



## **A TRAINER'S GUIDE FOR MAKING FUEL BRIQUETTES** **Legacy Foundation**

Legacy Foundation provides training, technology and media-services for biomass fuel briquette production, environmental conservation and income generation throughout the world. The definitive source for this information can be found at [www.legacyfound.org](http://www.legacyfound.org).

Anyone can join the Google group at <http://groups.google.com/group/fuelbriquetting?hl=en> for discussion of anything and everything to do with biomass fuel briquetting, or email the Google group at [fuelbriquetting@googlegroups.com](mailto:fuelbriquetting@googlegroups.com)

### **The Wet-Low Pressure Method**



### **FUEL BRIQUETTES TRAINING PROGRAM**

Successful training takes 6-8 weeks in order to be able to produce a smokeless fuel briquette. This manual summarizes, in point form, information from the main Manual of Trainers of Trainers (TOTs).

## **INTRODUCTION**

Sustainable sources of wood fuel have diminished. Many poor families' household budgets suffer from domestic energy expenses. Deforestation has become a worldwide epidemic due to poverty, poor management policies, pressures of population growth, greed, and so on. Therefore, success in fuel briquetting depends on understanding its benefits for the community.

### **Benefits of Fuel Briquettes**

- Protects the environment
- Generates income and employment
- Saves time
- Saves energy
- Saves lives

### **PROGRAM OBJECTIVES**

- Create a sustainable supply and production of fuel briquettes
- Create micro-enterprises of qualified individuals/groups to generate income
- Reduce the risks of carbon generating fuels in the kitchen
- Save our environment

### **Specific Objectives**

- Identify suitable biomass for fuel briquettes making
- Demonstrate how fuel briquettes work
- Become fuel briquettes producers and users

## **TRAINING**

### **Expectations**

At the end of the training, trainees are expected to:

- Have mastered the concept of making fuel briquettes and as a viable enterprise
- Have gained a new technology for application in their areas
- Have learned how to improve production and work as a team
- Have become experts in recycling biomass waste for profit
- Make innovations in quality and new briquettes related products

### **Training Period**

Training involves six site visits during 6 to 8 calendar weeks.

- Visits 1 to 3 are preparatory over a four week period; timing will be determined by the trainees.
- Visit 4 involves four to five days of intensive technical training onsite.
- Visits 5 and 6 involve follow-ups, which are usually half-day to full-day events. The schedule varies based on site location, weather, resources, and the trainees' availability and skills. In addition to motivating and encouraging trainees, marketing strategies are developed.

### **FIRST SITE VISIT (Length: 1 Day)**

This is to:

- Determine a fuel briquettes producer group
- Draw up a program and select a planning committee
- Conduct a feasibility study and contextual analysis

## Contextual Analysis

Consider

- The difficulty of firewood access and other sources for cooking energy sources
  - If firewood is difficult to access, then conduct a briquettes production project. If cheap, there is no need.
- The local policies related to fuel wood consumption
  - Get an overview on policies in favor of or against collection of firewood.
- The limitations to using alternative fuels and restrictions on marketing
  - Find space in the market
  - Can charcoal sellers be integrated?
- The proximity to the local market for sale of fuel briquettes
  - If demand is there, pool resources together and transport the fuel briquettes
  - The experience of the group with entrepreneurial self-reliance and sustainable activity Group must be innovative, interested, and creative in order to survive
  - Make briquettes production a business, not an activity
- The availability and applicability of published baseline information on fuel wood energy consumption for eventual impact assessment of the project/enterprise.
  - *Key data:* Population size, household sizes and expenditure on cooking fuel (e.g. kerosene, charcoal and similar); electricity, gas (LPG), rate of deforestation and plans for reforestation, and types of woodlots
- The availability of water supplies
  - 200-300 liters of water are needed daily for commercial fuel briquettes making
  - 10 liters of clean drinking water for producers (daily)
  - Trap and recycle used water during fuel briquettes pressing process
- Whether there is sufficient space for the production activity
  - Enough space, room or ground is needed
  - Storage space must be dry and well aerated
  - Space for decomposing a good number of rows of raw materials
- Whether there are sufficient resources for production
  - Raw materials for fuel briquettes production
  - Funds
  - Time
  - Hot weather
  - Human labor
  - Equipment (e.g. press machine and chopper/thresher)
- The commitment of the group/trainees
  - Preparedness to source materials, invest their time and energy
  - Regular production
  - Self-monitoring and evaluation
  - Consultations and meet consultancy expenses
  - Assess financial feasibility during this first visit

## **SECOND SITE VISIT (Length: 1 Day)**

Involves a full day of meetings in order to:

- Refine the Selection Process of Trainees to ensure success of the activity, and ascertain whether trainees are ready and willing. Find out if:
  - There are interested groups; venue is available and any deterrent factor?
  - The community is aware of alternative sources of cooking energy?
  - Any perception of wood fuel availability and environmental impact?
  - There are any other suggestions
- Demonstrate Fuel Briquettes Making and Cooking

### **Briquette Making**

Successful demonstration needs:

- Equipment for briquetting
- Raw materials (readily decomposed)
- Water
- Labor

### **Cooking Demonstration**

Successful demonstration needs:

- Stoves
- Food to be cooked
- Some dry briquettes
- Eating the cooked food
- Allaying any fears
- Grasping briquettes lighting and replacement during burning process
- Comments from trainees

## **THIRD SITE VISIT (Length: Full Day)**

This involves assessing materials, collecting, sorting, chopping, processing, pounding and decomposing at the same time.

## **FOURTH SITE VISIT (Length: 4 to 5 Days)**

**Involves:**

- Intensive training at groups' sites
- Providing core information and experience with fuel briquettes technology
- Requiring 6 to 18 people

### **First Day of Fourth Visit**

- Training starts with a review on the impacts of fuel briquettes:
  - Protects the environment
  - Generates income
  - Saves labor
- Learn to develop a system for constant fuel briquettes making, which include:
  - Community participation in production and material supplies
  - Participation of school children in production off class work
  - Contracting individuals to deliver raw materials for a fee

### **Second Day of Fourth Visit**

- Preparation of Materials for Decomposition
  - Requires practice, practice, practice and testing, testing, testing until briquettes makers get the sense right of the best blends;

- Dry materials then chop (manually/mechanically)
- Hand thresh/mill
- Use mechanized shredder or hammer mill
- Decomposing
  - Use usual decomposing procedures but do not add soil
  - The material should not decompose into compost fertilizer, about 4 weeks maximum
  - Make successive heaps of 50cm high x 1metre wide x 5metres long rows to avoid
  - missing what to briquette
  - Dry decomposed material and store safely to save pounding time and trouble
- Mixing/Blending the Materials after Decomposing
  - Suitably decomposed material can be blended
  - Pound in mortar, adding water in bits
  - Conduct three hand tests which apply to materials that require chopping/milling:
    - ✓ *Ooze test* – Scoop some materials into your fist then squeeze; if it oozes through your fingers, it is too ripe
    - ✓ *Spring back test* – If the material expands when squeezed in your hand, it is not ready
    - ✓ *Shake test* – Material well decomposed, when squeezed in your hand and then shaken vertically, never falls apart

### Third Day of Fourth Visit

- The Press and Briquette Making
  - Prepare material for press making using available measurements from the trainer
    - ✓ The press machine compresses fuel briquettes into uniform shapes and sizes better than bare hands
  - When decomposed material is ready, start fuel briquetting. Let different groups produce different blends
  - Six people can produce 750 –1000 fuel briquettes per 8 hrs, daily
    - ✓ Holey briquettes dry faster and burn effectively
  - Follow procedures for making quality fuel briquettes (e.g. right blending and ingredients; measure, pressing, drying, storage, protection from wetness, etc.)
  - Handle wet fuel briquettes with care and dry them in direct hot sun for 3–6 days in a electricity or solar dryer or in a dark well-aerated place (but this takes time)
- Press Maintenance
  - Ensure care to lengthen its lifespan
  - Do not dry it in the sun to avoid cracking
  - Preserve it with waterproof paints
  - Oil or grease the nuts
  - Keep under shade or cover it when not in use
- Work Organization
  - Timely materials collection and decomposing, briquetting, work distribution
  - Record keeping of major activities: date when material is composted, number of fuel briquettes produced and quantities sold, price and total cash, balances in stock; handing/taking over, etc.

**Fuel briquettes sample record**

Date	Qty Made	Qty Sold	Total Cash (Kshs)	Stock Balance	Remarks	Signature
Totals						

**Fourth and Fifth Day of Fourth Visit**

- Business Costing/Pilot Marketing
  - A famous business quote says, *“Nothing happens until it is sold.”* As in any other business, making fuel briquettes as a business depends on its sales
  - Sales depend on knowing who your customers are
  - Design a marketing strategy
  
- Pricing the Fuel Briquettes
  - Determine price of firewood sticks or a kilogram of charcoal, and how much a family uses in a day (morning, lunch and evening). Include special events, ceremonies and weather conditions
  - Calculate consumption per day, per month. Divide it over used quantities to get price per briquette. Then divide used briquettes over one family to get the number a person uses
  - Prices in rural and urban areas may differ due to certain influencing factors like distance
  
- Marketing of Fuel Briquettes
  - Who to approach and how? There are methods:
    - ✓ List prospective consumers (e.g. boarding, institutions, restaurants, chips sellers, fish mongers, etc.)
    - ✓ Buying large quantities (buying in bulk) can receive discounts or a gift
    - ✓ Exchange some fuel briquettes for raw materials delivered
    - ✓ Use pro-environmental conservationists
    - ✓ Conduct open air cooking demonstrations (e.g., in market centres)
    - ✓ Participate in shows and exhibitions

**FIFTH SITE VISIT** (Length: 1/2 Day)

Mainly to monitor progress

- The 5th and 6th site visit takes 3 weeks to track progress and discuss emerging issues
- Trainer is not there to offer solutions; rather, group members are to solve problems together
- Group(s) to begin realizing as owners of the enterprise as they wait to graduate

**SIXTH AND FINAL SITE VISIT** (Length: 1 Day)

- Closing ceremony and evaluation should follow within 1 to 2 weeks of the fifth site visit; to include a wrap up, feed back and evaluation of the training
  - ✓ Sponsor can provide budget for graduation ceremony
  - ✓ Laminated and beautifully crafted certificates are to be given to graduates by a high ranking official of government/private sector. Invite donors, media, guests, etc., to include popular foods cooked by briquetting trainees
  
- Assessment of the Training
  - ✓ Use informal opinion surveys and focus on group discussions

- ✓ Obtain baseline information from rural household energy studies to measure impact of
- ✓ the briquettes projects/enterprise
- ✓ Explore other new sites with fuel wood problems by obtaining background information

### **POST TRAINING PERIOD**

The trainer's job is to:

- Obtain production/sales figures of fuel briquettes from the group(s)
- Note changes in other cooking fuels consumption
- Note fuel briquettes sales patterns, types of consumers, reasons and types of use, favored and avoided blends
- Seek information from trainees on the content and organization of the training, and venue

### **CONCLUSION**

- Recycling biomass materials into fuel briquettes contributes to solving rural and urban needs by generating income, providing a new and cheap alternative source of cooking energy, avoiding excess waste disposal on insufficient land, avoiding having to cut down more forests for fuel wood, and ultimately promoting a sound environment.
- Fuel briquettes making is an environmentally friendly technology, which needs adoption and promotion by both rural and urban groups/individuals. After the training each group/individual is required to own a fuel briquettes press to start an enterprise.
- This, therefore, means that fuel briquettes can address the multiple needs of our society and our environment.

RECOVER, RECYCLE, REDUCE, & REUSE TO SUSTAIN LIVES

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