

“Analysis of charcoal value chains - general considerations”

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On behalf of



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Introduction

Charcoal is a prime source of energy in most African country, as well as a driving force of their economies with estimated annual growth rates of around 3.7 percent [1]. Surprisingly enough, policy makers pay little attention to the ways in which charcoal is produced and sold – e.g. the question as to whether wood used for charcoal burning is harvested in a sustainable fashion. For lack of coherent policies, charcoal production, transportation and distribution remain, above all, informal and unregulated – rendering them inefficient and risky [2]. Besides, various stages of the charcoal supply chain impact in multiple ways on the economic, social, and environmental aspects of the MDG agenda. The observation that charcoal does not receive the policy attention it deserves may in part be explained with a crucial lack of baseline data, and structural governance deficits. Investigating the sequence of charcoal production and marketing in all its facets – including research and development, the regulatory framework, raw material supplies – is a key to any systematic improvement. The value chain approach¹ provides a convenient means to this end, adding, as it were, knowledge, innovative insights and technology to each link. It enables policy makers to create favourable framework conditions which promote competitive enterprises, sustainable jobs and income for local people. Furthermore, it allows impact-oriented monitoring of initiated policy actions.

Numerous development projects dealing with wood-based fuels focused narrowly on individual links of the supply chain, often with mixed results. For instance, projects which promote improved kilns for charcoal burning have to compete against low-priced wood-fuels from open-access forest areas – in effect, investments necessary for the adoption of improved technology do not pay off, and dissemination falters. In a similar manner, dissemination rates of improved stoves usually level out at 20-30 percent, owing to the fact that reduced consumption lowers the price of wood-fuel (and thus discourages further investment). Unregulated logging in open access forest areas contributes to the problem of underpriced wood-fuels, and at the same time hampers projects which promote sustainable forest management (which likewise requires considerable investment).

If charcoal production and its use are to contribute to sustainable development and poverty alleviation, the entire charcoal value chain needs to be addressed in a holistic manner. That includes full and formal recognition of wood-based fuels as a future-oriented source of energy – a prerequisite for deliberate change from informal energy supply towards modern, locally-based energy industries. Wood-energy is versatile and displays a high potential for technological innovation (e.g. pellets, gasification, liquefaction) in terms of enhanced conversion and combustion – depending, of course, on the availability and targeted allocation of investment capital. Strategic interventions geared towards promoting enabling framework conditions thus create business opportunities for a wide range of service providers, and foster local employment and income. Additionally, sustainably sourced wood-based fuels contribute to carbon-neutral energy supplies, promote environmental protection and the conservation of biodiversity, and help to relieve dependency on finite fossil fuels.

¹ The basic concept of a supply chain is similar to the value chain. As the terms are contradictorily discussed we prefer to use the term value chain approach, taking into account the overall efficiency and the costs of performing the key activities of the charcoal supply chain providing more conclusive statements on development opportunities.

Importance of promoting the charcoal value chain

Charcoal burning and marketing at present requires only minimal financial and human resources. Wood is mostly obtained for free. Charcoal production therefore is a business of choice for the rural poor; it contributes to their household income and provides a safeguard against food-shortages, unemployment and similar poverty-related risks.

The number of people engaged in the charcoal business is remarkable. By example, the estimated number of charcoal producers in Kenya (ca. 200,000) is as high as the number of people working in the educational sector. Approximately 500,000 people engage in downstream-processing and trade. With the number of dependents added, the charcoal business supports as many as 2.5 million Kenyans [5]. Their annual income nearly equals that of Kenya's tea industry. Similar figures are reported by other countries (e.g. Malawi [6], Niger [7]). Such figures vividly underscore that promoting sustainable charcoal industries provides a first-rate means of poverty alleviation. The value-chain approach aims to bring out the charcoal business from the shady realm of the informal sector and to harness its potential for sustainable development. This necessitates a comprehensive analysis of existing constraints, from ecological parameters to property/user rights to market access. Response strategies need to be streamlined, combining approaches such as sustainable natural resource management, policy & legal-regulatory reform, SME promotion etc.

There are numerous examples and guidelines to value chain analyses [4],[8],[9], albeit with a decidedly agricultural focus. Adaptation to the specifics of the charcoal business is therefore necessary.

Common issues characterizing the charcoal value chain

Specific analyses aside, a number of common characteristics shall be presented upfront. They apply to most African countries.

- **Unregulated/illegal setting:** Wood harvesting, charcoal burning, transport and trade are in most cases unregulated. However, where legal restrictions apply, they are frequently ignored – due to many countries' lack of legal-regulatory coherence and enforcement capacities.
- **Corruption** is rampant and systemic in many cases, which hinders adequate governance and enforcement. This problem further diminishes the legitimacy of the charcoal business, and leaves many producers vulnerable to economic exploitation.
- **Inefficient conversion technologies** are the logical consequence of the unregulated & insecure setting, clandestine operation and overall capacity deficits.
- **Charcoal production is poor man's business.** Landless, uneducated or otherwise disadvantaged people provide a cheap source of labour. For lack of other options, they can be easily exploited. Poverty forces them to sacrifice long-term considerations (health, livelihood security etc.) for meagre short-term income. The poor are also powerless in the sense that they cannot defend their vital interests vis-a-vis more powerful stakeholders of the charcoal supply chain. They are not organised in most cases, and thus avail of little – if any – bargaining power, and virtually no access to investment capital.
- **In the public perception, charcoal is discriminated against** as “dirty” and economically unattractive. This hinders strategic planning as well as mobilisation of investment capital.

- **Free access to raw material** leads to deforestation and degradation. Adding to the widespread perception that wood-based fuels are “technically backward”, this further discredits charcoal as a source of energy.
- **The charcoal business displays a decidedly oligopolistic structure:** Profits are usually concentrated in the hands of a few intermediaries, engaged as transport agents or wholesalers. Furthermore, this setting is heavily biased against women, who often bear the heaviest workloads (wood harvesting/collection, kiln operation, small-scale retailers). Instead of equitable revenue-sharing along the entire value chain, revenue circulates in a loop between traders and consumers – a short-circuit, so to speak. Marginal cash flows to the charcoal burners – and virtually none to those communities, whose forest areas are being depleted in the process.
- **Charcoal operators are reluctant to formalize their businesses** as they cannot perceive the benefits. The reasons are: (i) transaction and other costs of formalization are high and arbitrary; (ii) procedures are complicated and time consuming; (iii) contact with local and central government officials (many of whom are suspected of corruption) is generally frustrating and humiliating.

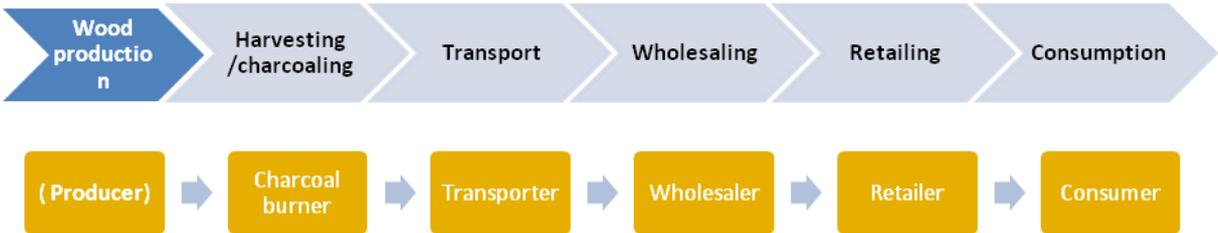
Analyzing the charcoal value chain

Any targeted response to the problems observed requires that knowledge gaps are filled, and relevant baseline data obtained for a specific setting. The value chain approach has already been introduced in the preceding sections. Now, therefore, systematic value chain analyses shall be advocated and outlined in broad conceptual terms as an instrument of choice. They yield insights immediately relevant to policy-makers, civil-society stakeholders and development agencies alike.

The exercise consists of a sequence of four mutually related steps. From each step to the next, facets are added to the picture, and the degree of resolution increases. Each stage of the analysis can be illustrated in a map-like fashion, a multi-layered “atlas” of the charcoal supply chain in a specific context being the eventual end-result [4]:

1. **Reconstructing the value chain.** This marks the point of departure for subsequent stages of the analysis and serves to visualise the links of a given charcoal supply chain. The result is a map which identifies both chain links (i.e. elements, or stages/functions of the charcoal supply process) and corresponding categories of stakeholders. Value chain maps are the core of any value chain analysis and therefore indispensable. The following figure provides an - admittedly generic – example; in a given case, some elements or stakeholder-categories may be missing.

Figure 1: Generic elements of a basic linear charcoal value chain map



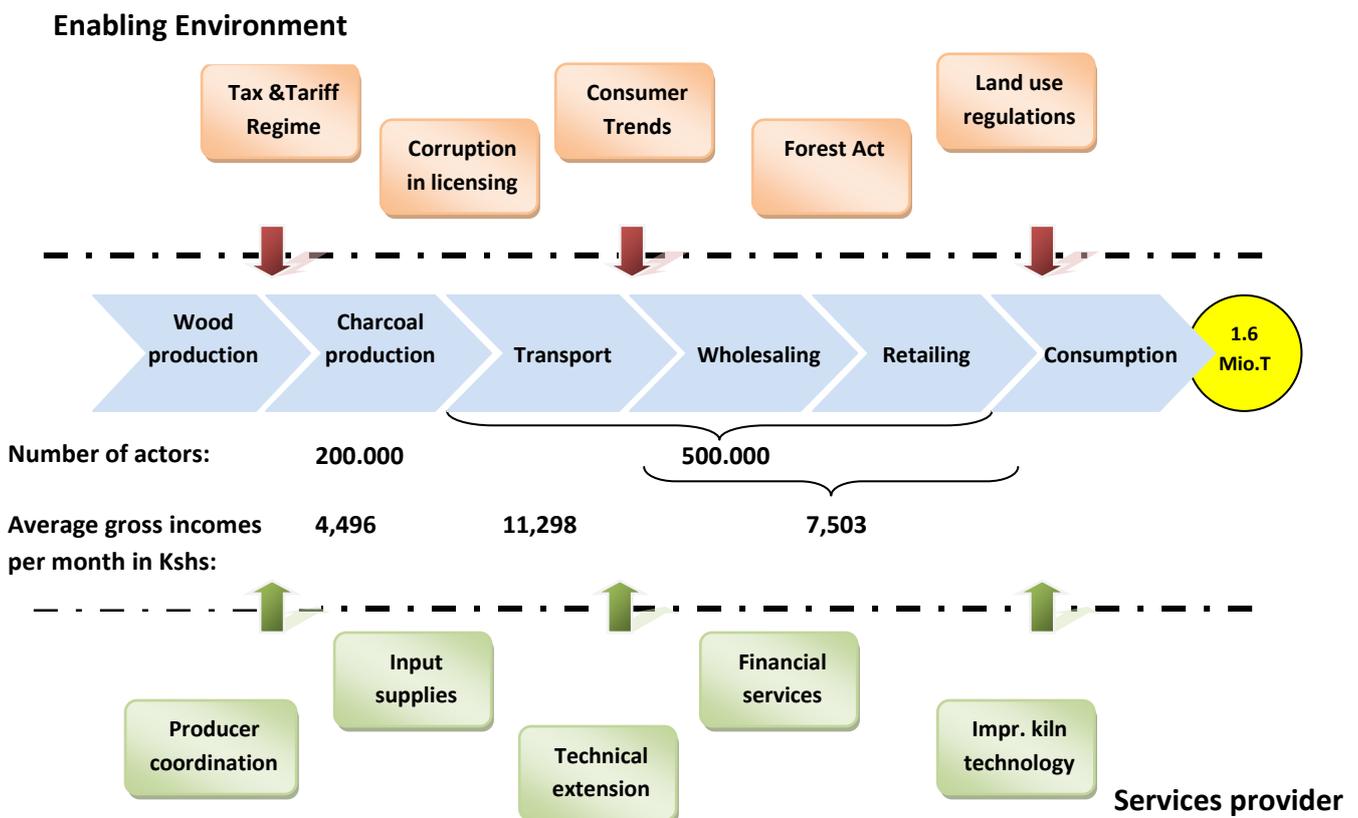
Chain mapping is not only analytical, but also a communicative exercise – one that benefits from stakeholder participation in workshops, interviews etc. Participatory value chain mapping provides the added value of stakeholder dialogue and may thus serve to build trust, correct misconceptions, and broaden the insight & awareness of policy makers.

- 2. Quantifying the value chain in detail.** Once elements and stakeholder categories are agreed upon, quantifiable data are added so as to (i) better understand the overall economic significance, (ii) identify and gauge trends of development, and (iii) provisionally identify intervention priorities and opportunities.

Quantifiable data typically include the number of stakeholders in each category, product volumes and their market shares, amounts of revenue accruing at different stages of the value chain etc.

Figure 2 outlines a charcoal value chain on a highly aggregated level, drawing on data obtained through the National Charcoal Survey in Kenya [5]. Additionally, political, legal-regulatory, administrative and societal framework conditions are added for the purpose of subsequent observation and analysis, as together constitute the wider context and “environment” of the charcoal business.

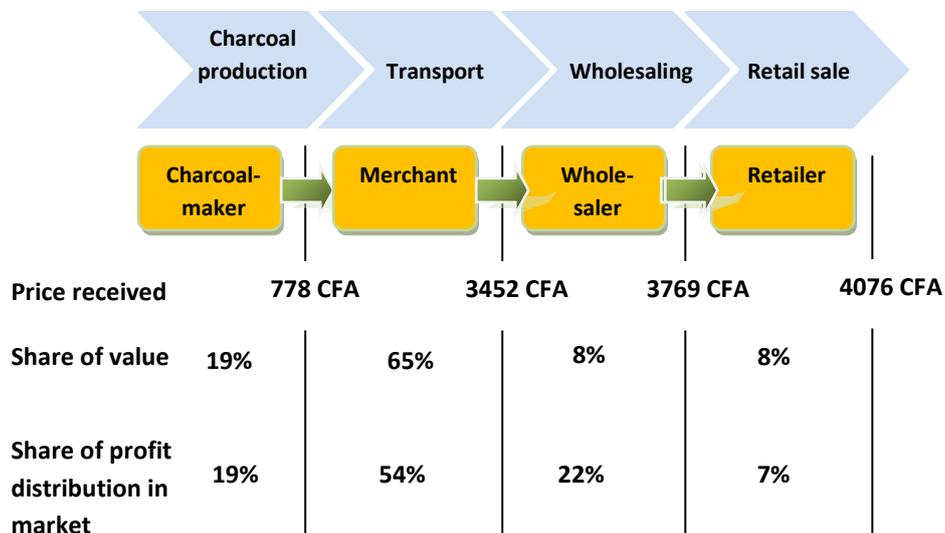
Figure 2: Quantified value chain illustrating the enabling environment as well as the services provider



- 3. Preparing an economic analysis of value chains.** This stage complements and deepens the quantification, with a distinct focus on economic efficiency. To this end, the flow of revenues accruing at various stages of the value chain is analysed in regard to (i) income and profit, prices, and quantities of the goods handled by the different

actors; (ii) distribution of income and profit within and among the groups along the value chain; and (iii) the mechanisms which determine revenue generation and revenue sharing in a given setting (see Fig.3).

Figure 3: Charted economic analysis of a charcoal value chain in Senegal [10]



4. In-depth analyses of selected factors. Following reconstruction and quantification of the value chain, identification of relevant framework conditions and economic analysis, each chain-link must be scrutinised for the underlying causes and mechanisms which promote or inhibit sustainable development and poverty alleviation. Zooming in on individual parameters adds qualitative detail and provides explanations for the quantifiable facts observed. The selection of parameters for further analysis is guided by the dimensions of sustainability, i.e. ecological, economic and social aspects. Once again, such findings can be visualised in the form of thematic maps (cf. Fig. 4).

Given the degree of resolution and the amount of detail at this stage, it seems advisable not to include the respective findings directly in the visualisation of the value chain (the overall “map”), but to produce supplementary thematic maps for each parameter. An easily accessible structure is paramount.

By example, poverty and the relative weakness of certain stakeholder categories may require a detailed “**stakeholder analysis**”. It allows for a differentiated investigation of matters such as household size and structure, educational histories including technical/entrepreneurial capacities and skills, gender-relations, market access, social networks, perception of needs and problems etc. (see Figure 4).

Numerous studies of the charcoal sector point to various regulatory and operational constraints hindering business development in an informal setting. For instance, **regulatory constraints** may include aspects of resource tenure and management rights (e.g. land tenure, forest management, environmental laws, etc.) as well as procedural requirements (registration, licensing, taxes and duties, property rights, etc.), factors such as labour legislation (e.g. employee benefits and rights) etc. Typical

operational constraints include access to public services and infrastructure (communication, roads, power); access to information and informational services (availability of rules and regulations, market information, advice on investment opportunities), and access to capital and credit.

Figure 4: Charted stakeholder analysis depicted from the National Charcoal Survey Kenya [5]

	Charcoal Producer	Transporter	Vendor
Average Age	39	35	34
Share of women	16%	14 %	57%
Marital status	78% married	75 married	66% married
Owning business	95%	88%	67%
Formal education		<ul style="list-style-type: none"> • Primary 58% • Secondary 30 % • Tertiary 3.8% 	<ul style="list-style-type: none"> • Primary 50% • Secondary 36 % • Tertiary 4 %
Business affected by HIV	26%	30%	27%
Av. gross income per month	Kshs. 4,496	Kshs. 11,298	Kshs. 7,503
Full time business	51%	43%	74%
Main problems faced	<ul style="list-style-type: none"> • Lack of raw material (21%) • Corruption/harassment s (19%) • Lack of finances (13%) • etc. 		<ul style="list-style-type: none"> • Scarcity in high quality charcoal (20%), • Harassment by govt. authorities (18%), • Low profitability (12.5%),etc.

Building a roadmap for charcoal value chain upgrading

Findings and conclusions from the systematic analysis of a given value chain must be put to practical use. They inform the drafting of coherent response strategies, geared towards promoting a regionally focused private sector of robust and dynamic small firms, delivering tens of thousands of decent jobs, and optimising the output of environmentally friendly, socially acceptable and economically viable energy services. Strategic development in this context allows for flexible, implementation-oriented consideration of global public goods & policy goals, including environmental services such as carbon sequestration and adaptation to climate change. The envisaged approach does not stop short at strategy development, however, but includes the design of operational action-plans with clearly assigned roles and mandates, impact-oriented results and corresponding provisions for monitoring and evaluation, and resource allocation – a **roadmap** being the intended result.

While individual roadmaps may vary according to a given setting, some common aspects may be discussed at this point. In most cases, optimising a value chain means to **promote stakeholder equity**, and to empower disadvantaged and hitherto marginalised groups. The aim is to involve stakeholders more evenly in policy formulation, strategic planning, implementation and monitoring. Educating stakeholders about their rights and responsibilities is just as important as the targeted improvement of the political, legal-regulatory and administrative framework.

Furthermore, it is necessary to enhance stakeholder relations. If **conflicts** are to be prevented, mutual trust has to be built particularly between (regional) government agencies and private operators engaged in the charcoal business. A market economy operates on the premise that

the roles and mandates of government agencies and private operators are clearly separated and complementary. Government is expected to create an enabling, business friendly environment which ensures that private operators - willing to bear risks and adequately skilled – may run profitable and reasonable secure businesses. In return, private operators are expected to abide by the effective rules and regulations, to pay taxes, and to help maintain those enabling framework conditions, on which their businesses depend.

Another common feature in many contexts is **decentralisation**, meaning the deliberate, strategic devolution of executive power from the central government to regional or local self-governing entities. Given that charcoal production is, by definition, a local/regional business, it is advisable to draw a roadmap on **the regional level**. Any centralised planning – from the national level downwards – would remain too abstract, too time-consuming, and less efficient besides.

Building a roadmap above all is a consultation & learning process. It benefits greatly from institutionalised stakeholder participation in terms of more cost-effective and less conflict-prone implementation, and more sustainable impact.

Building a roadmap involves a sequence of steps [4]: (i) agreeing on a vision and strategy for upgrading a given value chain (ii) analyzing opportunities and constraints (iii) setting operational objectives, (iv) drafting actions plans which prescribe certain measure in detail, ensure adequate coordination within and among thematic clusters (“fields of action”), and clearly attribute responsibility to certain stakeholders. In any case, all activities must be monitored – either continuously, or periodically, as required – with a view to verifying the realisation of lasting impact over time.

• **Agreeing on a vision and strategy for value chain upgrading**

A commonly shared “vision” or strategy is a key-requirement for the optimisation of any value chain. It requires transparent, multi-stakeholder participation (including by policy makers charged with shaping economic policies). Because many stakeholder groups tend to have different perceptions of reality, a first step is to achieve a common understanding and baseline knowledge among the stakeholders involved. This can be most conveniently achieved by jointly reviewing & discussing results of the value chain analyses.

Many policy makers and development organisations focus on poverty alleviation and the empowerment of hitherto marginalised groups of stakeholders. Those stakeholders, on the other hand, as thus far profited most from the status quo (transport operators & wholesalers) will most likely be very reluctant to consent to any redistribution of economic benefits. To avoid conflict, process facilitation/moderation is recommended. The aim must be to create a win-win situation which makes necessary redistributions of revenue along the value chain more palatable for the hitherto most powerful & privileged parties. For instance, one may point out more reliable and predictable supplies of high-quality charcoal, less opportunity costs arising from the harassment by public authorities, less corruption etc.

Determining a vision or strategy for the charcoal business requires answering the question “how should the value chain look like five years from now”. One obvious aim is to balance charcoal prices with at least the cost of forest rehabilitation/reforestation and sustainable forest management. Currently in most cases, informally produced charcoal is seriously underpriced, causing wasteful use of charcoal and discriminating against sustainable management of forest resources. This situation calls for four basic shifts: (i) charcoal needs to

get more expensive, so as to generate a more substantial revenue flow, (ii) revenues from charcoal production must be distributed more equitably, so as to give marginalized groups a stronger incentive for sustainable management and production, (iii) to achieve this goal, the legal-regulatory framework must be deliberately adapted, and (iv) disproportionate economic hardships must be relieved for poverty-stricken end-users, by way of promoting and disseminating fuel efficient stoves among vulnerable segments of society. Adequate monitoring and enforcement at each level eventually decide the success of improving a value chain.

• Analyzing opportunities and constraints to upgrading the value chain

At this stage, operational detail is added to the strategic vision. The roles, mandates, rights and responsibilities of the concerned stakeholders are systematized, and their respective capacities and weaknesses considered. The overall goal is to pinpoint specific weaknesses of the current setting, and to devise technically as well as socially adapted responses. To this end, three basic guiding questions may prove useful [4]:

- What are the reasons for the chain to stagnate?
- Which gaps exist between the requirements on a value chain derived from the vision and its current structure and performance?
- Which constraints reduce the competitiveness of poverty groups (target groups) and prevent their integration into the value chain?

Once again, the value chain analysis prepared at the outset provides the most important source of information. It further enables the design of indicators to measure the success of planned activities. Answering the above mentioned guiding questions amounts to a SWOT analysis.

• Setting operational objectives and planning specific action

Following the conclusion and evaluation of the SWOT analysis, most required improvements will readily suggest themselves. The challenge now is to involve stakeholders in implementation, according to their respective roles and mandates, and commensurate with their management capacity. Where stakeholders lack the capacities necessary for the implementation of planned activities, they must be supported by government services or donor-funded development cooperation, as appropriate. A clear schedule for implementation must be agreed at this stage, and milestones defined for the purpose of monitoring.

• Monitoring the impact of value chain upgrading

Impact-oriented monitoring is an indispensable component of value chain development. Without it, success cannot be observed, required adaptations cannot be effected, and the cost efficiency of planned measures remains uncertain. Adequate monitoring foremost depends upon the prior definition of indicators, each with clear and easily measurable baseline, and benchmark values. Wherever possible, monitoring should be conducted in the form of a participatory process, enabling stakeholders to add their experience and specific observations, and to capitalise on the experience of others, and lessons learnt.

Conclusions

As the previous discussion has shown, the value chain approach provides a useful and convenient tool for problem analysis, strategic planning, operational planning, implementation and monitoring. The paper at hand may only outline the process in general terms, and draw the reader's attention to the most important elements. In practice, circumstances may vary from case to case, and call for a carefully adapted approach. No blueprint exists, and no uniform operational guidance can be presented at this point.

However, some aspects clearly deserve to be highlighted:

- The need for systematic, multi-faceted analysis, as a precondition for any activity to promote the charcoal business,
- The conflict prone nature of measures intended to redistribute benefits and formalise various stakeholders' roles and responsibilities – careful moderation and mediation is required to promote equity among the groups concerned,
- The inseparable interdependency between political/legal-regulatory/institutional framework conditions on the one hand, and technical/practical issues on the other – ensuring sustainability of the charcoal business as a cornerstone of environmentally and socially friendly energy supplies is – above all – a governance issue,
- The need to regard the promotion of charcoal value chains as a mutual learning process of the concerned stakeholders,
- The need to foster ownership by means of a commonly agreed strategic vision,
- The need for operational planning using the road-map approach,
- The need for impact-oriented monitoring as an indispensable factor of success.

Finally, readers should bear in mind that, while ingenuity is called upon in promoting charcoal value chains, the simplest, most straightforward course of action in most cases will be the best and most successful.

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