The Kampala zero grazing farm produced a positive net farm income. Both the Highland fenced and Kampala fenced farms had positive net farm incomes over the 10 year planning horizon. The fenced operations had relatively lower costs per animal than their zero grazing counterparts. The same pattern is observed in the Kampala region where the Kampala zero grazing producer’s labor costs are higher than the Kampala fenced producer’s costs.

The highland zero grazing animal produced 792,000 Ush/cow worth of milk. The highland fenced animal produced 439,200 Ush/cow worth of milk. The Kampala zero grazing enterprise produced 1,340,640 Ush/cow. The Kampala fenced unit produced 171,600 Ush/cow. Each zero grazing enterprise had one cow whereas the highland and Kampala fenced farms had 12 and 50 cows respectively.

Figures 3.2.8-1 to 3.2.8-10 compare the average results of the five economic variables discussed under the old and current scenarios. Figures 3.2.8-11 to 3.2.8-15 describe the distribution of the variables under the two scenarios for Uganda Kampala fenced representative farm as an example.

**3.2.9 Summary and Interpretation**

Similar to the Kenyan dairy producers the representative Ugandan dairy producers are able to generate positive net farm incomes on an annual basis. The only farm type not obtaining a positive net income was the Highland zero grazing enterprise. The production declined in regions (Northern) that were less competitive relative to other dairy zones and increased in regions more conducive to dairy production in proximity to urban populations. The zero grazing technology with its increased costs was not competitive in the Western highlands though production in the region increased in the ASM analysis. In the Kampala region with its urban population, the price for milk is greater and allows the peri-urban zero grazing unit to operate on a sustainable basis.

When forage and associated crop yield variation and historical milk yield of these farms are introduced as stochastic information in the farm-level analysis, risk associated with adoption of these improved technologies can be assessed. Only the Kampala fenced representative farm had a 100% probability of obtaining a positive net farm income under the traditional technology and the improved technology. The Highland zero grazing farm had a 0.75 probability of obtaining a positive net cash farm income under both technology scenarios. The Kampala zero grazing farm experienced an increase in the probability of obtaining a positive net farm income from 0.45 under the traditional technology to 1.0 under the current adoption improved technology. Although the probability of economic success increased on the Highland fenced farm, it exhibited only a 47% chance of producing a positive net cash farm income with adoption of the improved dairy technologies.

The ASM model indicates that zero grazing could be adopted in more rural regions. However, Table 3.2.6.1, describing the expected adoption level of zero grazing suggests that only 5% of the total dairy producers in the Western province would use this system based on expert opinions. Investments in cross-fencing with some strategic infusion of improved grass and upgrading Ankole cattle with Friesian dairy breeds appears to be the most viable means of improving producer welfare and meeting urban demands for milk. However, expansion of the apparently more viable commercial dairying near peri-urban centers will place even greater economic pressures on the less variable farm-types in both the Highland and Kampala regions of Uganda. Seeking the right balance between investments in smallholder fenced systems and fostering the commercialization of dairying will be the challenge for policy makers in Uganda.
3.3 Tanzania

3.3.1 Introduction and Characterization of the Dairy Industry

Smallholder dairying is much more disaggregated in Tanzania; isolated milksheds are associated with market concentrations near Dar es Salaam, Arusha, Morogoro/Dodomo, Mwanza and the southwestern border areas of Tanzania. This is a reflection of the size of the country, distribution of urban populations, road networks and disease constraints as it applies to successful smallholder dairying.

Like Uganda, Tanzania producers’ milk yields were higher than those observed in Kenya. Like the Kenyan coastal representative farm the Tanzanian coastal sites, Tanga, and the Peri-urban Dar Es Salaam site face high disease pressures. The Kilimanjaro site is unique in that it is situated at the base of Kilimanjaro, a former volcano. The mountain produces a special climatic zone with a particularly fertile soil base due to the volcanic source of the soil. Unlike Kenya and to a lesser degree Uganda private land ownership is not well...