade of crops, milk, chicken and goats through integrated agricultural research for development for market oriented small, medium and large scale male and female farmers including those affected by HIV/AIDS. It has also embarked a project in strengthening HIV/AIDS and food security coping and mitigating mechanisms amongst smallholder farmers in selected SADC countries.

Of the estimated forty million people worldwide who are infected with the HIV, more than twenty five million (64%) reside in sub-Saharan Africa. Millions of people in Africa are becoming ill and dying prematurely because of avoidable health problems caused by poor nutrition and inadequate access to food and income (UNECA 2005).

Although poverty has long existed in Zambia, it is clear that diseases including HIV/AIDS have aggravated this poverty by contributing to decline in agricultural production and off farm sources of livelihood and to increased household food insecurity. AIDS kills most productive and reproductively active members of the society. The current population of Zambia is 11.7 million, 64 % of the population, reside in rural area and prevalence rate of HIV is 16.5 % among the adult population aged 15 - 49 years (UNAIDS, 2004). The sustained and long-term impacts of the HIV/AIDS epidemic are slowly eroding food security, damaging rural livelihoods and increasing poverty (MACO 2004)

For many reasons, HIV/AIDS affected families tend to have very few opportunities for income earning or saving. Thus a critical kind of mitigation intervention is to introduce ways that increase disposable income for poor and HIV/AIDS affected households and thus reduce their vulnerability.

Income generating activities that are suitable for HIV/AIDS affected household should be of low input, low labor demanding, close to homestead and market, have quick turn over and on regular basis (produce and income). The activities should also be socially and environmentally acceptable including drought and flood tolerant.

AIDS is believed to have made a major contribution for the food shortage that hit Zambia in 2002 and has been continuing. Poor nutrition makes HIV-positive people more vulnerable for infection and hastens the progression of not only AIDS but other diseases also. When people are poor, they turn to risky occupation for their survival.

Development practitioners and local community based workers who treat HIV/AIDS patients realize that without the right amounts of nutrients as well as palatable and easily digestible foods; drugs will have limited effects. Therefore the inter relationships between HIV/AIDS, nutrition and food security is complex.

Food in-security is especially damaging for PLWHA who need more calories and protein than uninfected individuals. An HIV infected person needs 15% more calories and 50 % - 100 % more protein than the average daily requirement (James and Schofield, 1990) including minerals. Malnourished HIV infected people progress more quickly to AIDS. Therefore given the high number of adults and children living with HIV/AIDS in rural areas in the sub-region it is important that sustainable strategy to improve food security and sustainable livelihoods are promoted

The major negative impacts of HIV/AIDS on smallholder agriculture as evidenced by studies conducted in different countries in the sub region includes

- Serious depletion of human resources,
- The loss of indigenous farming methods,
- Intergenerational knowledge, specialized skills and practices gaps,
- Diversion of capital from agriculture,
- Loss of farm and non-farm income
- Reduced Agricultural Production and Food Security

Although development partners are implementing a variety of interventions to mitigate the impact of disease on smallholder agriculture production but mostly on a small scale and dissemination of interventions to mitigate the impact of HIV/AIDS on smallholder agriculture production and food security is low (UNECA 2005)

Therefore keeping above in mind the present paper entitled '**Smallholder Dairy Farming: A tool for HIV/AIDS mitigation and food in-security**' discusses a non-clinical approach and interventions with primary aim of increasing incomes and mitigating HIV/AIDS.

## **HOW HIV/AIDS CAN EFFECTIVELY BE MITIGATED?**

Authors believe that the HIV/AIDS mitigating effects can be achieved through:

- Improving income and involvement in income generating activities.
- Improving smallholder agriculture production - House hold food security.
- Production and availability of nutritious diet.
- Counseling, Training and Education & Technology Transfer.

- Labor Saving Activities - Conservation tillage practices / oxen & donkey use
- Micro-finance services to support agribusiness and agriculture diversification
- Technology Research and development
- Support to OVC and women
- Medication (ARVT)

GART realized that smallholder dairy could play a major role in income generation, household food security and nutrition. Therefore it started a smallholder dairy development programmed in Southern province since year 2000 and extended to Lusaka province in 2006. The experience of this dairy farming as a non - clinical approach to mitigate the HIV AIDS effect and improve food security is explained in the paper.

Household food security is defined as the ability of the household to secure either from its own production or through purchases adequate food to meet the dietary needs of its members so that they can lead a healthy active life (Egal and Valstar 1999).

## **MATERIALS AND METHODS**

Following methods, approach and interventions related to dairy farming were applied targeting Kalomo, Choma, Monze, Mazabuka (Magoye) and Kafue (Mapepe) districts of Zambia from 2000 – 2005. The milk delivered to milk collection center by each farmer recorded daily and the money received by the milk collection center and amount paid to each farmer is recorded at the end of the each month

1. Knowledge Transfer -Training of the farmers, dedicated dairy extension, exchange visits, field days, publications
2. Production and sale of dairy crossbred in-calf heifers and improved goats to farmers including those affected by HIV/AIDS
3. Linkage of farmer groups with milk market and micro-finance institution, strengthening the farmers group capacity
- 3 Strengthening milk - marketing capacity
4. Safety of raw milk produced (animal health / milk hygiene dairy equipment)



## RESULTS AND DISCUSSION:

### I. MILK PRODUCTION, DELIVERY AND INCOME GENERATION.

Table 1: Milk Delivery and Income at Magoye Smallholder Dairy Farmers Cooperative Society

Year	Average No of farmers supplying milk in the year	Total milk Delivered (litres '000)	Income (Kwacha) million	No of dairy cows
2000	52	99	45	110
2001	65	129	103	195
2002	76	204	142	230
2003	99	350	315	300
2004	156	479	516	475
2005	227	591	690	500

1 US\$ = Kwacha 3335 as on 31/12/2005

### Magoye Milk Center

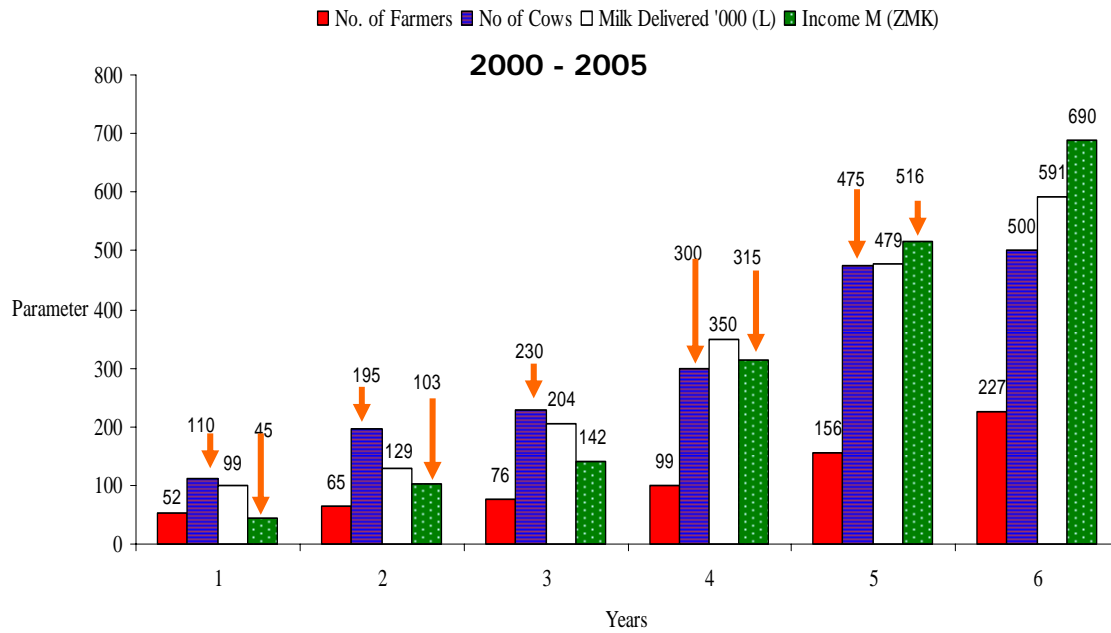


Table 2: Milk Delivery and Income at Monze Smallholder Dairy Farmers Cooperative Society

Year	Average No of farmers supplying milk in the year	Total milk Delivered (litres '000)	Income (Kwacha) million	No of dairy cows
2000	62	515	360	200
2001	78	518	370	250
2002	84	433	346	275
2003	93	535	552	300
2004	150	510	588	450
2005	158	437	524	480

1 US\$ = Kwacha 3335 as on 31 /12/ 2005

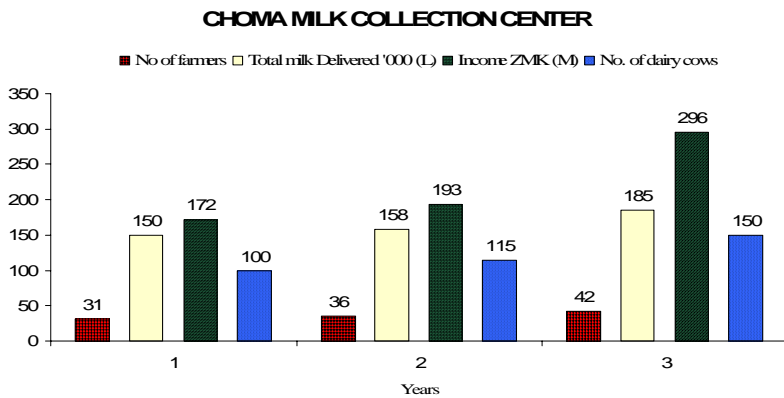
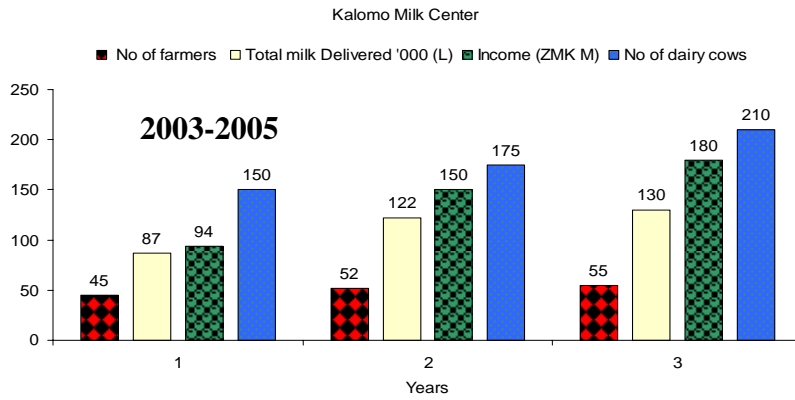


Table 3: Milk Delivery and Income at Choma Dairy Farmers Cooperative Union

Year	Average No of farmers supplying milk in the year	Total milk Delivered (litres '000)	Income (Kwacha) million	No. of dairy cows
2003	31	150	172	100
2004	36	158	193	115
2005	42	185	296	150

1US\$ = Kwacha 3335 as on 31/12/ 2005

Table 4: Milk Delivery and Income at Namianga Agricultural Cooperative Society-  
Kalomo

Year	Average No of farmers supplying milk in the year	Total milk Delivered (litres'000)	Income (Kwacha) million	No of dairy cows
2003	45	87	94	150
2004	52	122	150	175
2005	55	130	180	210

1 US\$ = Kwacha 3335 as on 31/12/2005

Table 5: Milk Delivery and Income at Mapepe Smallholder Dairy Farmers Association

Month **	Average No of farmers supplying milk	Total milk Delivered (litres)	Income (Kwacha) Million	No of dairy cows	Widows and orphans	Family Milk Consumption (litres)
Oct 05	7	870	1,392,000	15	10	210
Nov 5	7	1,992	3,187,000	15	10	210
Dec 05	7	2,927	4,684,000	17	12	420
Jan 06	11	3,280	5,248,000	20	17	660
Feb 06	17	4,644	7,430,000	23	28	1020
Mar06	17	5,853	9,366,000*	28	28	1020

\* US\$ 2925.00 \*\* The milk collection center started on 15<sup>th</sup> October 2005

This milk station and farmers group was developed by GART in the latter half of the October 2005 as a HIV/AIDS coping and mitigating efforts, house hold food security and expanded milk consumption strategy

## MILK CONSUMPTION IN ZAMBIA:

Currently an estimated over 180 million litres of milk is produced per year in the country and about 90 million litres is the share from smallholder dairy farmers.

The milk consumption per person per year, the trend in Zambia has been as follows:

1970	04 Kg
1980	05 Kg
1990	08 Kg
2000	10 Kg
2005	17 Kg



Increase in milk production at household level as anticipated in the project has contributed towards increase in per capita milk consumption to improve the nutritional status from 10 Kg in 2000 per person per annum to 17 Kg per person per annum in 2005 (Daka 2006). A number of milk outlets have been opened selling raw, sour and processed milk in rural and urban towns at affordable price. In addition milk collection centers namely Monze, Choma, Kalomo and Mapepe sell about 50% of the milk received locally in the community. Some dairy farmers sell the milk from door to door in rural and urban towns thus expanded more opportunity of milk consumption. A good number of small and large-scale milk processors have emerged currently reaching to 25 in the country as compared to only one large processor in 1990

The dairy cows are tested every year for brucellosis and tuberculosis and those positives are excluded. Farmers and consumers in the rural areas are also advised to boil the raw milk before they use for at least 15 - 20 minutes to make it safe for human consumption otherwise consume pasteurized milk if one has access and can afford.

Twenty five percent of the dairy farmers, although milk in the afternoon but do not deliver the milk to milk collection center due to long distances and lack of electricity to keep milk refrigerated. Therefore they sell the milk in community and consume fresh or sour. A good number of farmers give free milk to the neighbors particularly on Saturdays in Magoye and Monze area. The dairy development program widened the opportunity of milk availability and consumption to rural and urban population.

GART has been able to promote scientifically based smallholder dairy development, together with the support and cooperation of other stakeholders like Land O' Lakes, HPI, which has contributed significantly increase in milk production, consumption and poverty reduction in the project areas. In implementing the program the GART was determined

that the project must make a real difference to the lives of the many and emerging dairy farmers in particular to increase house hold food security, income and HIV/AIDS mitigation.

PLWHA and particularly those on ARVT need highly nutritive and digestible diet. The drug compliance is compromised when there is no food all the time and nutritional support required in alleviating opportunistic infections. Some anti-retroviral drugs must be taken with food to increase their absorption and effectiveness and decrease the side effects. Due to high level of poverty prevalence, significant numbers of patients that are receiving ARVT are food insecure and milk and milk products consumption can play a good nutritional support. Milk contains protein, carbohydrate, fat, vitamins and minerals including moderate amount of selenium with high bio-availability (Howard Armistead 2006) an important trace mineral in HIV/AIDS fight.

### **RURAL EMPLOYMENT:**

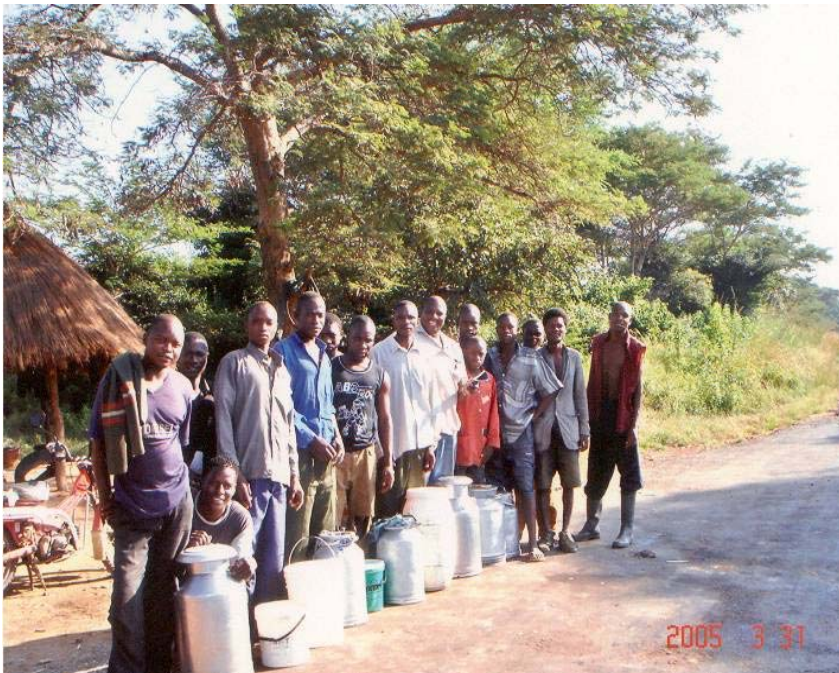
During the year 2005 a total of 482 active smallholder dairy farmers were supplying milk to established milk collection centers in the project area. Out of 482 farmers 38 % employed a total of 191 workers to deliver the milk to milk collection center on paid regular monthly salary ranging from K70, 000 - K 250,000 (US\$ 20 – US\$ 71). This is in addition to on farm employment of workers who look after dairy animals and engage in milking. Sixty two % of the farmers deliver milk either themselves or with the help of their children or family members thus saving expenses. The five milk collection centers the GART is working with, farmers group have employed a total of 19 workers on full time. This employment figure does not include those involved in indirect dairy related business / trades.



110 men and women in the project area, before 2001 had no means of earning or a cow, are now owners of animals and making regular monthly income through dairy thus empowering them

### **IMPROVED MARKET ACCESS:**

Ability to sell farm produce including milk is key to derive an income and sustainability of business. GART does facilitate linkages, dialogues between smallholder dairy farmer groups and other stakeholders including milk buyers. GART attempts to fill the major gaps in marketing to increase profitability, productivity and quality of milk through provision of milk van, dairy equipment, extension and training. Organizations interested in replication should facilitate beneficiary participated marketing opportunities of the produce.



## **MILK AS A BABY FOOD IN LIEU OF BREST FEEDING:**

HIV prevalence among women that visited antenatal clinics in major urban centers in Zambia was 27% while in Kenya SA and Namibia 15, 19, and 26 % respectively. Worldwide vertical transmission (mother to child) of the AIDS virus accounts for 40 to 90% of all HIV infections in infants and children (UNAIDS 2000). Transmission through breastfeeding only may account for 30 – 50% of the mother to child infection. With such high prevalence rate of HIV/AIDS among pregnant girls and young women, mother to child transmission of the AIDS virus is bound to be on increase. The best way to stop HIV transmission through breast milk is to discourage or stop breast-feeding although difficult. The challenge is to find an alternative that can match the quality of human milk that is available or easily accessible, affordable and socially acceptable recognizing that the majority of the affected people are typically the poorest. Some NGO's are promoting milk and infant milk formula as an alternative to avoid MTCT. Milk (cow / goat) is a possible alternative to avoid breast-feeding to prevent child to mother transmission of HIV/AIDS through mother's milk or in those situations when there is no letdown of the milk from breast or breast diseases and injury exists including orphans (in the case mother dies). GART is providing opportunity through dairy development (cows and goat milk production and consumption) in rural areas where infant milk formula is not available and if available very expensive. However there is need to do more research on the suitability, acceptability and usefulness of cow or goat milk to infant survival and growth.

Infant formula is acceptable among HIV + mothers but is too expensive for them to afford and cow milk (51.8%) is the most common, suitable, acceptable and accessible followed by goat milk (15.9 %) (Oguta 2001)

## **SCHOOL MILK PROGRAMME:**

The United Nations World Food Programmed has school feeding programmed in the sub region that is playing an important role in combating the malnutrition and mitigating the effect of HIV/AIDS, and in Zambia that exists but to a negligible number.

However there is no milk-feeding component in the program. The WFP / Zambian policy maker needs to be enlightened about the value of milk in the school feeding programmed including role of milk in HIV/AIDS mitigation and mental development of the child and their school attendance and increased enrolment.

Authors hope that the forum can convince the Zambian Government and WFP the need of introducing school milk program in Zambia with principal objective of the National School Milk program to support Zambian dairy industry, provide outlet for locally produced and processed milk, improve milk consumption, health of children and also enhanced knowledge about HIV/AIDS through learning in the school

## MICRO - FINANCE IN SMALLHOLDER DAIRY TO VULNERABLE:

There is need to 'develop culture of savings' among Zambian population. Livestock is a 'living bank' and dairy is like a hand pump to draw milk instead of water.

GART recently linked a group of vulnerable farmers (16) to Micro Bankers in Zambia to give them dairy cows on soft loan. GART provided training to these farmers and supported with establishment of temporary milk collection center and bought cooling facility and milk cans. Though the pilot scheme is still in very early stage it seems to have started very well as regards income generation, food security, improved milk consumption and loan repayment is concerned. Micro-finance institutions and NGO's can innovate and develop products to meet the needs of this emerging clientele.

### A CASE STUDY EXAMPLE:

Name of Farmer:	Ms. Mebe Miyoba
Village/Location:	Mbiya - Magoye- Mazabuka District
Status:	Widow (Female headed household with kids and orphans)
Children:	Six
Other dependent:	Three (Orphans)
Initial No. of animals:	Two (one dairy, one local )
Number calves born :	Three - one paid as pass on, one died
Average Milk Delivery:	10 litres / day to milk collection center
Family consumption:	2 litres /day ( <i>Food Security and Nutrition</i> )
Distance to MCC:	4 Km
Transport:	Bicycle
Income:	K 310,000 PM (\$93.00) ( <i>Income Generation</i> )
Number of animal	Three ( <i>Wealth creation, transfer of knowledge to family</i> )



*Smallholder dairy a practical, profitable route out of poverty*

## **IMPACT**

*The project has made significant contribution towards increase in milk production, sustainable income generation, rural employment opportunity, improved household food security and HIV/AIDS mitigation including improved longevity and lower number of deaths. The opportunities of youth going to school and university and thus reduced the vulnerability to HIV/AIDS trap.*

*Farmers including those affected by HIV/AIDS are appreciating the value and benefit of the project as dairy gives them regular monthly income as if they are in formal employment. A good number of dairy farmers from project area are able to pay the school fees, send their children not only to school but also to university and other higher institutions of learning. The dairy farmers are also able to meet funeral expenses, buy both human and animal medicines, feed, fertilizer, seed and bi-cycle and also liquidate the loan they got for other purposes including for dairy.*

## **CONCLUSION AND LESSONS LEARNT:**

The smallholder dairy farming has demonstrated the mitigating effects of HIV/AIDS on income generation and food security among 600 smallholder dairy farmers in Zambia. To improve nutritive food requirement and expanded milk consumption among rural poor population, mostly protein of higher bio-availability including selenium an important trace element to fight HIV/AIDS, increase income and disease tolerance, investment in smallholder dairy farming in potentially marketable areas is probably the answer. Improved milk consumption resulting in improved nutrition will possibly be resilience to opportunistic infection and can be a first line of defense in HIV/AIDS mitigation. Dairy leaves behind a source of wealth for surviving family members to maintain food security. Dairy is a practical, profitable route out of poverty and worth considering replication to counteract the effects of HIV/AIDS as a non-clinical tool to mitigate HIV/AIDS.

There is need to have collaborative approach and make donor agencies, organizations and institutions involved in human nutrition programme for HIV/AIDS affected families more aware of the contributions that livestock particularly dairy can make to household diet and food security on most smallholder farms in Sub-Saharan Africa

Provision of micro-finance, project replication, supporting dairy crossbreeding centers and dairy goat improvement programme as a source of suitable dairy stock in the country and the region is recommended. Introduction of school milk programme in Zambia should be introduced urgently by WFP / NGO's (LAND O' LAKES) / Ministry of Agriculture and Cooperatives/ Ministry of Education / Ministry of Health.

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**REFERENCES:**

Daka, D. E. (2006). Overview of Livestock Industry in Zambia: Improvement of Productivity and Marketing, Paper presented at a Workshop, Bronte Hotel, Harare, 4<sup>th</sup>-5<sup>th</sup> April 2006 PP 1-16.

Egal, F. and Valstar, A. (1999). HIV/AIDS and Nutrition: Helping families and communities to cope. *Food, Nutrition and Agriculture* 25: 20-26

Howard Armistead (2006). Personal Communication

James, W. P. T. and Schofield S. (1990) Human energy requirements: A manual for Planners and Nutritionist. Oxford University Press, FAO. PP 60-70.

Ministry of Agriculture and Cooperatives (2004) Strengthening Institutional Capacity in Mitigating HIV/AIDS Impact on the Agricultural Sector, PP 2-3.

Oguta, T.J. (2001) Infant feeding practice to and Breast Milk alternative for infant born to HIV/infected mothers in Homa Bay District of Kenya. MSc Thesis, University of Nairobi.

UNAIDS (2004). Facing the Future together: Report of the Secretary General's Task Force on Women, girls and HIV/AIDS in Southern Africa, Geneva.

UNECA (2005). Workshop on interventions to mitigate the impact of HIV/AIDS on smallholder agriculture, food security and rural livelihoods in Southern Africa. 17<sup>th</sup> – 19<sup>th</sup> October , Lusaka, Zambia.