BARRIERS TO PRODUCTIVITY IMPROVEMENT OF FUEL BRIQUETTES ENTERPRISES IN KENYA

BRIEF BACKGROUND
Seventeenth Century England, the poor (women) soaked cellulose papers and molded them by hand into fuel briquettes.
In 1897, Ellsworth B.A Zwoyer of Pennsylvania, USA, applied for briquettes patent. By the end of World War 1 Zwoyer Briquettes Company started building briquettes plants in the US.
In 1920, Henry Ford and Thomas Edison both US citizens put briquettes into practical use.
In 1945, the Japanese invented the briquettes screw press and in 1947, the Americans developed a ram / piston briquettes press.
In 1980, Dr. Ben Bryant of Washington University, Forest Products Laboratories, Seattle, USA developed the wet-low-pressure technology.

INTRODUCTION
Business innovation and entrepreneurship are pillars for catalyzing growth of fuel briquettes business enterprises. Sound business and financial management skills greatly contribute to the enterprise’s growth. Well thought out and good business plans are fundamental to long term business success. Trained briquettes entrepreneurs are better prepared in operating businesses optimally and profitably to spur competition and productivity in their enterprises. Competition helps to improve productivity, business focus and strategies, better marketing, management of finances, generation of new ideas, adds-value to products and results in sustainable solutions in our briquettes businesses.

PURPOSE
To find out the major constraints affecting fuel briquettes enterprise’s productivity and possible solutions for mitigating the problems

OBJECTIVES
To identify the major constrains affecting productivity improvement
To develop “tools” and apply them to mitigate the problems for sustainable results

ASSUMPTIONS
Utilization of the developed “tools” will result in improved productivity for higher profits in the enterprises

MEANS OF VERIFICATION
Visited 20 fuel briquetters producers in Kenya in 2008
To effectively promote fuel briquettes enterprises overcome the constraints to their productivity improvement and hence compete with other fuels (kerosene, liquefied petroleum gas, fuel wood, biogas, electricity and solar), a definition of productivity, factors and trends that affect the fuel briquettes enterprises' productivity need to be examined.

1: PRODUCTIVITY—Quantitative and qualitative production of goods utilizing less time and labor
Most enterprises operate under the ignorance of productivity which is defined as an index that measures outputs (goods and services) relative to inputs (labor, materials, energy and other resources) used to produce them. Productivity relates to how efficient and effective an individual or firm uses resources at their disposal. Productivity measures are used to track the performance of an enterprise so that the management can decide where improvements are needed. Productivity is closely related to a briquetter’s standards of living. Higher profits contribute to accumulation of capital, accumulated capital creates wealth, wealth is the key to sustainable development, sustainable development is the exit door from the yokes of poverty.

2: FACTORS—Agents of productivity
Some of the factors affecting improvement are lack of:
Methods: These are systems/mechanisms used to produce fuel briquettes and related services.
Capital: The more expensive the production machines, the higher the productivity of an enterprise.
Quality: Where standards and checks are not enforced the poorer the quality of the products produced.
Technology: Technological change improves the quality of capital and hence productivity. This means that the higher the technology, the higher the quality of products. Technological innovation increases productivity of the other resources so that total output is increased.

Research and Development: R&D contributes greatly to productivity improvement in the quality of human and physical capital. In terms of labor force, improvement results from more business skills and training on the job. In terms of physical capital, quality improvement results from better technology embodied in this capital. Improvements in technology arise from scientific discovery, which are the results of R&D.
Management: Productivity improvement can be achieved through improving preparation, organization and timely planning of work and related activities.

2: TRENDS—Designs for productivity
Briquetters are not tapping well from:
Networking: Networking amongst fuel briquettes enterprises improves growth and relationships between other economic development players. This impacts on technology transfer as new technologies are easily transferable through organizational components that are independent but linked through strategic alliances or temporary agreements.
Globalization: The development of communication, social and economic convergence and the growth of national and international links foster the exchange of marketing ideas in fuel briquettes management, technological advances and creation of alliances.

Knowledge: Knowledge brings to fore the importance of human capital and intellectual investment. These lend greater weight to intangible factors of production, for example, individual know-how, communication networks, access to information and technological knowledge.

Innovation and Time: This is a key factor in business enterprises exceeding other factors such as raw materials processing, scales of production and low labor costs. The importation of knowledge and innovation together with better access to IT leads to a reduction in the amount of time taken in processing raw materials into fuel briquettes hence increasing productivity in terms of turnover and profits.

BARRIERS AFFECTING PRODUCTIVITY IMPROVEMENT
Existing enterprises are individually owned and the owners do not have:

Management: Due to the low levels of education and business skills, enterprise owners are likely not to possess the required business management techniques; therefore, they are unable to effectively exploit training opportunities offered by fuel briquettes trainers. The result is, therefore, a limitation to an innovative and potential enterprise.

Technological Know-how: Sound technology in fuel briquetting is a scarce commodity in developing nations. Barriers restrain the flow and inhibit the access of active enterprises to this technology.

Cost: Due to lack of access to finances, fuel briquettes enterprise owners fail to achieve improved productivity goals.

Low-levels of Education and Training: Majority enterprise owners in Kenya need business skills training to enable them master a series of important challenges to their enterprises growth. Higher levels of education and training will enable them understand the factors that affect improvement of productivity and exploit the trends mentioned above for the benefit of their businesses.

Marketing Information: Many of briquetters have little or no marketing skills or the ability to properly promote their products and services. Sometimes they are affected by the micro scale levels of their enterprises inhibiting them to access new technologies and experts in this field.

Global Competition: With globalization and liberalization of markets, fuel briquetters in Kenya face competition from experienced competitors in developed nations and even at local level with quality briquettes at a more competitive price.

Human Resource: Sometimes fuel briquettes enterprises in Kenya do not seek further training. Nobody is dedicated to improvement of productivity as is the case with large and established fuel briquettes companies in developed nations or local level, which have dedicated staff who
dedicate their time in training and implementing knowledge gained in improvement of productivity.

**Institutional Capacity:** There are no established training institutions in Kenya with staff that possess necessary qualifications or training in fuel briquetting to deliver required skill to fuel briquettes makers.

**Representation:** Better fuel briquettes enterprises development requires organizational or an association to lobby for their interests and this critical framework is lacking.

**Cultural/Religious Factors:** Some operators in fuel briquettes enterprises have strong ties with traditional, cultural and religious obligations that normally conflict with ethics and practices, for example, women attending day long trainings, Muslims cannot mix with Christians, Muslim women cannot mix with Muslim men, etc.

**HIV/AIDS Factor:** This has negatively impacted on the social lives of those perceived positive from mixing with non-positive people, and not many would want to share certain things with HIV/AIDS victims. They are either shunned or feared. This affects improvement of productivity thus increasing cost of labor, absenteeism, and not to forget its negative financial implications.

**The “African PhD (Pull him Down) Degree Syndrome”:** In many development activities, you cannot miss critics who never appreciate one's good efforts and will always work against you to fail.

**WAYS OF MITIGATING THE CONSTRAINTS**

1 (a). **Education:** The challenges and opportunities to fuel briquettes enterprises to make them respond actively to external and internal pressures for improving the enterprises’ productivity require greater focus on the training of the individual in order to be able to manage his enterprise successfully. Education and training in business skills, contribute immensely to productivity and hence high competitiveness and the ability to acquire and use knowledge for the competitive advantage. Higher levels of education of an individual e.g. diploma or university degree enables him to take advantage of new technology niches. Higher levels of education improve enterprise owner’s success by:

- **Allowing for higher levels of training**
- **Facilitating good business record keeping**
- **Permitting quality product production through R&D**
- **Improving customer care as the customer is always right and principle employer**

Some of the principle requisites for fuel briquettes enterprise successes are:

- **Creative and innovative capacity**
- **Theoretical knowledge**
- **Business skills**
- **Networking**
- **Capital investment**
- **Control of losses**
(b) **Training**: Rapid technological change requires fuel briquettes makers to have a high level of literacy, and scientific knowledge to be able to shift between tasks. This is evident in Newly Industrialized Countries (NICs) where more than 70% of the practitioners are college or university graduates. Training alone cannot address the very real constraints faced by the enterprises. Research has proved that in developed nations, enterprises with the best technical skills and concerns about designs have had better quality formal technical preparations. Both education and training can contribute to the ability of an individual to respond more effectively to technological and economic changes to equip the briquetter master a series of important challenges which include:

- Product research and development
  - Product diversification
  - Quality improvement
  - Customer care
  - Marketing

**What is then, the Solution?**

It is evident that the low levels of education and business skills of some briquetters in Kenya are actually the major constraints to productivity improvement.

To train the individuals in better technologies and management skills to enable them understand and utilize available opportunities to develop their enterprises into viable businesses.

To improve productivity in briquettes businesses, the skills of enterprise owners/managers should be preferably diploma level and above as this will enable one write, develop and enhance briquettes concepts and business plans well.

With better education and business skills, the enterprises can be able to utilize available opportunities to improve their productivity resulting in high quality fuel briquettes.

Raise the education and/or training of those involved in fuel briquettes training and production. To succeed, two methods are suggested among others:

i: **Short term trainings** – For those already in production, a training curriculum should be developed to include business skills, management and a bit of environmental sciences.

ii: **Long term training** – Those with high level of education, to advance to training in briquettes concepts and business management skills. Also more and frequent vocational trainings (3-6months) in various technical skills in fuel briquettes should be conducted.

**2: Market Linkages**

Access to markets and marketing information is a severe constraint to fuel briquettes development in Kenya. Competition from other biomass fuels (charcoal and firewood) is challenging although charcoal is an illegal enterprise in Kenya.
Biomass fuel briquettes producers are ill prepared to compete with charcoal sellers and industrially processed carbon fuel briquettes. Few, fuel briquettes producers are capable of tapping from the new market frontiers especially e-commerce. In many cases the institutions that can deal with fuel briquettes research and development are not fully engaged. Also small capital bases, credit facilities or grants and limited technological sophistication make fuel briquettes fail to compete effectively in a globalized and competitive market environment due to quality limitations. This state of affairs is a hindrance to the goal of improving productivity of fuel briquettes and hence lack of competitiveness in local markets.

What is then, the solution?
With the low levels of education and business skills, the most appropriate method for improving productivity of fuel briquettes enterprises is through market linkages, where producers are linked to high volume buyers such as supper markets, boarding educational institutions, big hotels and restaurants, etc. Fuel briquettes producers are unable to reach these markets due to:
• High volume buyers want quality products on timely productions and delivery orders.
• Producers face lack of business development support services (BDS), credit facilities and appropriate capital equipment and discriminatory attitudes against briquettes from consumers.

The solution is then to have some intermediation either from government marketing agencies or NGOs to enable successful and sustainable coordination of briquettes production by individual enterprises in such a way that they collectively comply with vigor to meet demand of these lucrative markets. Some of the benefits expected from such interventions are:
• Increased income to owners and taxes to the government due to high volume selling
• Increased specialization, thereby, raising briquettes quality
• Expanded range of briquettes types within the production capacities
• Improved work culture with discipline and standards demanded by the formal economy.

3: HIV/AIDS Pandemic
HIV/AIDS is a threat to an enterprise's performance. Work is affected due to increased absenteeism of workers, new recruitments and trainings and re-retraining and discriminatory attitudes against those perceived to be HIV positive. In fuel briquettes and as in any enterprise, loss of a worker has major implications. Overall, there will be rapid reduction of enterprise growth if a remedial action is not instituted in time.

HIV/AIDS has had adverse effects on many enterprises in Kenya either by increasing their costs or reducing their productivity.

What is then, the solution?
To mitigate the effects of HIV/AIDS pandemic, the following preventions and management programs for the infected and affected are proposed for adoption for the enterprise's survival:
• Seek early medication for positive victims
• Voluntary Counseling and Testing lessons
• Peer education
• Education on use of condoms and other preventive practices
• Provision of information on HIV/AIDS impacts
• Networking with other infected persons to learn lessons
• Social protection schemes.

4: Technological Skills
Fuel briquettes enterprises are faced with inappropriate technologies and lack of capacity to support adaptation, coordination and absorption of new technological skills. The enterprises suffer from lack of information on existing technologies and their potential, and an enabling environment that hampers the transfer and coordination of these technological skills. The range of technologies that the enterprises can adopt and absorb is still limited because of the low levels of education and technical training of majority enterprises operators. Fuel briquettes production continues to experience low productivity, poor quality products and limited range of briquettes resulting in poor competitiveness. There is no proper channel for strengthening links between fuel briquettes enterprises and universities or technical institutions in briquettes research. Creating awareness on available scientific and technological support services is lacking. Framework for improving technical training for trainers of trainers in briquettes technology management capacity and link them to fuel briquettes enterprises is lacking is lacking. Establishing a fuel briquettes development fund (BDF) to finance R&D and technological innovation in fuel briquettes making can greatly improve businesses is also lacking. Framework for establishing and promoting briquettes technology business incubation (BBI) to support new business start-ups is not there.

What is then, the solution?
The following are some of the ways of mitigating the effects of inadequate skills and technology lapse in fuel briquettes development in Kenya:
Customer satisfaction through non-price factors- Enterprises have to move from low cost production to high added-value cost production non-price factors such as design, quality and reliability. This can be achieved by focusing on customer demand i.e. more variety, more customization, frequent model changes, high quality briquettes, faster deliveries, better service and new and advanced designs of packages.
Technology linkages with support institutions- To address the problem of weak technological transfer mechanisms, government technical support institutions such as the Kenya Industrial Research and Development Institute (KIRDI), Public Universities, Kenya Industrial Estates (KIE), Kenya Bureau of Standards (KEBS) and NGOs in briquettes development should assist
the fuel briquettes enterprises to acquire and adopt appropriate technologies for advancing this age old but new technology for creating alternative solid biomass fuel energy for cooking.

*Introduce market oriented behavior in R&D* - Although slow, briquettes research activities are on going in Kenya but results never trickle down to the beneficiaries. Market oriented R&D system may result in its improvement to commercial levels by:

- **Improving the linkages between production and R&D institutions**
- **Establishment of technology promotion centers in fuel briquettes**
- **Increased participation of the technology users in decision making processes**
- **Improving linkages between basic-aid-applied research through collaborative and cooperative relationships with researchers**
- **Combining production capabilities (engineering/technology) of the enterprises with intellectual capabilities of research organizations/institutions**

*Response strategy to cope up with technological change* - Technology change will allow enterprises to produce higher outputs using fewer inputs or increase the rate of outputs using same inputs and/or may be input neutral: - labor or capital savings. To cope up with this change briquettes enterprise owners need to assess their activities in respect to the following

- **Position** – Assess your enterprise position in the market by asking the following questions;
  - Is the enterprise independent or dependent on a single raw material for briquetting?
  - Is the enterprise dependent on a large number of small scale customers?
  - Is the enterprise vulnerable to supplier perspective?

- **Processes** – Assess the processes the enterprise uses in producing briquettes by asking questions such as;
  - What is the process used in the production of briquettes?
  - Is the process clearly understandable?
  - Is there a different way of achieving the same end result?
  - Is there a licensing implication of the process?

- **Products** – Assess the products by asking these questions
  - What type of briquettes is the enterprise producing for the market?
  - Are they environmentally acceptable?
  - Are there short, medium or long term risks in the continuation of such production? Can they be re-designed to suit environmental issues?

- **Technology** – Assess the technologies the enterprise uses by asking the following:
  - Have technologies changed?
  - Is there an opportunity to innovate within the technology?
  - Is there room to modify existing technologies and can they be used better?
Competitors – Assess the competitors by asking the following questions:
Who are the competitors from within the local and international levels?
What are these competitors doing?
Are they designing their briquettes and processes to suit environmental standards?
Are they marketing their products in an innovative way?
Are they driving down costs through environmental innovation?
Can they be edged and by what means?

What risks do the micro/small briquettes enterprises face in comparison with large scale competitors?

STRATEGIES FOR PRODUCTIVITY IMPROVEMENT
The following are some of the strategies for enhancing the level of competitiveness in fuel briquettes enterprises in Kenya:

Introduction of a business mentorship program by utilizing marketing and management professionals to guide and advice enterprise owners
Establish well regulated and coordinated relationships between the enterprise owners and researchers in this field of alternative cooking energy creation
Increasing networking and alliances with others in similar fields in order to be more competitive and efficient
Acquire credit facilities to boost funds for the enterprise to be able to meet set business goals and targets.

LESSONS LEARNT
Copy writing: Enterprises owners fear others to copy write their methods of operations.
Planning: Many briquette's never do business research nor cost their business operation activities.
Neglect: Many fear researchers for they will use their enterprise’s information to advance their career leaving them abandoned thereafter.
Marketing: Not many enterprises owners possess good marketing skills
Education: Low-levels of education of an individual is a major contributor to the slow growth of their enterprises

CONCLUSION
Existing fuel briquettes enterprises operating within a proper framework should have the capacity to contribute to the building of a sound and competitive economy, wealth and employment creation, alternative energy creation for cooking and hence poverty reduction. The impediments that constraint the growth and sustainable development of fuel briquettes productivity and competitiveness in Kenya include:
Internal constraints – These include low levels of education and business skills, and training, limited access to marketing information, inadequate technological skills adoption to meet modern demands, HIV/AIDS pandemic, limited access to credit, poor or no business planning and work ethics, and cultural and religious beliefs.

External Constraints - Government policy on renewable energy creation from solid biomass wastes is not known to micro/small scale briquetters. We rely on foreign standards for testing local briquettes and support institutions overlook issues concerning biomass fuel briquettes.

The most and serious challenges are those related to the internal constraints more especially the low levels of education and training, inadequate management, technological and business skills.

For a sustainable productivity improvement meant to enhance competitiveness in light of globalization and liberalization, the levels of education and business skills and training of fuel briquettes enterprise owners/operators should be prioritized by the owners themselves from time to time. This is likely to assist in mitigating the constraints in the briquettes enterprises.

Therefore, to effectively assist the existing fuel briquettes enterprises in Kenya overcome the constraints to their productivity improvement and hence competitiveness, the constraints should be critically analyzed and adequately addressed through collaboration with the government, researchers and briquettes concept trainers.

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