The red meat value chain in Tanzania

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Abstract
The red meat value chain in Tanzania includes live animals, fresh meat, processed meat products and by-products from cattle, sheep and goats. Participants in the chain include primary producers, traders in animals, in meat and in by-products, processors, butchers, other retail outlets and consumers. Most actors are not specialized, and their functions relate to various segments of the value chain. Many primary producers, for example, engage in trading of animals and some upstream actors, such as butchers, trade in animals and meat and undertake primary processing for production of higher value cuts, minced meat and sausages.

Introduction
The value chain describes the range of activities required to move a commodity through the various stages that bring it from the first point of production to the last point of consumption. This usually involves (an often complex) combination of physical change, inputs from various producer services, transfer of ownership and delivery. Commodity value chains are increasingly recognized as providing a solid framework for the analysis of the public and private sector stakeholders players within them as well as the overall performance of particular markets.

Ruminant livestock have long been a mainstay of Tanzania’s economy and one of the key livelihoods of its people. In the 50+ years between Independence in 1961 and the year 2012 the human population quadrupled, the cattle population increased 9-fold, the goat population 3-fold and the sheep population by a factor of 1.4. The Tanzania red meat value chain from supply and use of inputs, via production and processing to marketing and retailing is confounded by many technical and institutional impediments. The chain is fragmented, unorganized, uncontrolled (in spite of being over-regulated) and uncoordinated. Many participants have more than one role. At various stages, goods and services include land, labour, live animals, veterinary supplies, feed supplies, transport, energy, finance and (perhaps above all and what is most lacking) institutional support. Clearly defined and enunciated standards and a regulatory framework under law are needed. Many of these requirements continue to be weak, non-existent or are not applied in Tanzania.

Materials and methods
This study derives from a period of study in Tanzania. A thorough review of the literature was first undertaken. Field visits were made to all the areas in the country, except the western provinces, where livestock are reared. Discussions were held with individual participants operating throughout the chain, with focus groups and with technical and administrative personnel in both public and private sectors. Analysis and report production were then carried out according to standard methods.

The value chain map
The value chain map (Figure 1) shows that the whole is suspended from the consumer. If the link to the rest of the chain were broken the whole would be susceptible to collapse. This situation is similar for all other links in the chain. Each link takes the product from its immediate predecessor and “processes” it to an output that is used by the next link (Figure 2). Nominally, the value of product increases at each stage until it reaches the consumer.

It is possible to provide a succinct list of most of the participants in the chain (Table 1) and it is also possible to provide a list of their functions and roles. Some small-scale livestock producers who operate across every link and a similarly unknown number of middlemen who operate throughout the chain (Table 1) but pivotal roles are played by the middle links of the chain through which all products must pass. Many participants (Table 2) occupy more than one role.
Table 1. Simple listing of supply and service participants in the Red Meat Value Chain.

| Core actors                                                                 | Service suppliers                                      |
|----------------------------------------------------------------------------|--------------------------------------------------------|
| Producers (Agropastoralists, Pastoralists, Dairy farmers, Commercial Ranchers) | Research                                               |
| Traders and agents                                                         | Training and Education Institutions                     |
| Slaughters and facilities                                                  | Extension service                                      |
| Wholesalers                                                                | Inputs (Veterinary, Feed)                               |
| Butchers (Rural, Urban, Quality butcheries and supermarkets)                | Transport                                               |
| Meat product retailers (Street vendors, shops, supermarkets)               | Financial services                                      |
| Importers (live animals, meat and meat products)                           | Meat inspectors and abattoir workers                    |
| Exporters (animals, meat and meat products, hides and skins)               | Associations (Producer, Processor, Trader, Exporter)    |
|                                                                             | Tanzania Meat Board                                     |

Figure 1. The red meat value chain in Tanzania.
but especially those of slightly larger scale also act as processors and retailers. Further up the chain some processors are also wholesalers and retailers and operate in both the domestic and export markets. Primary producers may sell cattle, goats or sheep directly through a market, to a trader or to a processor or may use a combination of all three outlets. A trader can sell to another trader, directly to a wholesale or retail butcher or to a processor or, again, may broaden his option by using a combination of these channels. Processors, especially the smaller enterprises, may buy animals directly from farmers or from traders and sell the products to wholesalers or retailers.

Every link in the chain relies on goods and services in order to enable it to fulfil its role(s). At the various stages, goods and services include land, labour, live animals, veterinary supplies, feed supplies, transport, energy, finance and (perhaps above all and what is most lacking) institutional support. Also required are clearly defined and enunciated standards and a regulatory framework under – and applied by – law. Many of these requirements continue to be weak or non-existent in Tanzania.

Technology generation

Technology in livestock production includes inputs such as feed or veterinary medicine at the producer level, machinery use in slaughtering and processing and proper and hygienic presentation of products at the retail level [2]. Technology has a key role in improving competitiveness and especially vis-à-vis near neighbours operating in and competing for the same environment.

Red meat production in Tanzania is based on traditional systems that use very little modern technology. Indigenous cattle (Tanganyika Shorthorn Zebu), sheep (undifferentiated African long-fat-tailed types although the Red Masai is recognized in the north of the country) and goats (Small East African) (Figure 3) that are considered of limited potential for production dominate the herds and flocks [7]. Animals
derive their feed almost in its entirety from the natural rangeland and some crop residues which are usually in low supply and for much of the year have minimal nutritional value. Most herds receive little in the way of animal health treatments such as vaccination (only 29 per cent of cattle are vaccinated regularly), protection from ticks (and the diseases they carry) or control of internal helminth parasites [8]. As a consequence, if the animal does not succumb to its miserable lifestyle (death rates are very high in calves and may reach 70 per cent of those infected by East Coast Fever (ECF) which can be reduced to less than 30 per cent with regular dipping), reproductive rates in cattle are only about 50 per cent (a cow calves first at 4 years of age and then produces a calf only every 2 years) and overall growth rates are low (and characterized by the gain-loss-gain annual cycle). Thus, overall output is greatly reduced (annual offtake for slaughter may reach 12 per cent but is more likely to be 10 per cent) and if an animal survives to the slaughter stage (at a minimum of 4 years and often at 6-8 years) the resultant product (meat) is of very poor quality.

As can be inferred from the preceding paragraph many technological interventions are available. For the most part, however, they are not used by producers and probably not even communicated to them by technical staff. Some are, indeed, somewhat sophisticated or too expensive for use at the present state of development of the regional herd. A vaccine against ECF, for example, has recently been put on the market but is too costly for general use [9]; on the other hand, frequent and regular dipping or hand spraying (acaricides are subsidized by the public sector) would greatly reduce the incidence of tick-borne diseases, not only of ECF but heart water, anaplasmosis and babesiosis. The more widespread use of artificial insemination (AI) is often advocated as a means of improving the genetic make-up of indigenous stock but in the prevailing Tanzania conditions this technique can have only limited application and is fraught with such problems as supply of liquid nitrogen and actually getting to the cow while she is receptive to insemination [10]. Urea- or ammonia-treatment of fibrous feeds to improve their nutritional quality is a cheap, simple and very effective technique for accelerating weight gain but has little application in the country [11]. Low adoption of available technologies is caused by poor extension services, difficulties in gaining access to the technologies (cost/location) and the low level of knowledge among most livestock keepers.

Adoption of known improved but not over ambitious management and technological practices can, however, bring about spectacular increases in the output and quality of livestock products (Table 3). Amongst such are:

- strict implementation of the tick control regime recommended by the veterinary authority;
- vaccination against epidemic and endemic diseases, both “trade” and “production”;
- matching the stocking rate to the carrying capacity and providing preferential access of target groups (pregnant animals and young stock) to set aside dry season pasture reserves and conserved fodders;
- regular (daily at least) access to water by livestock;
- use of mineral and vitamin supplements to target groups including breeding males;
- castration and early removal of inferior males and those unfit for service;
- sale of barren and unproductive females and of over age draught animals; and.
- sale of slaughter cattle when they are in good condition early in the dry season and try to avoid “emergency” sales for immediate cash needs.

**Conclusion**

A plethora of reports, workshops, projects and programmes have masqueraded as — or been a proxy for — development of the livestock red meat industries. The simple fact is, however, that the ordinary people of Tanzania still do not have enough meat to eat and even were there to be enough they would not be able to afford to buy it [12]. Failure to overcome the lack of use of available, effective, cheap and simple technology will inevitably result in even further loss of competitiveness as the peers of Tanzania’s livestock producers and processors in neighbouring countries, especially Kenya, are making widespread use of it [13].

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Table 3. Potential improvements in red meat production with adoption of simple technology.

| Production parameter | Current value | Intervention | Future value | Improvement (per cent) |
|----------------------|---------------|--------------|--------------|------------------------|
| **Cattle**           |               |              |              |                        |
| Reproductive rate (calving interval) | 24 months     | Strategic supplementation | 18 months | 33                     |
| Cow lifetime calf production | 3             | Strategic supplementation | 4          | 33                     |
| Calf survival         | 30 per cent   | Vaccination/dipping against ECF, anthelmintic treatment | 70 per cent | 233                    |
| Calf growth to 7 months | 300 g/d       | Supplementation | 400 g/d     | 33                     |
| Long term growth, 1 to 4 years | 200 g/d       | Mineral/molasses/multinutrient blocks, crop residue treatment | 250 g/d    | 25                     |
| Older animal survival, per year | 80 per cent   | Supplementation, dipping, anthelmintic treatment | 90 per cent | 12                     |
| Offtake rate, per year | 10 per cent   | Combinations of above | 12 per cent | 20                     |
| **Goats and sheep**  |               |              |              |                        |
| Reproductive rate (kids/lambs per year) | 1.5/1.2       | Strategic supplementation, anthelmintic treatment | 1.6/1.3    | 41126                  |
| Growth to 2 years    | 300 g/d       | Mineral/molasses/multinutrient blocks, crop residue treatment | 350 g/d    | 16                     |
| Adult survival, per year | 80 per cent   | Mineral/molasses/multinutrient blocks, crop residue treatment | 85 per cent | 6                      |
| Kid/lamb survival    | 50 per cent   | Anthelmintic treatment (including tapeworm), tender loving care | 70 per cent | 40                     |
| Death from Peste des Petits Ruminants/Rift Valley Fever | 15 per cent   | Vaccination | 2 per cent  | 750                    |
| Offtake rate, per year | 20 per cent   | Combinations of above | 25 per cent | 20                     |

Source: Author’s compilation

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**Competing interests**

The author declares no conflict of interest.

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