

3.2.7 Economic Impact of Smallholder Dairy Technology in Uganda at the Farm Level (East Africa Farm Level Economic Methodology and Analysis)

To address technology impact at the household level, farms were selected in two broad agro-ecological zones, Kampala and Highland. The Kampala zone was delineated as a “new” region with a substantial milkshed that was not delineated with the Kenya agro-ecological extrapolation. Since the “Horticultural” zone and Kenya dominated the landscape where dairying occurred outside of the Kampala milkshed, all Kenya extrapolations were “lumped” and farms assigned to a “Highland” zone.

A rapid rural appraisal of farms in existing surveys of NARD and Land ‘O Lakes was made and six farms selected: Kampala-fenced, Kampala-zero grazing, Highland-fenced, Highland-zero grazing, Kampala-traditional, and Highland-traditional. A cluster analysis similar to that performed in Kenya was used to select farms by ecological strata and farm type.

The old, or base traditional technology, was continuous permanent grazing of indigenous grass with Ankole or Zebu crossbred cattle. Improved technologies included a fenced system with Ankole-Friesian crossbred animals in the highland region and Ankole breed in the Kampala zone with rotational grazing of improved indigenous grass pastures. Zero-grazing in both the Highland and Kampala zones were represented by a Friesian dairy cow fed Napiergrass or Kikuyu grass in a confined feeding system.

Farm size in Uganda was more variable than in Kenya (Table 3.2.7.1). Cropland available ranged from 0.81 to 8 hectares. Pasture land ranged from 0.00 hectares in the peri-urban zone (Kampala-zero grazing) of Kampala to 875 hectares in the rural areas of Kampala (Kampala-traditional). Annual milk yields are higher in Uganda than in Kenya. The lake crescent zone near Lake Victoria encompasses Kampala and its environs, with higher moisture than for areas further removed from the lake. Pastures in this area are more

Variables	Highland/ zerograzing	Highland Fenced	Kampala/ zero grazing	Kampala/ fenced
Latitude	-1.34370	-1.21823	0.33957	0.17003
Longitude	30.01293	29.96008	32.66652	31.64660
District	Kabale	Kabale	Mpigi	Mpigi
Crop Hectares	2.00	2.00	0.81	8.00
Grass Land Hectares	0.00	12.24	0.00	875
Cattle Type Current Technology	Friesian	Friesian	Friesian	65% Boran 35% Boran./Ankole cross
Current Mean Milk Yields kg/Cow	3434	2112	3184	480
Number of Dairy Cows	1	12	1	50
Cattle Type Old Technology	Ankole Friesian Cross	Ankole Friesian Cross	Ankole Friesian Cross	Ankole
Traditional Mean Milk Yields Kg./Cow	965	593	894	261
Source: Kaitho				

productive. Also, the highland zone of Uganda near the Rwandan border has highly productive stream fed pastures.

3.2.8 Results From Farm Level Analysis

In the Ugandan farms studied, the net present value under the current or improved technology increased for all farms except the Highland zero grazing farm compared to the old technology. This was most apparent for the highland fenced producer whose expected net present value for the ten-year horizon increased by 69% (see Table 3.2.8.1). The gains in net present value were negative for the Highland zero grazing unit which declined by -0.93%, the Kampala zero grazing increased NPV by 86.4%, and the Kampala fenced farm's net present value increased by 41.2%. All farms total cash receipts increased. In percentage terms the increases ranged between 38 to 71 %. Total cash costs increased on the two zero grazing farms by 51.3% for the Highland enterprise and 24.0% for the Kampala unit. Costs rose for the Highland fenced unit by 7.8% and 19.3% for the Kampala fenced farm. In these two enterprises the net farm income is positive under both scenarios. The increased feed and maintenance costs associated with the current technology result in increased costs for the producer relative to the old technology (dairy breeds with zero grazing and Napiergrass versus extensive non-fenced dairying on native pastures).

Table 3.2.8.1 Uganda Representative Farms Mean and Standard Deviations of Net Present Values, Total Cash Receipts, Total Cash Costs, Net Cash Farm Income, and Real Net Worth Under the Base (old) and Current Smallholder Dairy Technology in 1,000,000's Uganda Shillings

Farm Type	Net Present Value		Total Cash Receipts		Total Cash Costs		Net Cash Farm Income		Real Net Worth	
	Old	Current	Old	Current	Old	Current	Old	Current	Old	Current
Highland 0 grazing	-6.44*	-6.50	0.98	1.57	1.15	1.74	-0.17	-0.18	-5.48	-5.51
		(-0.93) ⁺		(60.20)		(51.30)		(5.88)		(0.55)
Kampala 0 grazing	2.23**	3.14	0.103	0.103	0.391	0.391	0.329	0.331	4.974	4.995
	-6.19	-0.84	1.15	1.97	1.19	1.48	-0.04	0.5	9.79	12.35
		(86.4)		(59.04)		(24.37)		(400)		(26.15)
Highland Fenced	2.31	4.42	0.057	0.074	0.387	0.257	0.339	0.205	4.957	3.273
	76.48	129.26	7.52	11.96		1.1	6.5	10.86	84.13	109.83
		(69.01)		(71.30)	1.02	(7.84)		(67.08)		(30.55)
Kampala Fenced	7.34	11.78	0.297	0.495	0.000	0.000	0.297	0.493	20.764	36.383
	130.48	184.18	12.94	17.96	3.01	3.59	9.93	14.37		201.83
		(41.16)		(38.79)		(19.27)		(44.71)	175.89	(14.75)
	33.01	45.65	1.038	1.398	0.007	0.008	1.034	1.396	37.441	53.890

* Number in the parenthesis represents the percentage change between the old and current scenario

** Mean in 1'000,000's of Uganda Shillings (Ush)

*** Standard deviation

Net cash farm income remained negative for only the Uganda highland zero grazing unit. The highland zero grazing units negative net farm income declined by 5.9%. In the other three farms net farm income increased between 44.7 to 125%. The real net worth increased for all farms except in the case of the Highland zero grazing unit which declined by .6%. In the other farms the percentage change in real net worth ranged between 14.8% to 30.6%.

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.

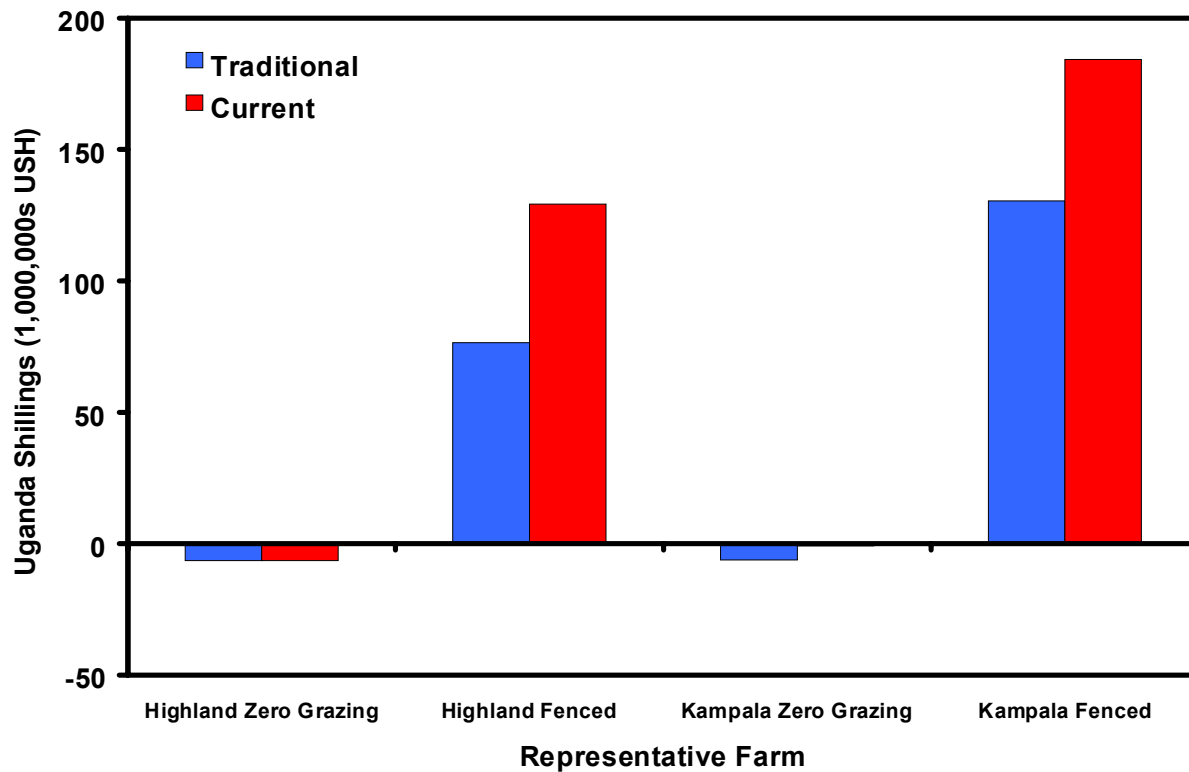


Figure 3.2.8-1. Net present value (NPV) for Ugandan representative farmers under the traditional (zebu cattle/native forage) and the current technology, stochastic scenarios.

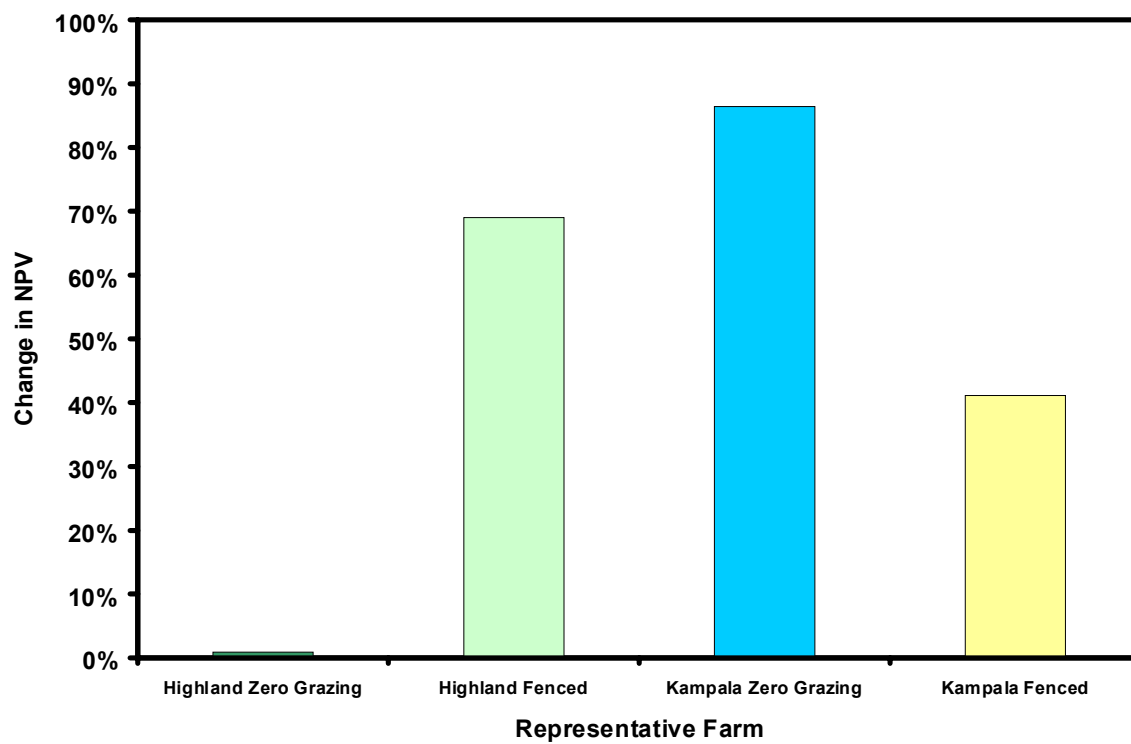


Figure 3.2.8-2. Percentage change in net present value (NPV) for representative small holder dairy farmers changing from traditional (zebu cattle/native forage) to current technology for farms in four dairy environments in Uganda under the stochastic scenario.

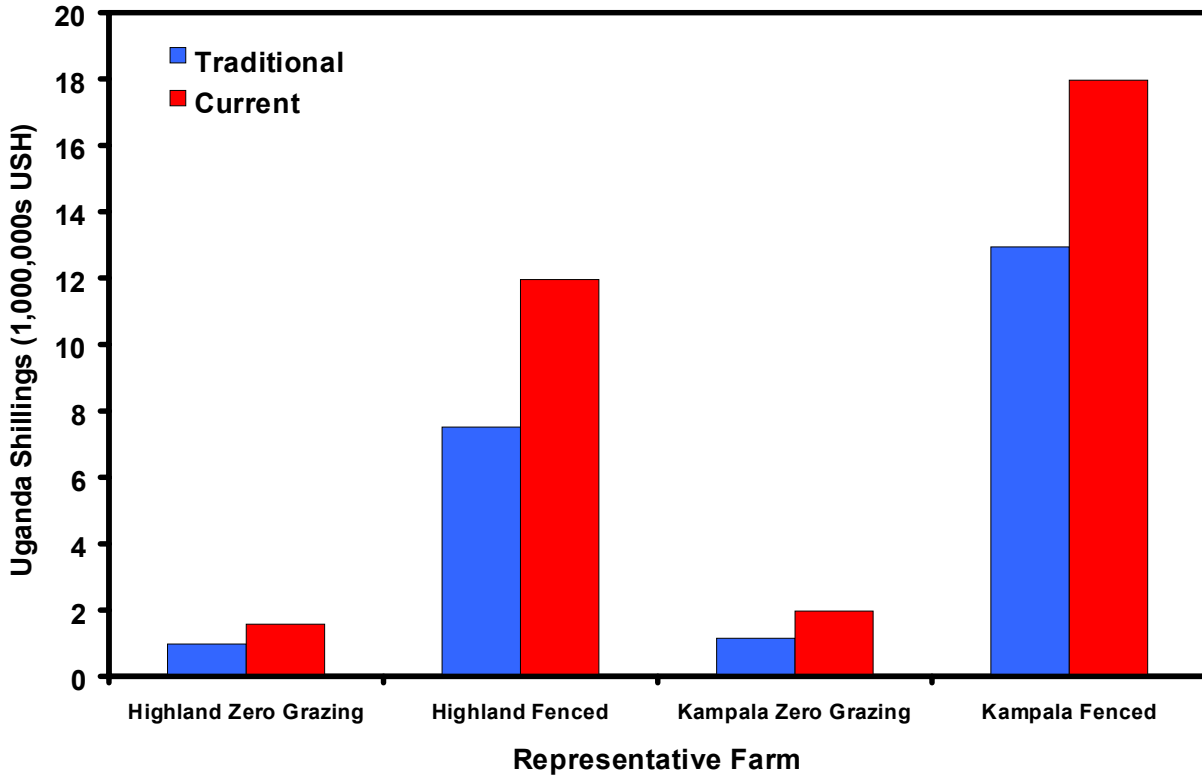


Figure 3.2.8-3. Total cash receipts for Ugandan representative farmers under the traditional (zebu cattle/native forage) and the current technology, stochastic scenarios.

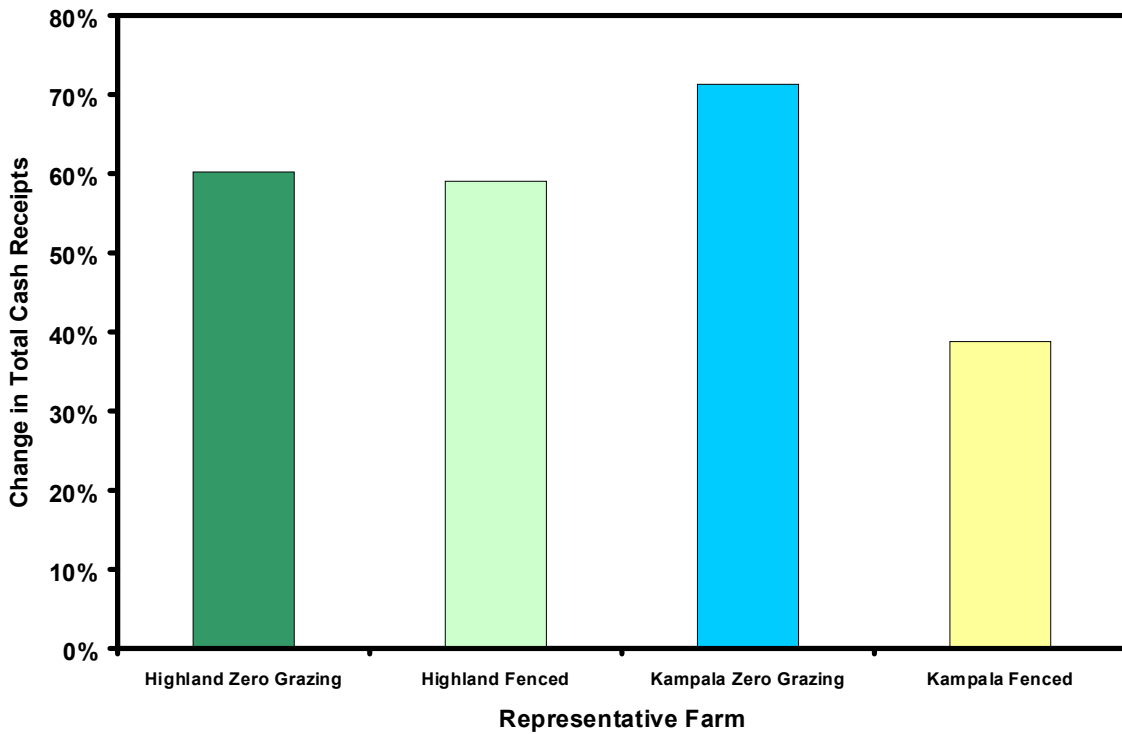


Figure 3.2.8-4. Percentage change in total cash receipts for representative small holder dairy farmers changing from traditional (zebu cattle/native forage) to current technology for farms in four dairy environments in Uganda under the stochastic scenario.

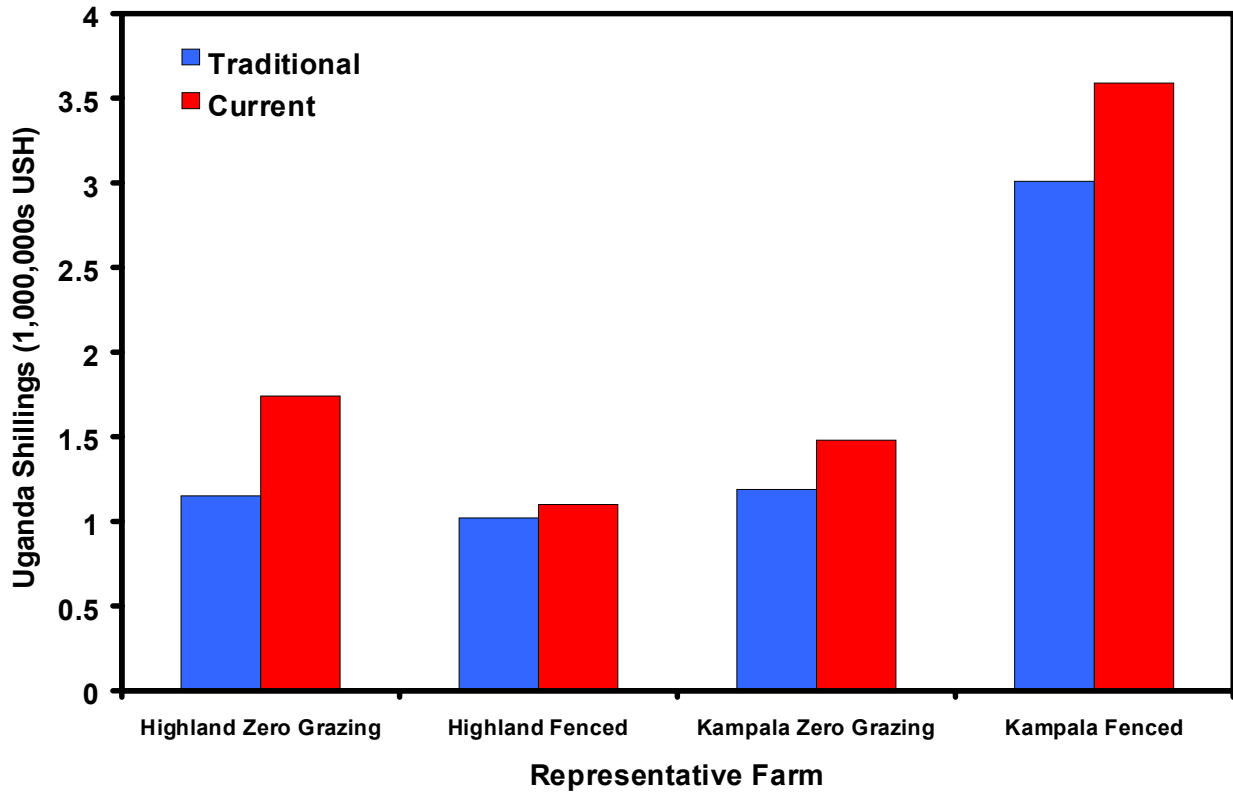


Figure 3.2.8-5. Change in total cash costs for Ugandan representative farmers under the traditional (zebu cattle/native forage) and the current technology, stochastic scenarios

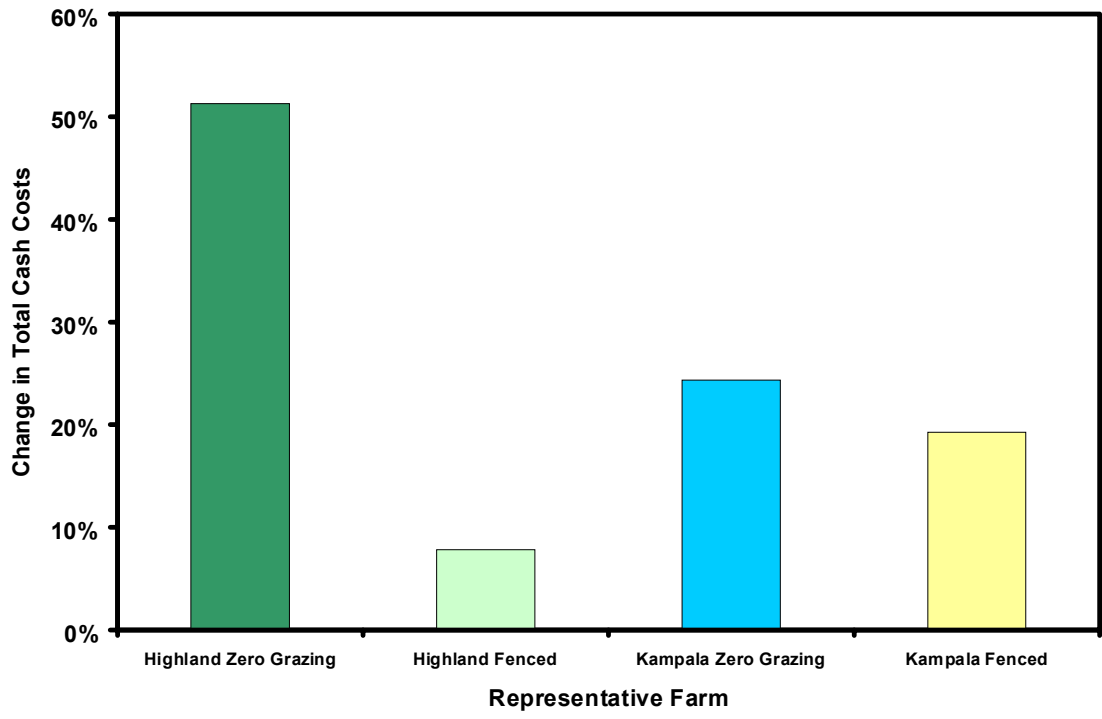


Figure 3.2.8-6. Percentage change in total cash costs for representative small holder dairy farmers changing from traditional (zebu cattle/native forage) to current technology for farms in four dairy environments in Uganda under the stochastic scenario.

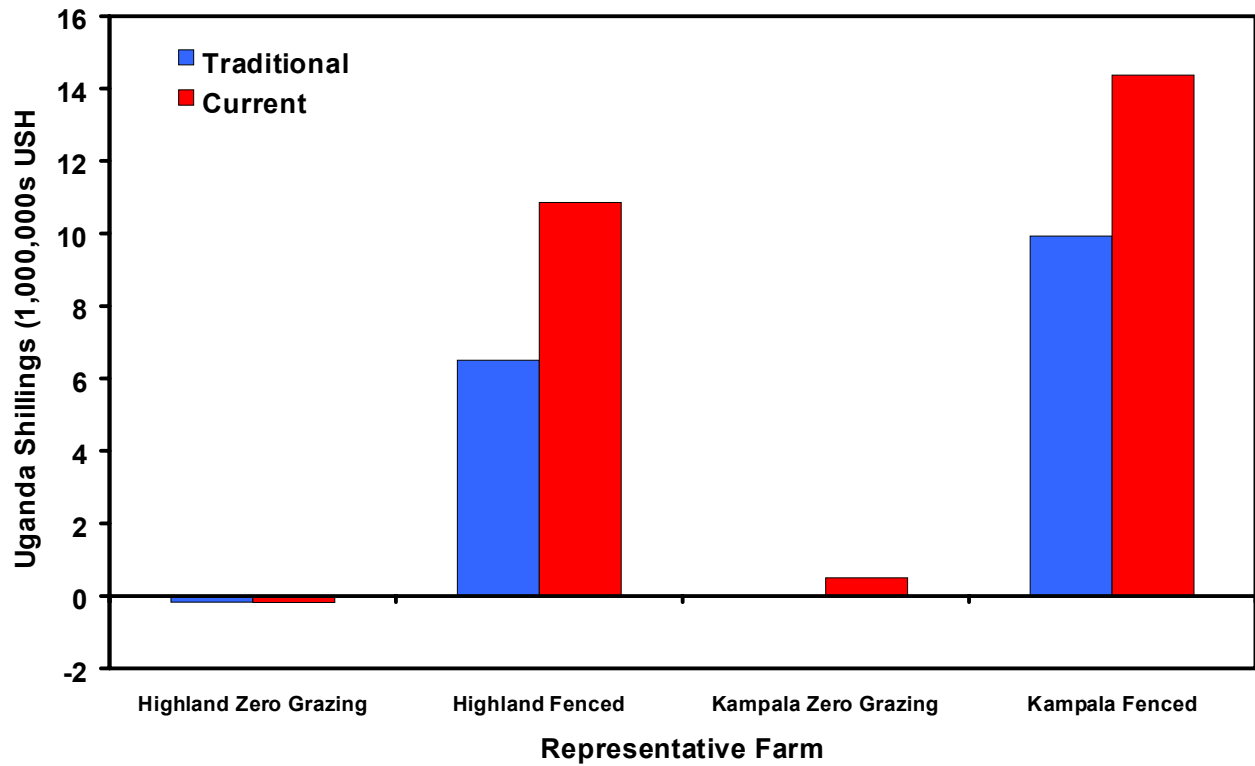


Figure 3.2.8-7. Mean net cash farm income for Ugandan representative farmers under the traditional (zebu cattle/native forage) and the current technology, stochastic scenarios.

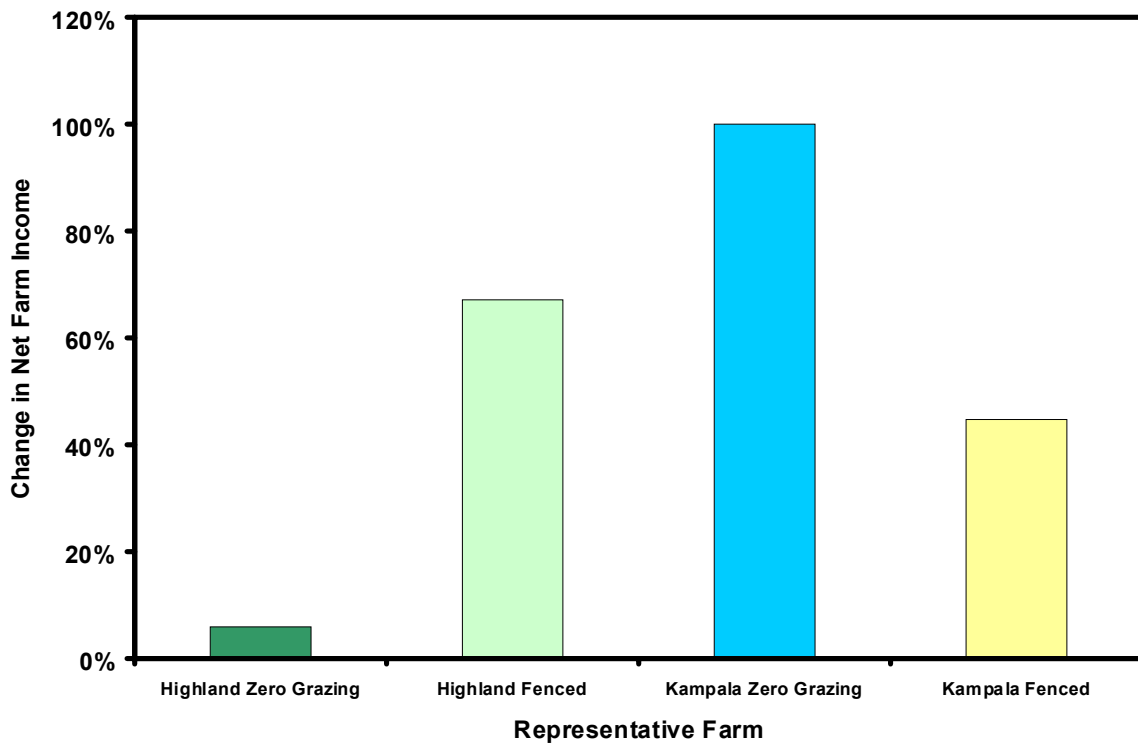


Figure 3.2.8-8. Percentage change in net farm income for representative small holder dairy farmers changing from traditional (zebu cattle/native forage) to current technology for farms in four dairy environments in Uganda under the stochastic scenario.

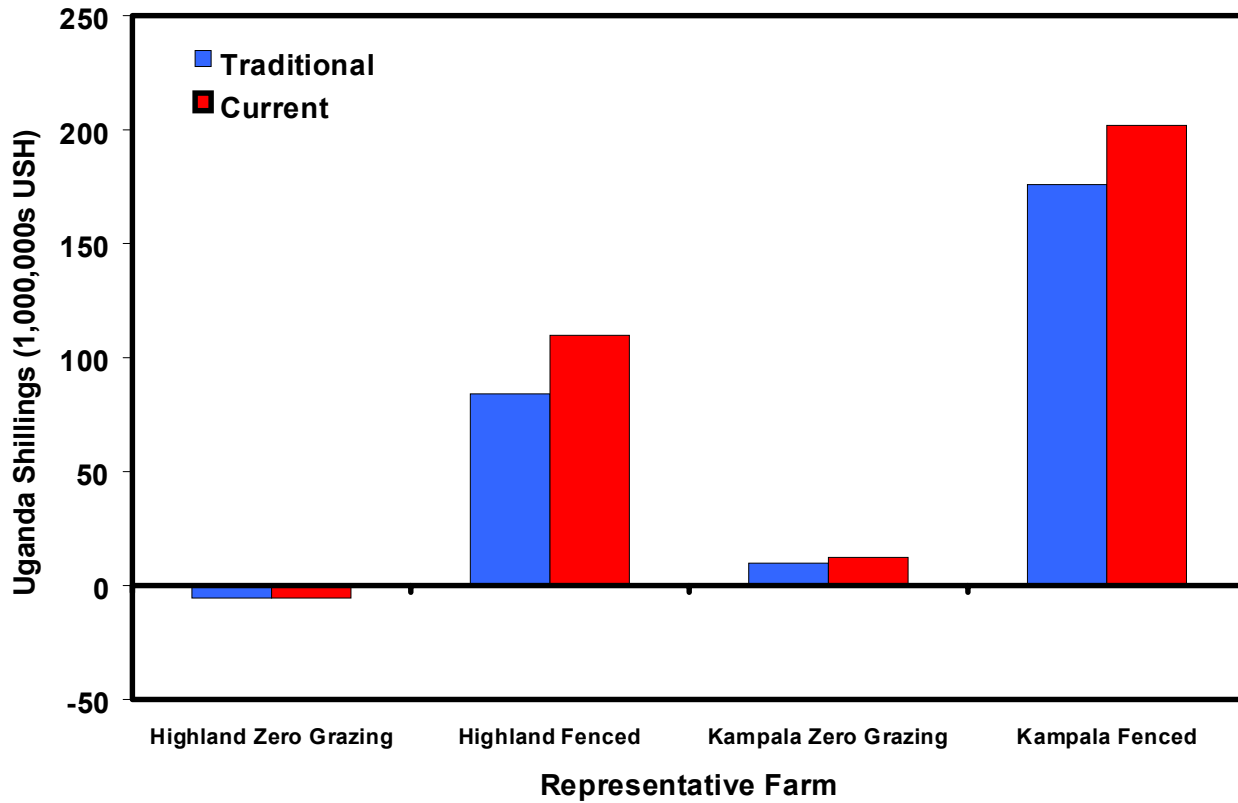


Figure 3.2.8-9. Mean real net worth (RNW) for Ugandan representative farmers under the traditional (zebu cattle/native forage) and the current technology, stochastic scenarios.

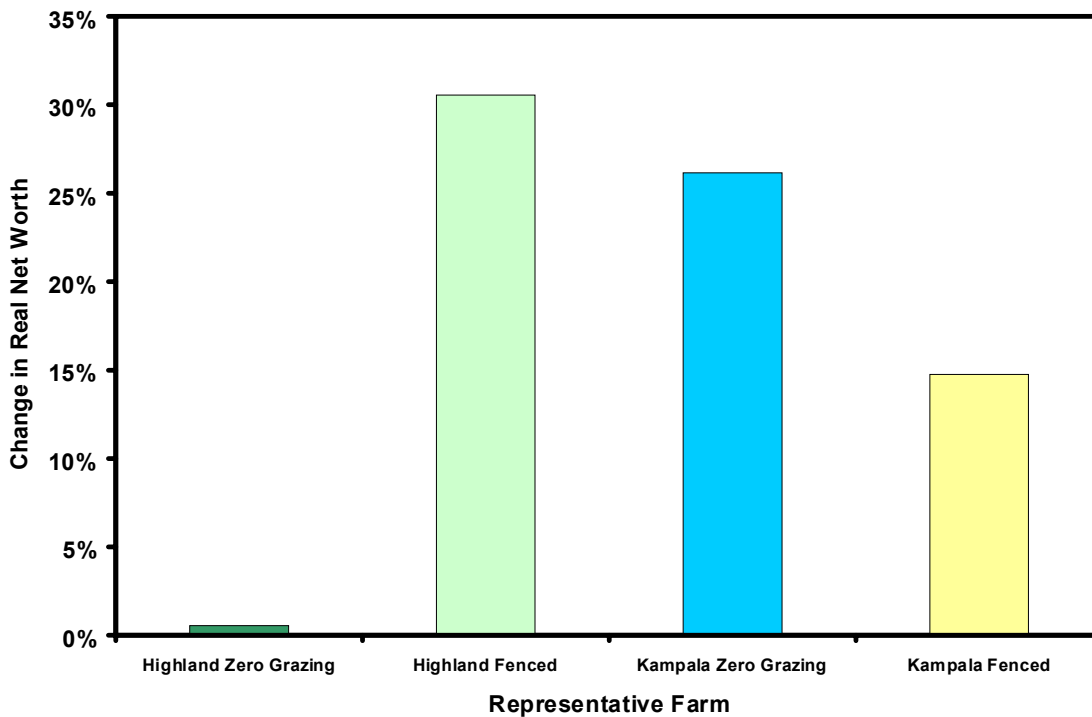


Figure 3.2.8-10: Percentage change in real net worth (RNW) for representative small holder dairy farmers changing from traditional (zebu cattle/native forage) to current technology for farms in four dairy environments in Uganda under the stochastic scenario.

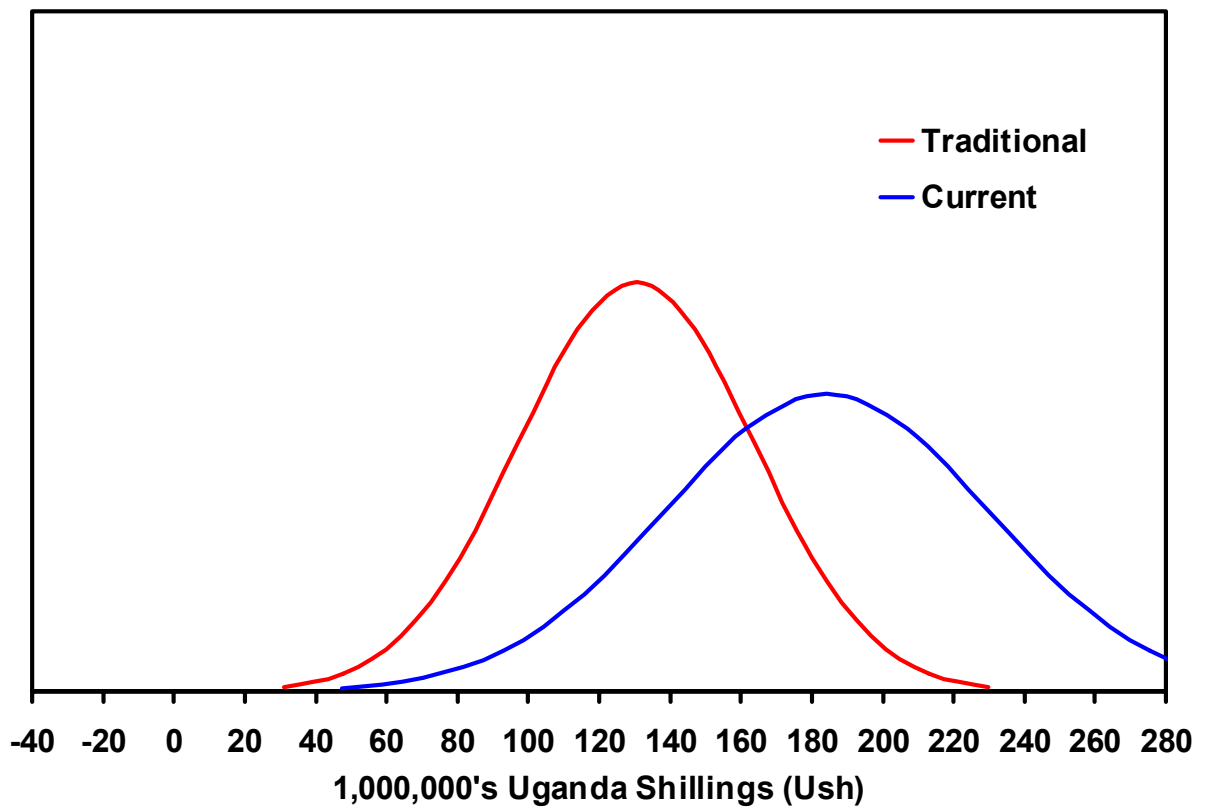


Figure 3.2.8-11. Distribution of net present value (NPV) under traditional and current small holder dairy technologies on a representative Kampala Fenced farm in Uganda.

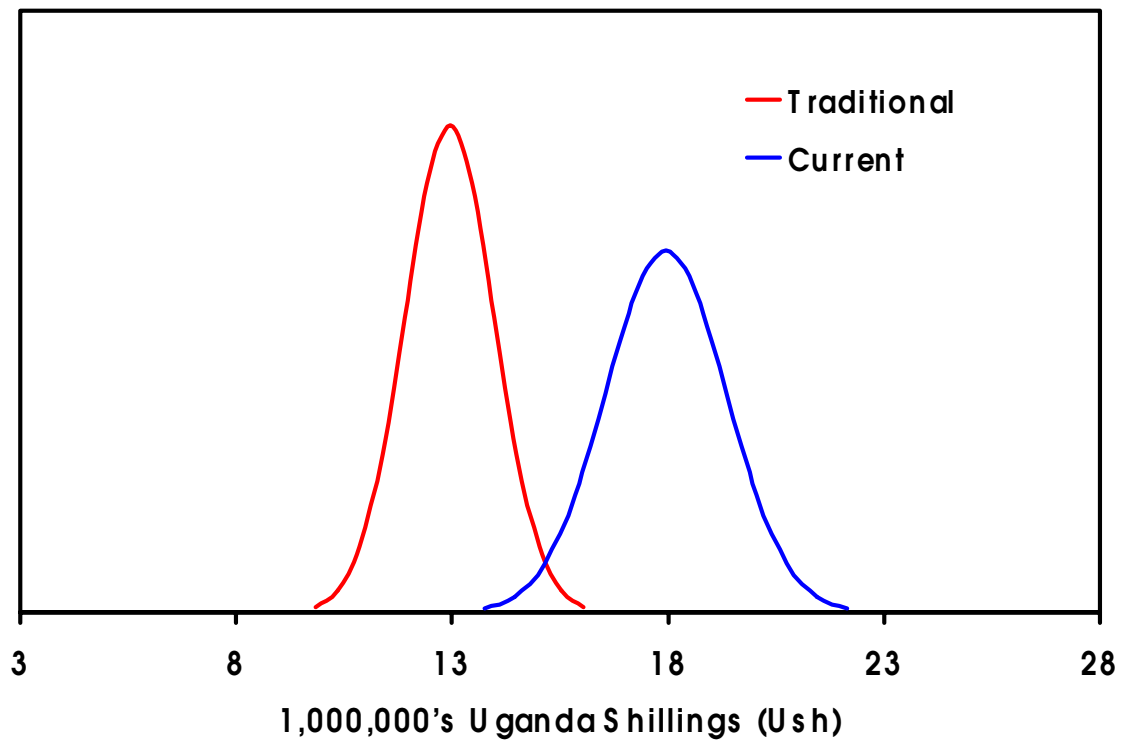


Figure 3.2.8-12. Distribution of total cash receipts under traditional and current small holder dairy technologies on a representative Kampala Fenced farm in Uganda.

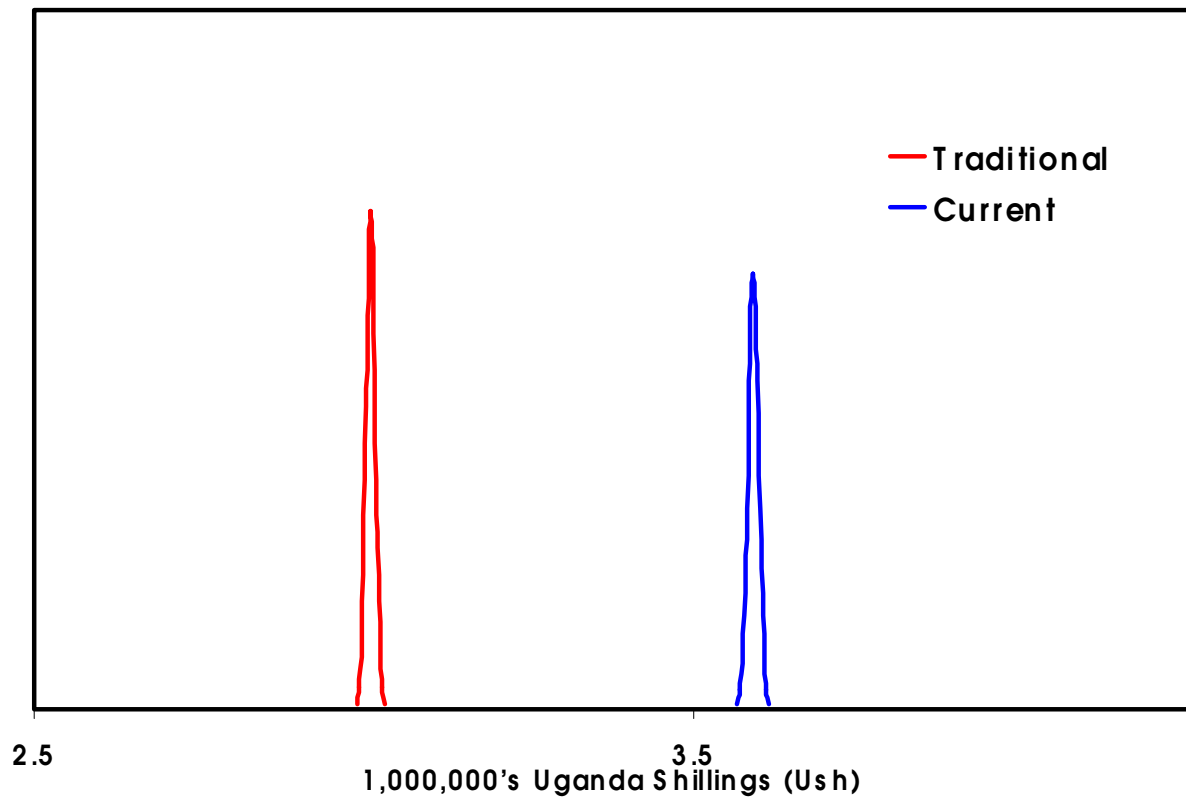


Figure 3.2.8-13. Distribution of total cash costs under traditional and current small holder dairy technologies on a representative Kampala Fenced farm in Uganda.

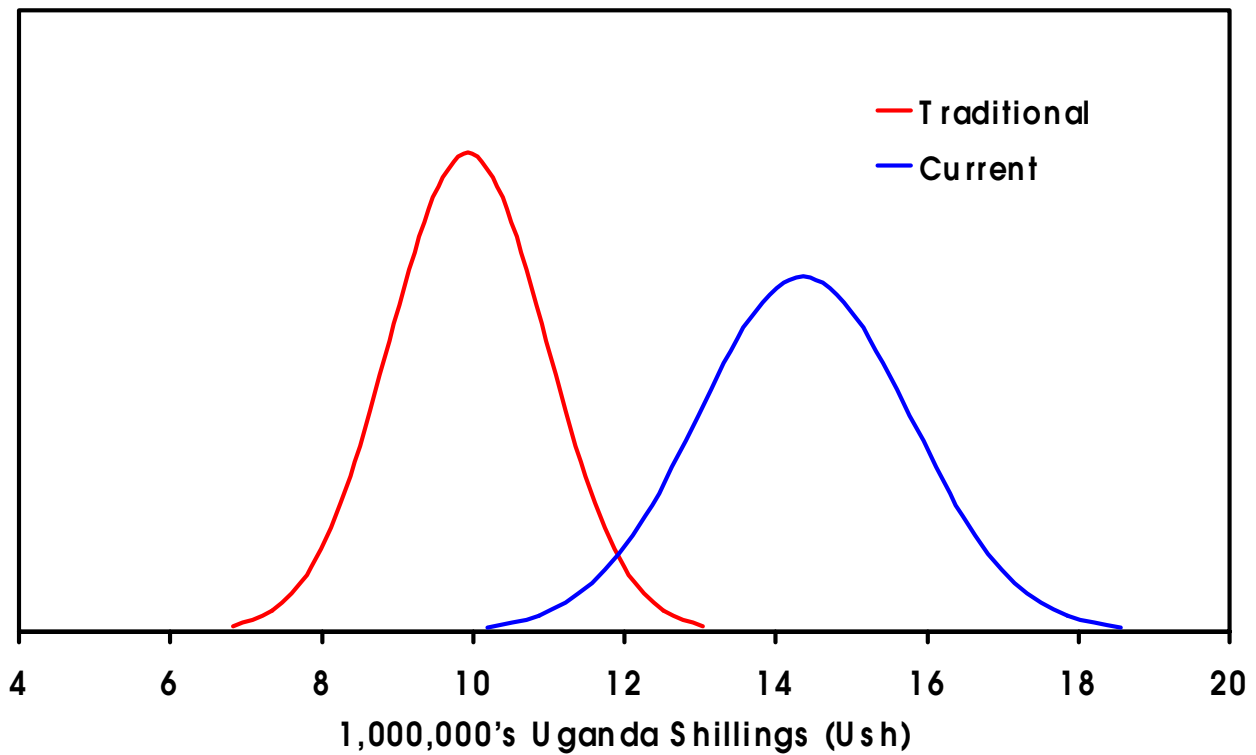


Figure 3.2.8-14. Distribution of net cash farm income under traditional and current small holder dairy technologies on a representative Kampala Fenced farm in Uganda.

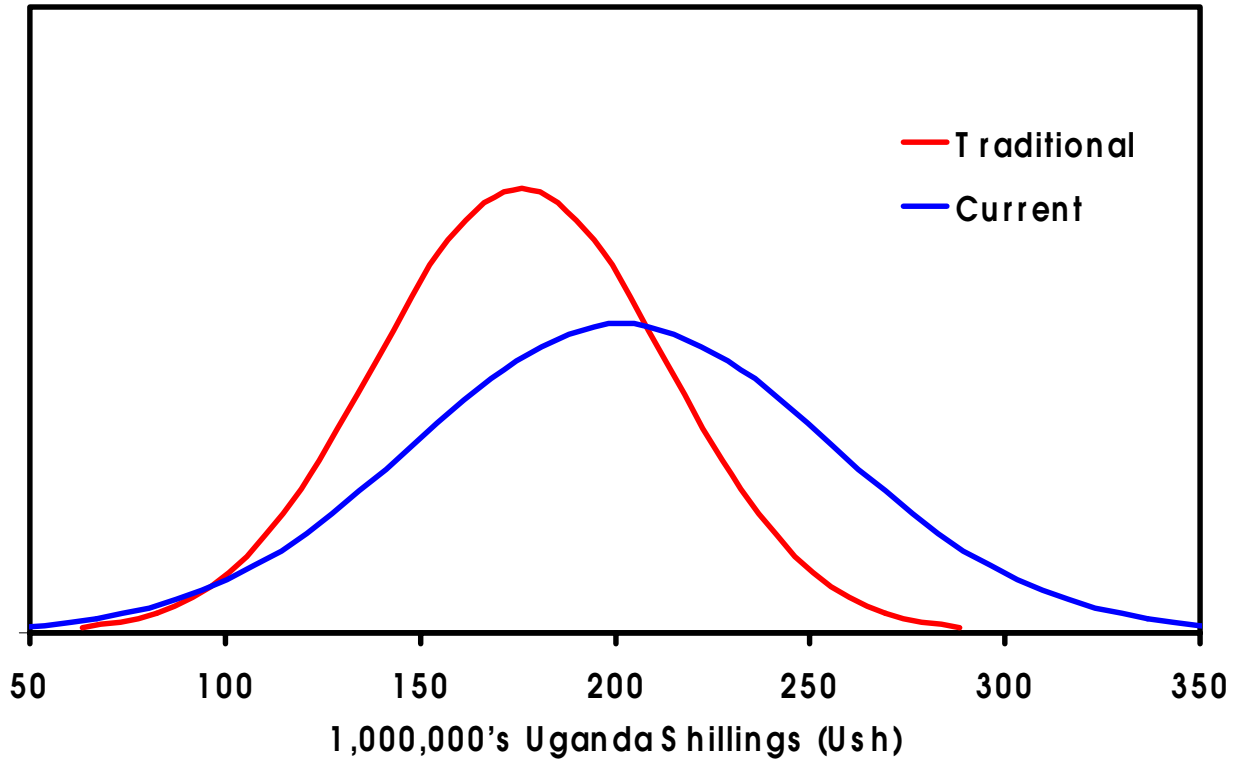


Figure 3.2.8-15. Distribution of real net worth under traditional and current small holder dairy technologies on a representative Kampala Fenced farm in Uganda.