FOOD SECURITY RESEARCH PROJECT

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by
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ACRONYMS

ACF	Agricultural Consultative Forum
ACU	Acceleration of Cassava Utilization Task Force
CLUSA	Cooperative League of the USA
FAOSTAT	Food and Agriculture Organization Statistics (online)
GSB	Growing Sustainable Business
GTZ	Gesselschaft für Technische Zusammenarbeit
LDT	Livestock Development Trust
MACO	Ministry of Agriculture and Cooperatives
MSU	Michigan State University
NGO	Non-governmental Organization
PAM	Program Against Malnutrition
RTIP	Roots and Tuber Improvement Program
SARRNET	Southern Africa Root Crop Research Network
UNDP	United Nations Development Program
UNZA	University of Zambia
ZABS	Zambian Bureau of Standards

EXECUTIVE SUMMARY

Smallholder farmers operate in vertical supply chains. Therefore, an understanding of key opportunities and constraints up through the value chain becomes necessary for sustaining smallholder growth. Yet market analysis is of little value unless key private and public sector stakeholders agree to implement necessary reforms. This paper advocates an approach which marries together value chain analysis with a stakeholder taskforce to ensure that analysis of opportunities and constraints gets translated into actions that will facilitate commercial growth. Using Zambia's cassava task force as an example, the paper describes the value chain task force method and identifies elements critical to its effective implementation.

KEY WORDS: cassava, value chain, task force, Zambia, Africa

1. INTRODUCTION

Small commercial farmers participate in vertical supply chains. They sell to traders or processors who, in turn, market through exporters or local distribution outlets. As a result, new agricultural production technology alone is often not sufficient to trigger smallholder income growth; sustained income growth at the farm level depends also on access to final markets further up the supply chain. For this reason, groups involved in smallholder agricultural development have become increasingly interested in understanding the full vertical marketing network linking farmers with the final markets they serve (Vorley 2001; Evans 2004; Magistro et al. 2004; Goletti 2005).

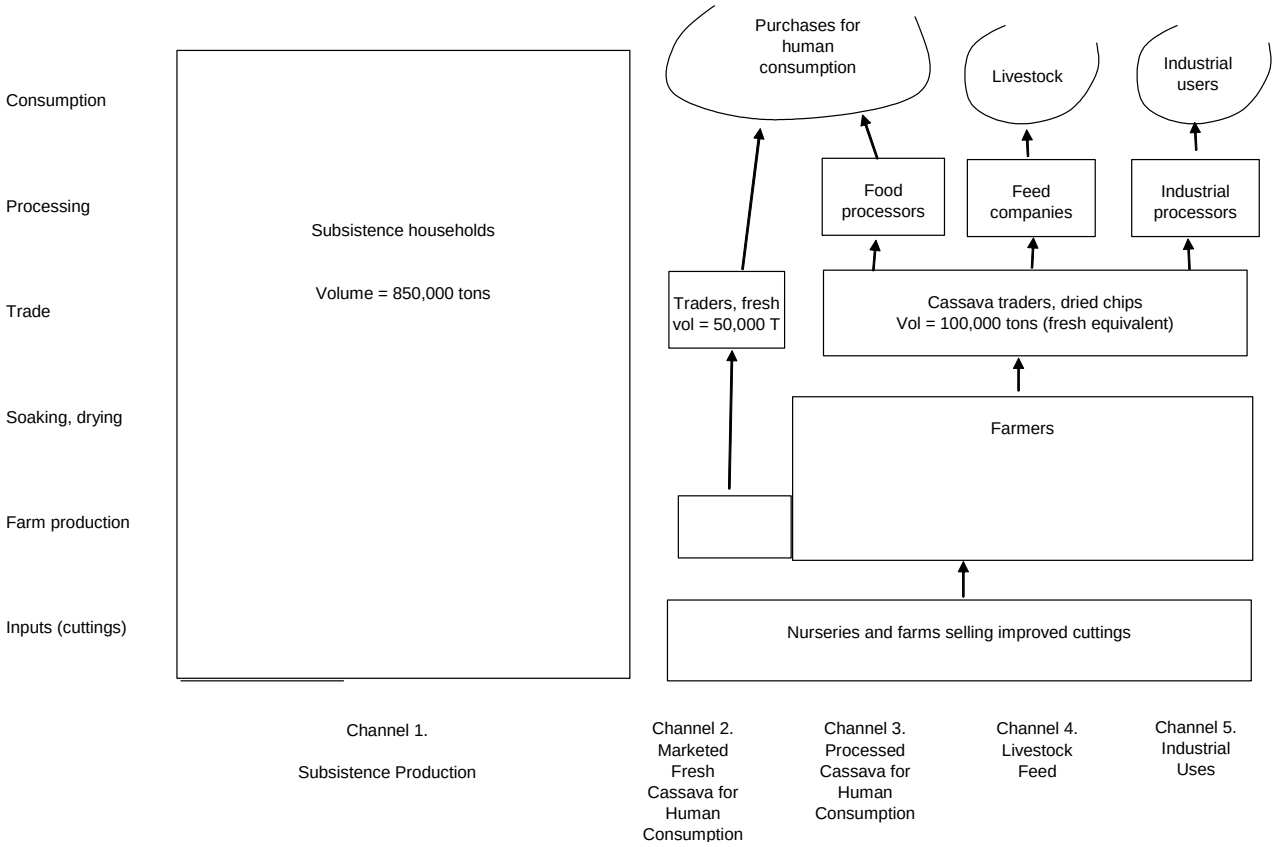
Since the early 1990's, structural changes in agricultural markets have heightened interest in understanding these vertical marketing systems. Growing concentration, worldwide, in food retailing and export agriculture has led to fears that resulting upstream consolidation in rural marketing systems risks excluding smallholders from these increasingly concentrated supply systems (Weatherspoon and Reardon 2003; Reardon and Timmer 2005; Wiggins et al. 2005). In Africa, direct public sector participation in agricultural markets has diminished substantially following structural adjustment and widespread liberalization. As a result, the private sector plays an increasingly important role in output marketing, input supply and service delivery (Kherallah et al. 2002; Zulu et al. 2000). This diminished public role has led African policy makers to rely increasingly on private sector initiatives and on private-public partnerships (PPPs) for developing smallholder marketing systems.

Marketing specialists refer to these vertical supply systems by various names – as supply chains, value chains, commodity sub-sectors, filières, networks or clusters (Shaffer 1968; Goldberg 1968; Boomgard et al. 1992; Montigard 1992; Lauret 1993; Porter 1998; Kaplinksy and Morris 2000; Dowds and Hinjosa 1999; Evans 2004). To emphasize the value addition that takes place at each vertical step in the system, this article refers to the overall production and marketing system for a particular commodity as a *value chain* and to each competing vertical channel within as an individual *supply channel.* Zambia's cassava value chain, examined in some detail in this paper, encompasses five different supply channels, ranging from subsistence consumption (Channel 1) to industrial starches and derived products (Channel 5) (Figure 1).

A variety of closely related methods have emerged for analyzing marketing systems and identifying interventions that will enhance system performance (Boomgard et al. 1992; Dowds and Hinjosa 1999; Bourgeois and Herera 2000; Kaplinksy and Morris 2000; Meyer-Stamer 2002; Lusby and Panliburton 2002; Haggblade 2006; Roduner and Gerrits 2006). In common, they typically adopt a vertical marketing perspective and a diagnostic process that aims to identify key opportunities, key constraints and cost-effective interventions for expanding commercial potential. Less common is effective participation and buy-in by key stakeholders in the diagnostic work. While most "how-to" handbooks concentrate on diagnostic methods and signature market characteristics that assist in defining effective interventions, few discuss how to engage key supply chain participants in a participatory analytical process.[1] In practice, donor-funded project staff or proprietary in-house consultants conduct the bulk of the value chain diagnostics.

[1] See Bourgeois and Herera (2000) for one of the few available discussions of how to involve private sector stakeholders in the diagnostic process.

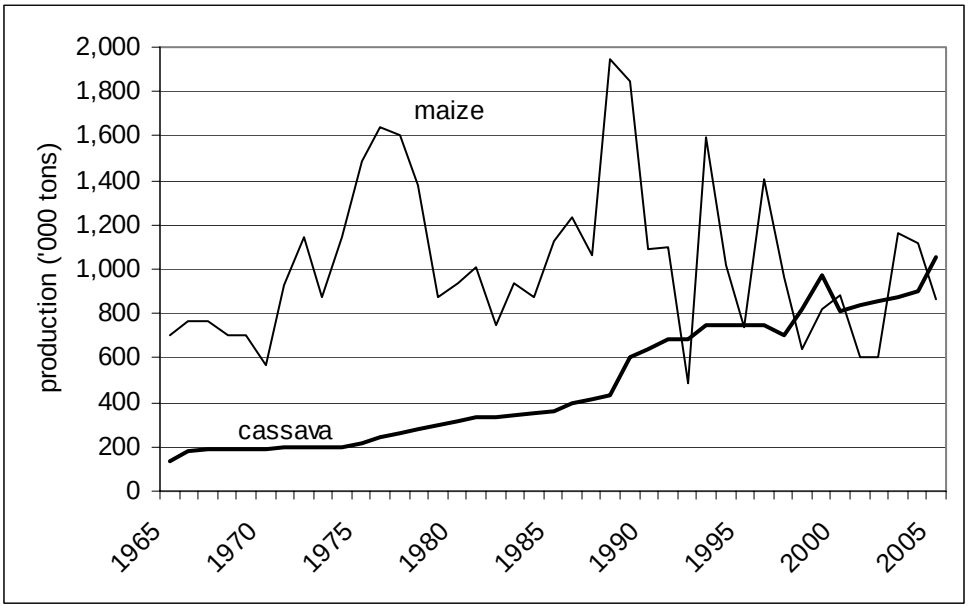
Figure 1. Overview of Zambia's Cassava Value Chain



To counteract this exclusionary tendency, a growing cohort of practitioners emphasizes the importance of including key private sector interest groups – the so-called channel captains – at the analytical stage (Bourgeois and Herrera 2000; Ernst et al. 2004; Meyer-Stahmer and Waitring 2006). This enables more rapid diagnostics and likewise facilitates coordination of subsequent interventions. Without private sector involvement at the analytical stage, the diagnostic effort is prone to remain an academic exercise. But with private sector participation, the resulting value chain task force method offers a diagnostic as well as an operational tool for assessing marketing system performance, identifying key bottlenecks and coordinating private and public interventions aimed at improving performance.

This paper documents a recent application of the value chain task force method in Zambia, focusing on the case of the Acceleration of Cassava Utilization (ACU) Task Force. Cassava, the staple food crop in northern Zambia has seen rapid production growth over the past decade and a half (Figure 2). But continued output growth will depend critically on the development of commercial markets throughout the country and even abroad; hence the mobilization of the ACU Task Force. In describing the origins, operation and impact of Zambia's ACU Task Force, this paper aims to illustrate the value chain task force method and to identify elements critical to its effective implementation.

Figure 2. Trends in Staple Food Production in Zambia

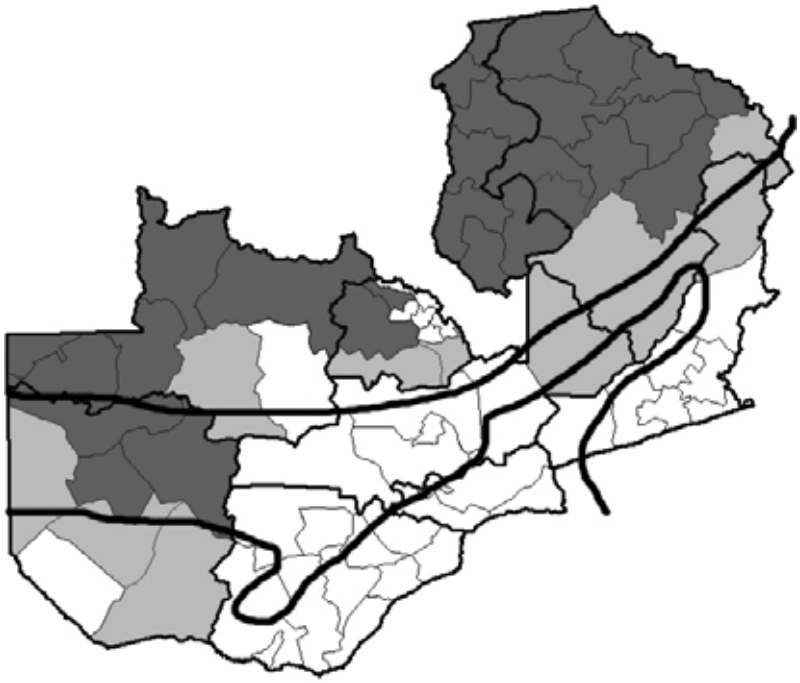


2. ZAMBIA'S CASSAVA SURGE

2.1. Trends and Causes

Zambia's two staple foods, maize and cassava, both arrived from the Americas with Portuguese traders during the 17th century (Miracle 1966; Jones 1959). Since their arrival, these two crops have revolutionized Zambian agriculture, displacing sorghum and millet as the country's principal foods. While maize has become the principal staple food in the central and southern parts of Zambia, cassava is now the mainstay of diets in northern and western Zambia (Figure 3). Today, maize supplies about 60% of national calorie consumption, with cassava furnishing a further 15% (FAO 2002).

Figure 3. Areas of Heavy Cassava Production* in Zambia, 1990



Beginning in the 1930's, government subsidies and policy preferences for maize have artificially inflated maize production in Zambia. At their peak, in the late 1980's, maize subsidies amounted to 17% of total government spending (Howard and Mungoma 1996). Following the withdrawal of these substantial support programs, maize production has gradually trended downward, while production of cassava, groundnuts, cotton, tobacco and horticultural products has expanded significantly (Jayne et al. 2002). Among staple foods, cassava output has grown most rapidly (Govereh 2007).

Zambia's highly successful cassava breeding program laid the foundation for this rapid recent increase in cassava production. As government began phasing out maize subsidies, breeders released two waves of improved cassava varieties, the first in 1993 and the second in 2000 (Table 1). Developed at research stations in northern Zambia, these improved varieties offer disease and pest tolerance, early maturity and yields up to triple those of most local varieties. As a result, the new varieties have spread rapidly in northern Zambia, through farmer-to-

Table 1. New Cassava Varieties Released in Zambia

Variety	Type	Released	Yield (tons/ha)	Taste
1. Bangweulu	cleaned local variety	1993	31	bitter
2. Kapumba	cleaned local variety	1993	22	sweet
3. Nalumino	cleaned local variety	1993	29	bitter
4. Mweru	bred by RTIP	2000	41	sweet
5. Chila	bred by RTIP	2000	35	bitter
6. Tanganyika	bred by RTIP	2000	36	sweet
7. Kampolombo	bred by RTIP	2000	39	sweet
Traditional	local variety		7	bitter

* All yields refer to research station observations using no purchased inputs but following recommended agronomic practices. Yields were measured 16 months after planting.

Source: Chitundu and Soenarjo (1997) and Simwambana et al. (2004).

farmer distribution of planting material (Ministry of Agriculture 2000)[2]. Agronomic trials outside of the north suggest that most of the new varieties are equally productive in central Zambia, although they require about six months longer to reach full maturity because of cooler temperatures, lower rainfall and a shorter growing season (Barratt et al. 2006). Outside the north, cassava production has grown most rapidly in Eastern Province, though from a very low initial base. Elsewhere, in central and southern Zambia, apart from small pockets of growth, cassava remains a minor crop (Barratt et al. 2006).

2.2. Potential Benefits

Zambia's cassava surge has attracted considerable attention, among the private sector as well as relief agencies.

Groups concerned with household food security have begun actively promoting cassava production among vulnerable households because of its drought tolerance, year-round food supply, high yield and low production cost. Well known for its drought tolerance, cassava production proves highly stable from year to year. In contrast, maize yield and output vary widely (Figure 2). This leads to recurring food shortages in the maize-consuming regions of southern, central and eastern Zambia. But in northern Zambia, where drought-tolerant cassava serves as the principal food staple, food aid appeals are rare (DMEWU 2005; FAO 2005). Cassava is likewise the only major food staple farmers can harvest at the height of the lean season – in December, January and February – before the maize harvest, when maize prices peak, incomes are low, and hunger is most acute. Highly productive, cassava produces more calories per unit of land and per unit of labor than does maize. Even in good rainfall years, when maize yields are highest, cassava production per hectare exceeds that of smallholder maize by about 20% for fertilized hybrids and by 100% compared with unfertilized local maize varieties (Barratt et al. 2006). While cultivation of hybrid maize requires purchase of new seeds and inorganic fertilizer each season, cassava farmers require

[2] Although cassava can be grown from seed, farmers typically propagate it vegetatively by planting a cutting 30 cm long from an available, preferred variety.

neither. They simply replant cuttings from their existing fields. So cassava production is accessible to even the very poorest families.

Commercial firms have likewise been attracted by cassava's high productivity and consequently low cost, which make it potentially profitable as a starch substitute in livestock feeds, human foods and industrial starches. Though the roots are largely composed of starch, cassava leaves contain between 21% and 39% protein (dry weight) and can be marketed for human consumption or as a livestock feed supplement (Yeoh and Chew 1976; Nassar and Marques 2006). Countries such as Thailand, Indonesia, Nigeria and Brazil market large quantities of cassava for domestic industrial use and for export. Yet most of this commercial potential remains untapped in Zambia.

3. ORIGINS OF THE CASSAVA TASK FORCE

3.1. Spontaneous Emergence

Realizing the potential of Zambia's new cassava varieties to improve food security in drought prone areas, a coalition of NGO's began, during the late 1990's, to distribute cassava cuttings in food security packs as part of drought mitigation efforts in central and southern Zambia. Around the same time, the private sector began to develop commercial cassava-based products on a small scale. Several local livestock farmers and feed companies began experimenting with cassava-based feed rations. A handful of local bakeries and catering services began developing cassava-based biscuits, nshima[3] and composite-flour fritters, while several West African immigrants have worked to develop local gari[4] production. Zambia's largest brewery, together with a newly established food processor, has been exploring prospects for cassava-based malt beer as well as cassava-based sweeteners for soft drinks, juices and prepared foods.

In June 2005, this broad commercial potential surfaced during a discussion at the Agricultural Consultative Forum (ACF), an association promoting information exchange and policy dialogue among farm groups, agribusiness and government. The ACF organized a special session on cassava, showcasing two presentations. The first reported the results of three years of agronomic trials in central Zambia, undertaken from 2002/3 to 2004/5. The trials demonstrated that many of the cassava varieties developed in the government's northern breeding stations have the potential to perform well in central Zambia, and they prove superior to maize under erratic rainfall conditions (see Barratt et al. 2006). Moreover, the cassava plots performed well with no purchased inputs, a clear advantage in a cash-scarce rural economy. The second presentation summarized the experience of a Nigerian entrepreneur, based in Zambia, illustrating the potential of cassava as a raw material input in various food processing industries.

The participants agreed that a significant opportunity existed. Two rounds of new varietal releases, between 1993 and 2000, had triggered obvious productive potential. Yet, despite growing commercial interest in cassava, participants claimed that considerable volumes of cassava remained unharvested and unutilized in key producing areas of northern Zambia. This paradoxical situation invited investigation into the cause of the "missing link" between surplus productive capacity and potentially significant commercial opportunities. How could this potential be harnessed to improve national food security and fuel industrial growth? Following the initial ACF meeting, the forum secretariat invited stakeholders from the private and public sectors to join them in forming a cassava task force with the express goal of helping to accelerate development of this commercial potential. The group ultimately became known as the Acceleration of Cassava Utilization (ACU) Task Force. At its inaugural meeting, the task force launched an interactive and participatory exploration of the cassava value chain.

[3] Nshima is a thick porridge made from cooked flour, primarily maize nshima in the south and cassava nshima in the north.

[4] Gari is a pre-cooked, dried, granular form of cassava, popular throughout West-Africa as a convenience food.

3.2. Principles

Early on in the process, this self-selected group of cassava value chain stakeholders developed an explicit written statement of the task force's objectives and guiding principles, which are summarized below.

Objectives: The ACU Task Force is a group of self-motivated stakeholders determined to realize the commercial potential of cassava and consolidate its contribution to household food security in Zambia.

Membership: The ACU Task Force will open its membership to any interested stakeholder, including partners from the private and public sector, civil society and concerned implementing agencies.

Public information access: Reports, documents and findings produced by the ACU Task Force are open to the public.

Value chain perspective: The ACU Task Force adopts a holistic approach to sector development based on a comprehensive value chain analysis, including an assessment of all major supply channels.

Facilitating interventions: The ACU Task Force will act as a catalyst for building partnerships, facilitating information exchange and identifying opportunities for the commercialization of cassava. Task force members will initiate, facilitate and coordinate interventions in order to address bottlenecks along the cassava value chain as identified by the collectively developed task force roadmap.

Funding: The ACU Task Force has no operational budget. Its members implement actions enhancing cassava utilization through their ongoing operations with existing resources. Where necessary, the task force will lobby for external resources required to fill specific, strategic gaps.

Evolution: The strategic roadmap, structure and function of the task force will evolve to accommodate new issues and opportunities as they emerge. The task force will regularly review progress in cassava utilization and re-assess future opportunities and interventions.

Thus, the mix of stakeholders, their roles and functions have been largely determined through an evolving, self-defined process, guided by a collectively developed common vision of opportunities, constraints and key interventions required to unleash the commercial potential in cassava. The absence of large infusions of external funding for an explicit task force budget proved key. Early on, some of the original promoters of the task-force dropped out when they realized that the task force principles would frustrate their ambitions to obtain access to additional public resources. Conversely, as the process unfolded, other individuals and groups were drawn into the process when it became clear they were key to help unblocking specific bottlenecks. Among others, these later recruits included the Zambia Bureau of Standards, a group of cassava brokers and several commercial livestock farmers. Still others joined in, after sitting on the fence in the early stages, when they realized the momentum and opportunities the task force created.

4. DESIGNING THE INITIAL ROADMAP

To chart its substantive agenda, the task force began by simultaneously addressing two closely related questions. First, what are the existing structure, opportunities and bottlenecks in the cassava value chain? Second, why have past promotional efforts failed to stimulate broad expansion – of cassava production outside the northern cassava belt and of cassava processing in general? In order to answer these questions, the task force commissioned an inception study, through the ACF, which then served as a basis for in-depth discussions within the task force (Simwambana 2005). The following discussion summarizes the main conclusions emerging from this review.

4.1. Value Chain Analysis

Five distinct supply channels link cassava producers with various final markets (Figure 1). The first supply channel is composed of self-sufficient cassava-producing households who consume the bulk of their own production. Channel 1, the largest by far, accounts for about 85% of all cassava production in Zambia (van Otterdijk 1996).

The second channel, derived from the first, involves farm households selling surplus production in fresh form to nearby markets for human consumption. The fresh sales account for no more than 5% of total production (van Otterdijk 1996; Tembo and Chitundu 2000; Langmead and Baker 2003). Because cassava roots contain about 70% water, and because root quality deteriorates within 48 hours after harvesting, most fresh sales travel no more than about 50 kilometers from field to final market. For this reason, Channels 1 and 2 are well established in northern Zambia but offer limited expansion potential elsewhere, until consumption patterns change appreciably.

Channels 3, 4, and 5 link rural cassava producers to potentially vast urban markets by supplying a cheap carbohydrate to substitute for the wheat- and maize-based products that currently predominate among Zambia's food, feed and industrial processors. Collectively, these three channels account for 5% to 10% of total cassava production. Farmers, traders and processors in Channel 3 prepare dried cassava, then mill it to produce cassava flour for use in a variety of human foods, including toasted snacks, composite flour biscuits, blended nshima and convenience foods such as gari. In Channel 4, an array of innovative farmers and feed companies are experimenting with cassava-based feed rations as a means of lowering feed costs, the major cash expenditure in livestock production. Industrial starch production, in Channel 5, has atrophied with the demise of a parastatal cassava starch company in the town of Ndola, on the Zambian Copperbelt, though a variety of private firms have been exploring prospects for cassava-based flour and starch as an input in a range of industrial applications (Mwasi, Chisamanga, and Mapulanga 2004).

The dominant forces driving change in each of these three channels – the so-called "channel captains" – are the innovative players at the top end of the chain. As they develop markets for products that incorporate cassava-based carbohydrates into their products, these innovators expand demand for cassava roots and chips, generating demand to which the rural producers have shown they are likely to respond. In Zambia's expanding dried cassava trade, an absence of trading standards, poorly coordinated market information, long distances, small volumes and consequently high marketing margins are among the bottlenecks that currently constrain growth in these supply channels. And this is where the task force comes in.

4.2. Review of Past Interventions

4.2.1. Northern Zambia's Cassava-consuming Zones.

In northern parts of Zambia, where cassava is the principal food staple, promotion efforts have centered on support for Channel 1, through long-term investments in cassava research and subsequent distribution of planting material for these improved varieties. Because yields of the new varieties roughly triple those of traditional varieties, farmers have rapidly adopted the new varieties, initially from cuttings supplied by seed multiplication sites and subsequently through farmer-to-farmer distribution of improved cuttings (MAFF 2000). As a result, cassava production has grown rapidly in the northern provinces, at a compound rate of 9% per year over the past decade (Barratt et al. 2006). As households satisfy their own consumption needs, this rapid production growth generates increasing surpluses available for sale. So future expansion of cassava production in this zone will be constrained, in the short run, by the size of commercial markets that can absorb this additional output. In the medium run, production growth is threatened by the collapse of government cassava breeding programs and the consequent failure to develop a future pipeline of new varieties that will be essential in maintaining the production base in the face of constantly evolving disease and pests.

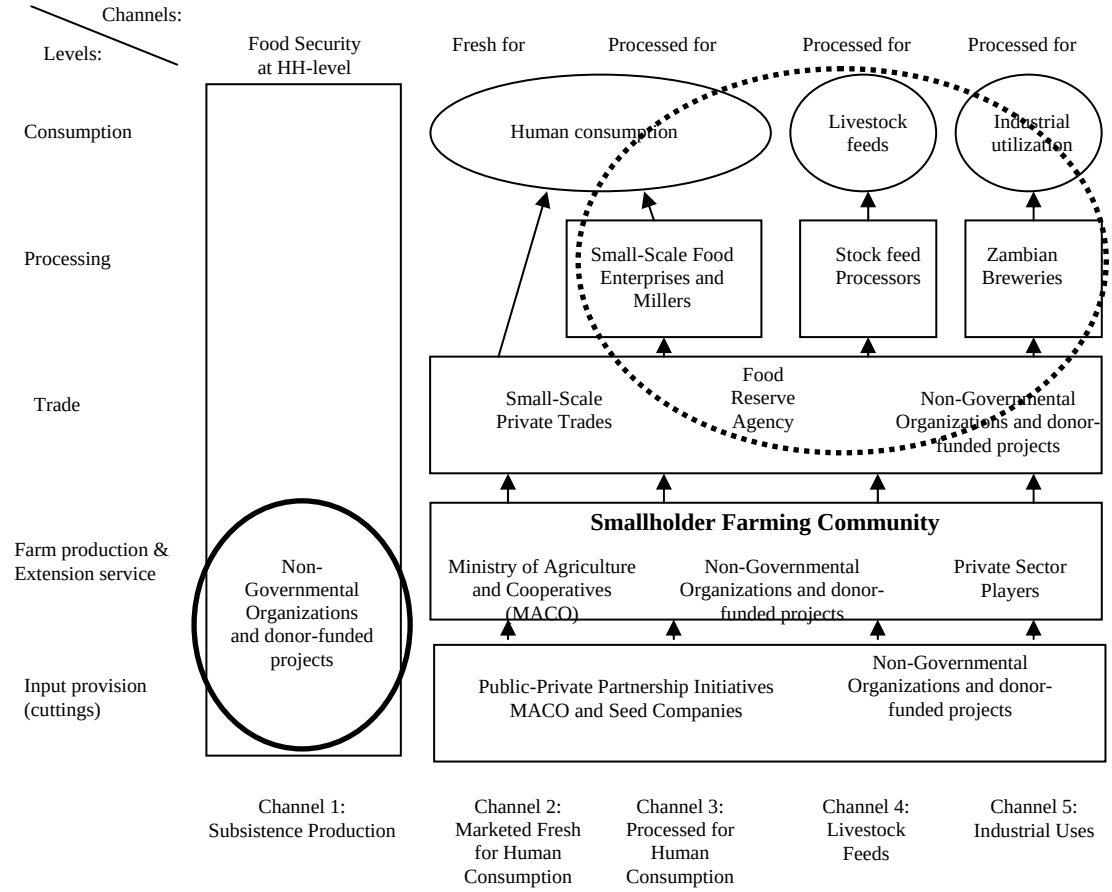
4.2.2. Southern Maize-consuming Regions.

In the primarily maize-consuming zones of southern Zambia, the great bulk of promotional efforts have likewise focused on expanding Channel 1, by distributing cassava cuttings to food-insecure households for their subsistence consumption (Figure 4). With a few notable exceptions, these efforts have largely failed to establish cassava as a significant food security crop in this zone. As a result of late delivery of planting material, frequent failure to distinguish among the varieties distributed and limited on-farm extension support, farmers have planted only about 20% of the cassava cuttings they received from an array of drought relief and food security programs. Today, less than 1% of the farmers who received cuttings are still growing cassava (Simwambana 2005).

4.3. Charting the Initial Course

These initial diagnostics suggest that the most significant opportunities for growth lie in commercializing cassava for use as a low-cost carbohydrate in processed foods, livestock feed and industrial cassava derivatives (Channels 3, 4, and 5). The availability of Zambia's new cassava varieties, and the simultaneous withdrawal of large-scale maize subsidies, have made significant cassava production increases possible. But to sustain this production response will require steady expansion of commercial cassava markets. In both northern and southern Zambia, the task force concluded that priorities for future cassava development should focus, in the short run, on building commercial markets for cassava and, in the medium run, on reviving the cassava research system necessary to sustain future production gains in the face of ever mutating pests and viral diseases. In its first round of efforts, the task force agreed to focus on the pressing short-run priority of expanding commercial markets for cassava.

Figure 4. Value Chain Stakeholders



Concentration of early promotional efforts, 1990-2005

New focus of promotional efforts by the ACU Task Force, 2005 - 2006

This initial, commercial focus represented a radical break with the past. Prior efforts had focused largely on a supply-led strategy of promoting food production among subsistence households (Channel 1). Instead, the ACU Task Force adopted a demand-led strategy, focusing on market development in both trade and upstream processing industries – composite flours, convenience foods, livestock feed and industrial starch – all of which stand to benefit from access to low-cost, cassava-based carbohydrates (Channels 3, 4, and 5). The task force anticipates that expanding commercial markets for cassava will motivate farmers to increase cassava production as a cash crop. As production grows, household food security will improve, in both drought years and in the lean season. Thus, the task force road map aims to achieve household food security indirectly, by developing commercial markets which will induce cassava production and, in the process, ensure food availability in years of poor maize harvest as well as during the lean season.

5. FIRST-ROUND INTERVENTIONS

5.1. Priority Setting

To identify initial priority actions for accelerating cassava utilization and commercialization, the task force considered several related criteria: a) potential scale of the commercial opportunity; b) likely speed of market development; and c) investment costs and the consequent prospects for broad-based, incremental growth in processing activities (Table 2).

Using these criteria, the task force considered livestock feed (Channel 4) to offer the most promising immediate potential for cassava market development in the non-cassava consuming zones of central and southern Zambia. Current annual maize use in the livestock feed industry, together with common international feed formulations, suggest that Zambia's feed industry could absorb on the order of 90,000 to 150,000 tons of fresh cassava per year. The upper end of this range would represent a 15% increase in national production and a doubling of currently marketed volumes. Given widespread use of cassava as a livestock feed in Europe and in Asia, members felt confident that development of appropriate feed formulations could be quite rapid. And given low barriers to entry, any number of existing feed companies, millers, food processing firms or even individual livestock producers could potentially produce cassava-based livestock feeds. Thus, prospects for broad-based, incremental growth looked strong.

Cassava-based processed foods (Channel 3) hold even larger long-term market potential, though marketing and product development would likely be slower than with livestock feeds. Blended flour products, such as biscuits, breads, fritters and nshima offer the advantages of access to a large existing milling infrastructure and hence potentially rapid uptake, although they would require some product development and marketing efforts to gain consumer acceptance. Given current wheat consumption and estimating potential substitution at 10%, the rate officially targeted in Nigeria, would yield a market for blended flours requiring about 40,000 tons of fresh cassava per year. Blended maize flour, at a 10% substitution rate, could potentially absorb as much as 200,000 additional tons of fresh cassava. For gari and other cassava-based convenience foods, past efforts by private entrepreneurs suggest that market development will require time as well as resources sufficient to finance investments in marketing, packaging and processing technology. In the medium run, if Zambia were to

Table 2. ACU Task Force Priorities

		Northern Zambia				Central and Southern Zambia			
		Growth	Speed	Incremental	Priority	Growth	Speed	Incremental	Priority
Channel 1	Subsistence production	+	+++	+++		+	+	+++	
Channel 2	Fresh marketed cassava	+	++	+++		+	+	+++	
Channel 3	Processed foods	+++	+++	+++	1	++	+	++	3
Channel 4	Livestock feed	++	++	+++	2	+++	+++	+++	1
Channel 5	Industrial users	++	++	--	3	+++	++	--	2

Criteria

Growth:	What is the potential size of the market?
Speed:	How quickly can this potential be realized?
Incremental:	Can the channel be scaled up in small steps by many small players, or does it require big, lumpy investments?
Priority:	Among channels with the greatest growth potential, where should task force participants focus their efforts?

Rating

+++	high
++	moderate
+	small
--	negligible

reach cassava consumption patterns similar to those achieved in West Africa, then gari and other cassava-based convenience foods could ultimately account for as much as 50% of total cassava consumption, or roughly 500,000 tons of fresh cassava per year.

In the long run, industrial uses of cassava derivatives in the manufacture of paper products, wood processing, artificial sweeteners, ethanol and other manufactured goods offer a third potential market for Zambian cassava. Current use of cassava flour in the packaging, paper products and wood processing industry does not exceed 300 tons of cassava flour, or 1,000 tons of fresh roots, per year. However, in land-locked Zambia, where petroleum-based fuels cost in the range of $1.50 per liter, ethanol production from cassava could potentially absorb on the order of 100,000 tons of fresh cassava per year, given current volumes of fuel consumption and assuming a 10% substitution between ethanol and petroleum-based fuels without modification of vehicle carburetion systems (Earth Trends 2003). Cassava-based sweeteners could likewise absorb significant volumes, possibly in the range of 40,000 tons of fresh cassava per year. According to industry sources, investment costs required for production of high-quality cassava flour and starch lie in the range of $1 to $5 million. Therefore, investments are likely to be lumpy. Given strong interest by several local food processors, investors and a pair of business development projects, prospects for mobilizing the necessary investment funds, nonetheless, lie within the realm of possibility.

Given these alternative markets, and varying levels of private sector interest, the task force elected to focus on specific interventions aimed at accelerating commercialization of cassava-based livestock feeds (Channel 4), processed foods (Channel 3) and industrial sweeteners (Channel 5). At the urging of industry members, the task force agreed to tackle a fourth priority, development of official cassava trading standards necessary for the growth of efficient marketing systems linking farmers with processors in all three channels. At its third meeting, in November 2005, three months after its formation, the ACU Task Force divided into sub-groups focusing on each of these four areas. For the ensuing 12 months, the task force operated through these four smaller, separate but overlapping working teams (Table 3). The secretariat and steering committee ensured coordination across groups.

5.2. Livestock Feeds

In spite of extensive international experience with cassava-based livestock feeds, industry stakeholders counseled that local feeding trials would be necessary for two reasons: first, to ensure a nutritionally balanced feed ration using local cassava varieties, and second, to provide laboratory testing results that would put to rest lingering public health concerns about potential cyanide toxicity in cassava-based feeds and animal products. Invoking its “open access” principle, the task force opted to confide primary responsibility for conducting the feeding trials in the Livestock Development Trust (LDT), a public/private research institution.

To launch this effort, the Livestock Feeds Subcommittee convened a broad livestock stakeholder meeting to discuss objectives and issues involved in conducting the cassava-based feeding trials. Based on that input, the subcommittee developed a small proposal ($2,700) which was submitted to the Southern Africa Root Crop Research Network (SARRNET) for funding. Although SARRNET quickly approved the proposal, the long lag between approval and disbursement of these funds delayed the trials by about six months, a

Table 3. ACU Task Force Participants and Activity Schedule

Activities	Participant numbers PS	Gov	Res	FA	NGO	Med	Oth	Outcomes	Timing 2005 June	Sept	Dec	2006 March	June	Sept	Dec
Instigation															
ACF cassava seminar	8	6	5	8	3	3	10	• broad enthusiasm for promoting cassava	X						
ACF proposes a stakeholder task force								• ACF invites stakeholders to participatel							
Task Force meetings															
1. Inception meeting	1	3	1	2				• agree on mandate		X					
2. The roadmap	4	3	2	4	1			• review of past promotion efforts • define the roadmap			X				
3. Organize the operational work		3	2	3	2			• approve task force operating principles • establish working groups			X				
4. First-round stock taking								• assess progress of the 4 working groups • define 2nd round prioritie							X
Steering committee meetings			1	1	1			• track progress • coordinate across working groups			X	X	X	X	X
Livestock feeds group															
workplanning meeting			2	2	1			• develop proposal for feeding trials				X			
first stakeholder forum	7	2	5	6	2			• elicit feedback from stakeholders				X			
seek funding			2	2				• solicit funding from SARRNET • receipt of funds				X		X	
conduct cassava-based feeding trials															
- onfarm and feed company trials	3							• 3 trials: 1 dairy, 2 poultry						X XX	XX
- LDT on-station trials	2		1					• 3 trials: dairy, poultry, pigs						X XX	
second stakeholder forum								• present results to stakeholders							X
Cassava-based foods group															
work planning	3	1		1	2			• develop workplan				X			
sensitization trials	5	1			1			• tasting trials on composite flour nshima at bakeries and restaurants • review trial results							
review trail results		1	1	1	1			• plan sensitization workshop				X			
sensitization workshop	11	4	4	6	1	3		• disseminate trial results					X		
composite fritter trials	4				1			• evaluate oil and flour consumption of composite flour fritters					X		
composite flour fritter exposition at agricultural s	6				1			• public awareness and market building						X	
technical testing of composite flour fritters			1		1			• laboratory measurement of oil consumption						X	
Industrial applications															
GSB private-public partnership workshop	4	3	1	3	4			• broad awareness of brewery interest in cassava-based beer and sweeteners		X					
industrial research	2							• research on production technology and specifications in use elsewhere		X	XX				
equipment rehabilitation	1							• rehabilitation of a parastatal food processing company				XX			
trial production of cassava-based sweeteners	1							• sample sweeteners and production coefficients					XX	XX	
Standards group															
organization		1	1					• test commercial samples for all parameters			X				
first technical committee meeting	4	2	2	1	1			• review standards from elsewhere • identify parameters to be specified				X			
laboratory testing	1	1	1					• test commercial samples for all parameters • assess test results				X			
second technical committee meeting	6	2	3	1	2			• given wide variation in measured cyanide levels, commission additional testing					X		
second round of testing: cyanide only	1	1	2		1			• cyanide testing on 96 samples, controlling for variety, location and processing method						XX	
third technical committee meeting								• finalize proposed standards							X
public vetting (projected)		1						• solicit input from the public							X
issue standards (projected)		1						• ZABS issues formal standards							X

PS private sector
Gov public sector institutions
Res independent research institutions
FA facilitation agencies such as ACF, associations and donor-funded projects
NGO non-governmental organizations
Med media
Oth others: students from the American International School of Lusaka who participated in the cassava trials

ACF Agricultural Consultative Forum

clear downside to the task force's "no task force budget" principle. On the flip side, the absence of a special task force fund helped in mobilizing significant in-kind contributions from task force members. Feed industry players pledged to share their feed formulation matrices, to help develop test rations with the greatest potential commercial viability and to arrange laboratory testing of final products. Several small-scale commercial livestock producers, as well as one local feed company, volunteered management time and farm animals necessary to conduct on-farm research trials that would complement the on-station trials carried out by LDT.

Begun in October 2006, the LDT trials continued through November. The on-farm trials by local dairy and chicken farmers took place in parallel. LDT, the feed company and several of the cooperating farmers presented the results of these feeding trials to the broader stakeholder groups in early January 2007. The results suggested that the cassava-based rations produced

weight gains equivalent to maize-based feeds and would prove commercially viable so long as cassava chips could be procured at the millgate at 60% of the price of maize (Simbaya 2006).

5.3. Processed Foods

Past cassava promotion campaigns have failed in southern Zambia, in part due to lack of familiarity with cassava by both households and the food processing industry (Simwambana 2005). Therefore, in these regions, taste panels and sensitization of households and food processors will be required to increase demand for cassava-based products. In northern zones, where taste preferences favor cassava, development of cassava-based convenience foods requires primarily technology and marketing development by working with food processors.

5.3.1. "Nshima" the Zambian Staple

To promote blending of cassava and maize flour in nshima, as is frequently done in northern Zambia, the food processing group conducted a sensitization workshop for millers, restaurant and bakery owners. Spearheaded by Zambia's Programme Against Malnutrition (PAM) and a German-funded Gesselschaft für Technische Zusammenarbeit (GTZ) project, they tested various methods of pre-blending of maize and cassava flour nshima, bread and fritters. In a follow up session, the group invited several cassava hammer mill operators in order to facilitate supply linkages with individual restaurant owners who had previously been compelled to source cassava flour in expensive small quantities from retail market outlets. The group also produced a pamphlet on cassava fritter production and conducted three promotional training sessions, financed by $3,1000 in funding from SARRNET's regional cassava promotion program.

5.3.2. Composite Flour Bread

A taste panel study conducted by PAM revealed that blending cassava with wheat flour at 10% and 15% produced composite flour bread acceptable to Zambian consumers. Out of 145 participants, only one could detect a "cassava flavor" in the bread (PAM 2005). In order to further assess commercial prospects for composite flours, the task force subcommittee has approached several large millers, attempting to persuade them to conduct milling and baking tests with composite flours.

5.3.3. Composite Fritters

Fritters are a popular convenience food among city dwellers. Because the fritters are deep fried, cooking oil constitutes the major cost item in fritter production. Given that composite flour fritters appear to seal faster, they allow less oil to penetrate into the fritter. This results in a healthier product and a reduction of production costs. To evaluate these potential gains, task force members worked with several fritter vendors to conduct preliminary tests and consumer acceptance trials at the Lusaka agricultural show in August 2006. These tests indicated that the composite flour fritters (80/20 wheat to cassava) consumed less oil than

pure wheat-flour fritters and were preferred by consumers for their flavor and taste. More detailed analyses at the University of Zambia (UNZA) confirmed the strong consumer taste preference for the composite flour fritters, although reductions in oil consumption appeared smaller that in the initial tests. These results suggest that composite flour fritter production will be commercially viable where cassava flour is cheaper than wheat flour. Currently this is the case in northern Zambia but not in the center or south.

5.3.4. Gari

Several West African immigrants have experimented with gari production in northern and central Zambia, in partnership with Zambian businessmen and with support from PAM, Ministry of Agriculture (MACO) and the Cooperative League of the USA (CLUSA). After two years, the gari plant in central Zambia closed down due to lack of consumer familiarity with the product and because of a series of production problems at the cassava processing plant, initially placed in Kaoma and subsequently in Lusaka. A parallel private sector effort in Mansa (in northern Zambia) is continuing, although the firm produces gari only sporadically due to working capital constraints and an inability to finance advertising, product development and promotion. Although the task force has kept abreast of this ongoing private sector venture in the north, the task force committee has not yet intervened in a significant way other than to help link the fledgling operation with potential buyers from neighboring countries. Given the significant potential scale of the gari market, and projected investments in cassava processing facilities to serve refugee camps in the north, this product niche may merit expanded attention in the future.

5.4. Industrial Sweeteners

Following the successful introduction of a cassava-based malt beer by a sister company in Uganda, Zambia's major brewery became interested in launching a similar effort in Zambia. Longer term, they are interested in developing artificial sweeteners from cassava starch as a means of reducing input costs for their soft drinks. A handful of local food processing industries have been exploring production of cassava-based sweeteners necessary as an input into this process. Working to facilitate these efforts, a UNDP Growing Sustainable Business (GSB) project convened a stakeholder group in October 2005, as the ACU Task was getting under way, to assess potential demand, economic feasibility and requirements for bringing these ideas to fruition. In response, one local food processor has procured and renovated equipment necessary for cassava hydrolysis and glucose production in hopes of developing a lean-season product to fill in the seasonal gap in their current line of processed vegetables, fruits and beans, which are available for processing only in the dry season. They have conducted a series of production trials in June, August, and November 2006. The initial results indicate that with their current technology they are unable to meet the stringent requirements imposed by the brewery. However, in the short run, they may be able to supply the needs of the maheu[5] and local juice industry for sweeteners. Given high local costs for sugar-based sweeteners, the large scale of this market and the availability of seasonal slack in their other production lines, the firm is now focusing on development of the market for low-cost cassava-based sweeteners. Servicing the brewery's demand for high-quality sweeteners will remain a longer term goal. Within the ACU Task Force, members have agreed that the

[5] Maheu is a soured, non-alcoholic maize-based beverage.

UNDP GSB project will take the lead in providing support to this channel, while keeping the broader task force membership abreast of potential spillovers into other cassava supply channels.

5.5. Cassava Trade Standards

Early on, the feed companies and food industry participants on the task force advocated development of formal cassava standards and specifications. They insisted that standards were necessary to ensure that the cassava marketing system develops procedures and processes that will enable it to supply specifications required by the processing industry. From a legal standpoint, formal standards provide protection for feed and food industries selling products to the public. Therefore, the task force launched a fourth group to develop cassava standards for traded dry chips and cassava flour.

Since the Zambian Bureau of Standards (ZABS) regulates all legal standards in Zambia, the ACU Task Force invited ZABS to spearhead this effort. ZABS agreed, and in February 2006 they issued invitations establishing a formal Roots, Tubers and Derived Products Technical Committee, as required to by law, in order to establish legal standards for traded cassava and cassava products. The technical committee elected as its chairman an ACU Task Force member, the feed formulation manager from a local feed company. The private feed company and one of the research organizations on the task force shared the testing costs. Following review of international standards and three rounds of detailed laboratory analysis of local cassava products, the subcommittee issued draft standards for public review and comment in January 2007. ZABS expects to issue final standards on cassava flour and chips by the first quarter of 2007.

6. TAKING STOCK AND IDENTIFYING NEW PRIORITIES

After 16 months of operation, the task force had concluded its first round of interventions aimed at addressing initial constraints identified along the cassava value chain. At the end of this initial period, the task force's associated stakeholders had produced several definable outputs:

• draft cassava trading standards, poised for adoption by the Zambian Bureau of Standards; and

• cassava-based livestock feed formulations suitable for Zambian production systems in the poultry, pig and dairy industries.

Though less easily quantifiable, the task force had also made headway in promoting production and consumer acceptance of a range of cassava-based food items, including pilot commercial production of cassava-based industrial sweeteners. To take stock of these initial efforts, the ACU Task Force conducted a formal review of its initial road map at the end of January 2007, 17 months after its launch. This collective stock-taking included a review of the results of the first round of promotional efforts, a reassessment of opportunities for commercial growth and a formal assessment of second-round constraints and priorities for future operational work.[6]

[6] The results of this assessment as well as the current status of the ACU Task Force efforts are available from the Agricultural Consultative Forum at acf@zamnet.zm.

7. CONCLUSIONS

This paper describes a two-pronged approach to commercial promotion of agricultural supply chains. The first prong, the value chain analysis, offers a diagnostic tool for identifying commercial opportunities and constraints. The second prong, the task force model, offers an operational vehicle for coordinating promotional initiatives by concerned stakeholders in both the private and the public sector. Experience with this model, during the first round of the ACU Task Force interventions, suggests a number of practical lessons.

First, successful value chain interventions require identification of a sizeable and broad-based commercial opportunity. The model will not work well where only small or highly concentrated gains are available. Broad interest and support will not be forthcoming in such circumstances. In the cassava case discussed here, widely recognized commercial potential existed, easily sustaining a 50% increase in national cassava production. In addition to the onfarm income gains, this potential expansion afforded significant opportunities for increased value added upstream in three of the value chain supply channels. These commercial opportunities likewise offered significant potential spin-offs in terms of improved household food security, reduced costs of feed and livestock products, and potentially lower protein costs for consumers. Thus, the cassava case presented a positive-sum game with potentially significant spin-offs for a great many firms, households and institutions. All stakeholders could see how they stood to benefit collectively by growing the system. The potential gains were widespread and well-recognized. Hence, the enthusiastic support by the private sector, civil society and public institutions.

Second, integration of the private sector into the value chain diagnostics is critical for generating buy-in and subsequent support for key interventions. It likewise forms an ideal platform for coordinating private and public interactions. In the present case, private sector market leaders, or so-called channel captains of the value chain, took the lead in much of the operational work. This level of private-public interaction does not come naturally in an economy such as Zambia which finds itself in a transition from reliance on public sector management towards a liberalized yet regulated market economy. Mutual mistrust between the public and private sector are common. The value chain task force provides a way of bringing interested players together around a table in search of very concrete solutions to identified opportunities. By focusing on win-win situations, the task force model offers a transparent process for building trust among key private and public players.

Third, in order to be effective, the value chain task force model requires a respected, honest broker. Zambia proved fortunate in this instance. The ACF, a well-recognized, neutral information exchange platform for agricultural stakeholders, provided the convening power and secretariat. Michigan State University's Food Security Research Project (FSRP) provided informed analytical support. And PAM, who chaired the task force, brought their long operational experience and reputation for public service and poverty reduction. None of these three steering committee members was viewed as harboring ulterior motives. The result was a highly motivated and well-respected coordination unit.

The fourth issue concerns resource mobilization. ACU Task Force members have been generally pleased with the "zero budget" task force principle adopted at the outset. The ACU Task Force judged that the time lost in seeking external omnibus funding, coupled with potential disincentives to both private and public resource contributions, might impede stakeholder buy-in and slow implementation. For this principle to work, however,

institutional collaborators must have available resources they are willing to commit to this broader effort. Because circumstances vary across settings, testimony from other efforts, with large project budgets, would prove welcome. It will be important to assess how the availability of internal task force funds influence incentives, contributions and buy-in by various private and public stakeholders. For this reason, we would welcome evidence from elsewhere on alternative systems for motivating and funding value chain diagnostics and interventions.

Finally, consider the time dimension. In the current case, the task force process required a significant gestation period, 16 months, for the first round of diagnostics and interventions. Typically, as in the cassava case, these diagnostic and operational efforts need to unfold in phases. Identifying and unblocking one constraint often reveals the next key log in the jam. Thus the task force method defines an ongoing process of collective diagnosis and intervention. Ultimately, with achievement of a rapidly growing, well functioning value chain, the need for the task force may wither. Where the process ends will depend on the evolving intersection of common opportunities and interests among the value chain stakeholders.

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