

# A GLASS OF MILK A DAY KEEPS THE KWASHIORKOR AT BAY



Timothy Doherty: Department of Liberal Studies (Environmental Studies), Montana State University (MSU)-Bozeman;  
 Keriba Coulibaly, ICRISAT-Mali, on leave from l'Institut d'Economie Rurale-Sikasso Mali;  
 Florence V. Dunkel, Department of Plant Sciences and Plant Pathology MSU-Bozeman

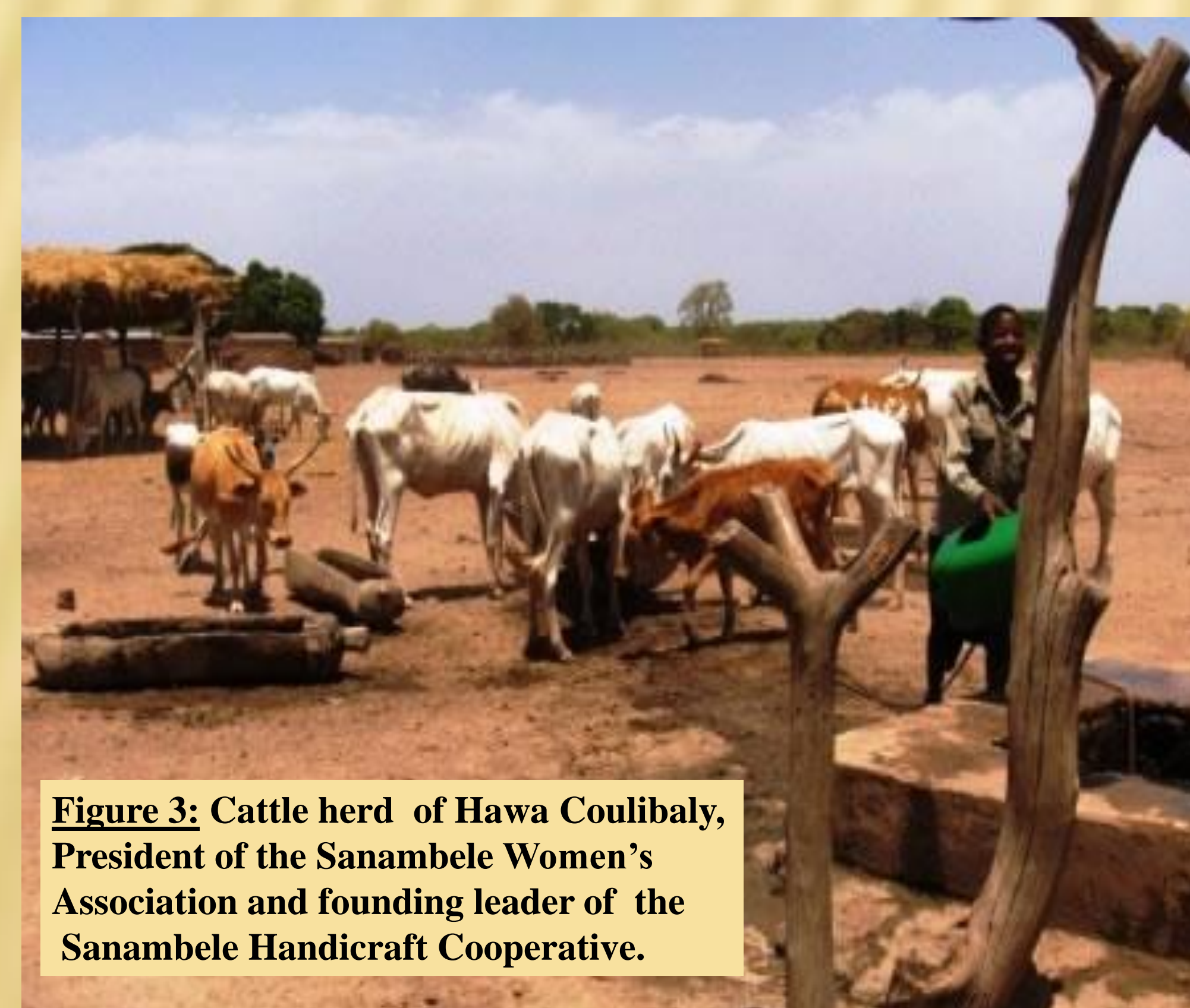


**Introduction:** Sanambe, Mali, a small, subsistence farming village 110 km from the capital city of Bamako, relies on the hard work of everyone in the village. To a person in the Western cultures, the village of Sanambele may seem like a very impoverished place, no running water, electricity, or cars. What needs to be done is to take a step back and put one's self in the sandals of the villagers, actually live in the village and use the Holistic Process (Savory and Butterfield, 1999). Using this process, students in the precursor of AGSC 465R determined that villagers wanted to eliminate childhood deaths from malaria and stunting and death of their children from hunger (kwashiorkor). After malaria was eliminated in 2009 and a successful handicraft project initiated, thanks in part to students in this course, Sanambeleans and AGSC 465R students turned their attention to finding a cure for Kwashiorkor in the village. Kwashiorkor is a result of protein malnutrition in children. There are many ways to receive this nutrition, one of them is milk.



**Figure 1 (left) and Figure 2 (right):** Brahman cattle grazing in fallow fields surrounding village (Fig.1) and in mango orchard area of Sanambelean villagers. (Dunkel 2011)

**Hypothesis:** Sustainable elimination of Kwashiorkor in Sanambele could be accomplished with a small cow herd dedicated to milk production for the 2- to 5-year old children of Sanambele.



**Figure 3:** Cattle herd of Hawa Coulibaly, President of the Sanambele Women's Association and founding leader of the Sanambele Handicraft Cooperative.



**Figure 4:** Health, Poverty, Agriculture: Concepts and Action Research course logo created by Malian artist (Soumbaounou 2003).



**Figure 5:** Jenabu Coulibaly (age 4) sharing lunch with her brother eating millet tou, main protein source for village of Sanambele. (Dunkel 2011)

**Materials and Methods:** Over 220 peer-reviewed journals were reviewed of which a small fraction were cited. Past student reports (Wedlake 2011, \*\*\*add others\*\*\*), and many in-depth conversations with Florence Dunkel in-person and with Keriba Coulibaly in Mali by e-mail were built upon. We used the Holistic Process (Savory and Butterfield, 1999) which we began practicing the first class period. Through this process we involved ourselves in the village in a way that does not allow our Western way of life to be imposed upon their local cultures. This is imperative because we are there to be a resource as villagers search for solutions to Kwashiorkor in their own traditional ways. Keriba was extremely important in this aspect, contact with him made it possible to ask via cell phone specific questions of villagers, whose adult population, with several exceptions, speak only Bamanakan (local language of the Bambara people).



**Figure 6 (left):** Location of Sanambele in Mali (Luong et al. 2012)



**Figure 7 (above):** Sanambelean chart showing number of children with Kwashiorkor (Red), "At-Risk" (Yellow), and free and clear (Green). (Dunkel 2011)

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**Results:** Previous reports indicated that if a Sanambelean child receives just two cups of milk per day, the threat of Kwashiorkor would be eliminated (Wedlake 2010, Turley 2011). It has also been shown that a single female Brahman cow can produce roughly 22-30 liters of milk per day. With there being currently about 400 children in the village within the "at-risk" category of 2-5 year olds (Coulibaly and Coulibaly 2012), there would only be a need for roughly 7 to 9 cows to supply their children with a reliably and steady supply of milk, and to account for the "dry period" a cow needs to recover from milking.

Parameters Essential for Calculating Cow Herd Size	Result:
Number of children in Sanambele 2-5 years old	400
Amount of milk produced by one Brahman cow	30.3 liters
Complete daily protein required for 2-5 year old children	1.05g/kg body weight/day
Protein content of Brahman cow milk	30g/ liter

**Conclusions:** Sustainability of a milk-producing cow herd in the village of Sanambele is good. There is enough foliage and grazing area around the village with access to water that there should be no problems in keeping the cows at a healthy, milk-producing stage.

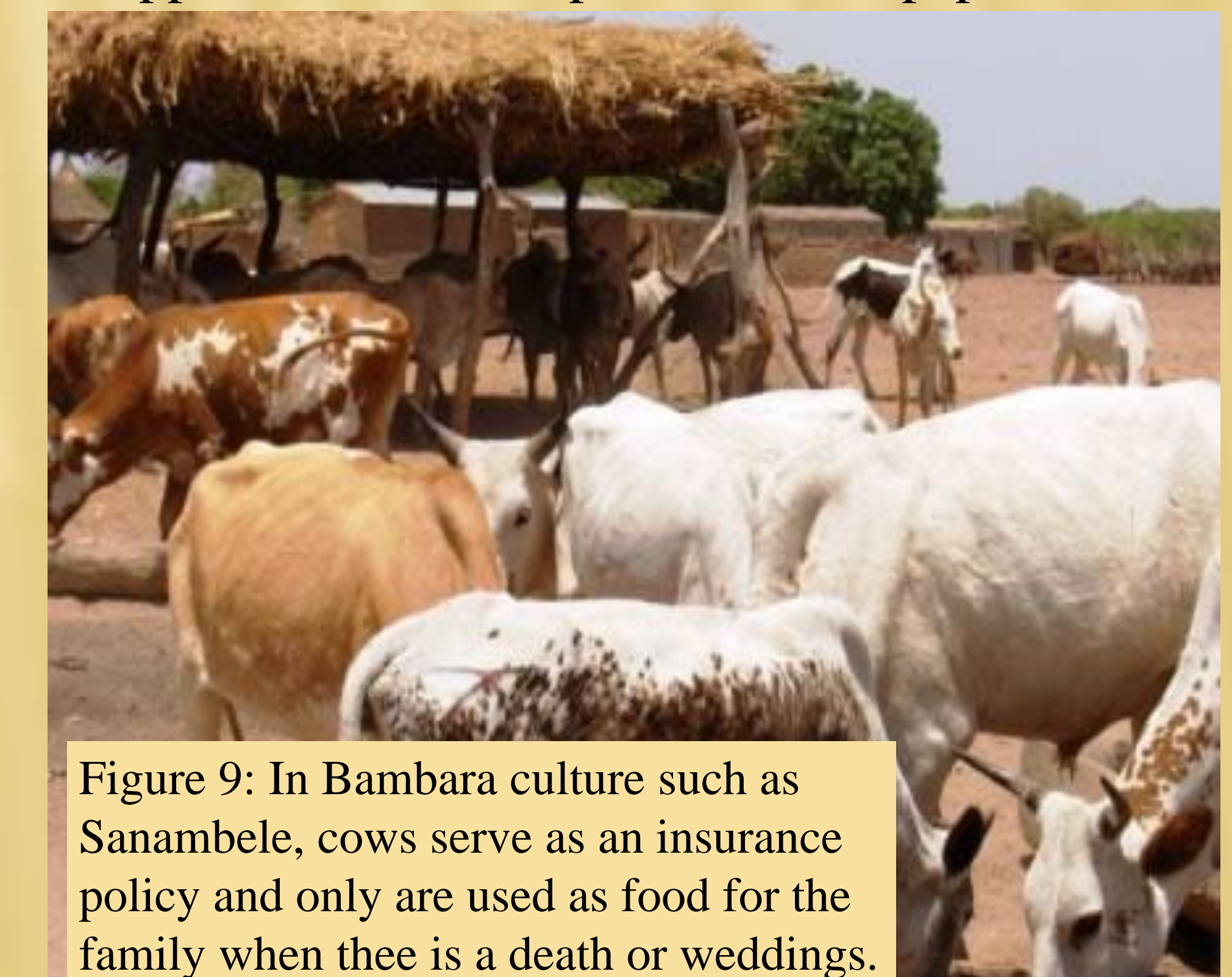
## Recommendations:

- In the event that the number of "at-risk" children decreases, the number of cows should not follow this trend, in case there is a sudden spike in "at-risk" children.
- The herd should be expanded as funds and personnel see fit, the excess milk should be stored in one of many ways, and could be used within the village.
- Apply for a microloan with the local Women's Association to cover the cost of the cows, if there are not enough currently within the village.



**Figure 8:** A mother with her "At-Risk" child in the village of Sanambele. (Dunkel 2011)

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**Figure 9:** In Bambara culture such as Sanambele, cows serve as an insurance policy and only are used as food for the family when there is a death or weddings.