

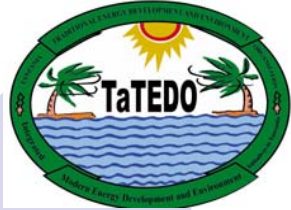
WOOD FUELS STOVES DEVELOPMENT AND PROMOTION IN TANZANIA: (SOME *SELECTED EXPERIENCES*)



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workshop on Bioenergy for Rural Development in Africa and
Asia*

PRESENTATION OUTLINE

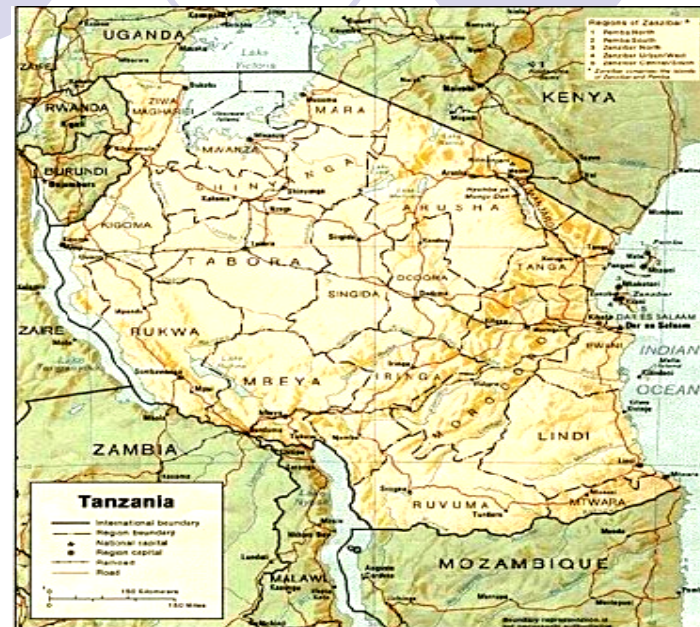


- ❑ Introduction–
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 - Energy situation
 - country energy strategy
 - about TaTEDO
 - Extract from TaTEDO sustainable energy catalogue
- ❑ Stoves-why?
- ❑ stoves Projects in Tanzania
- ❑ TaTEDO Stoves Efforts development and promotion.
- ❑ Stoves technology Transfer to Communities and micro-enterprises
- ❑ Selected Achievements and Impacts
- ❑ Lessons Learnt
- ❑ Challenges
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TANZANIA-LOCATION & FEATURES

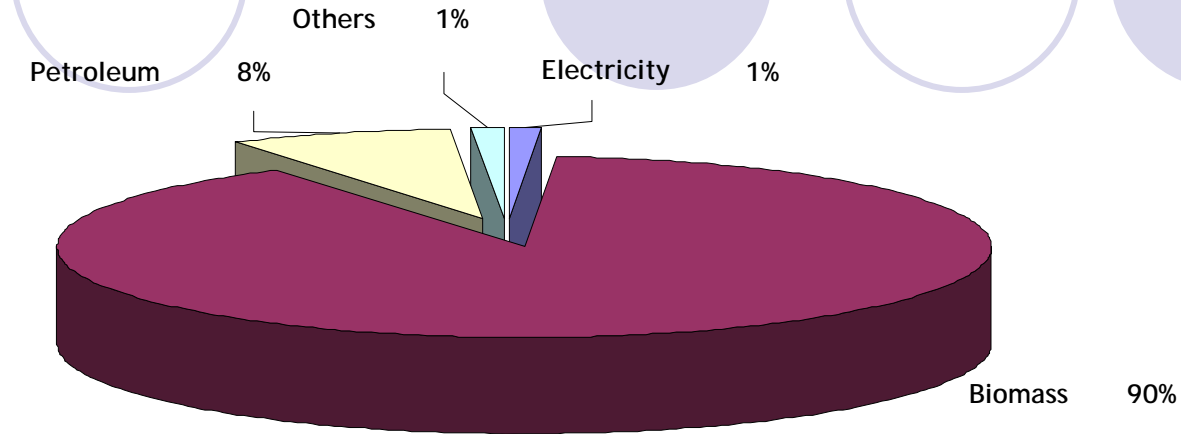
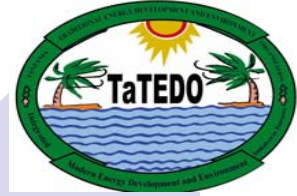
Location: Tanzania lies between 10° and 12°S and 30° and 41°E between three great lakes - Victoria (north), Tanganyika (west) and Nyasa (south) in the Western Rift Valley and the Indian Ocean (east) in East Africa.

Altitude: The altitude varies between the summit of Mount Kilimanjaro 5,950 m. above sea level and the floor of Lake Tanganyika 358 m. below sea level.



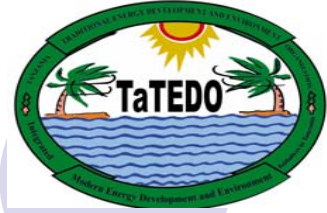
Lake Tanganyika-
Gombe Shore (358 m
below sea level)

ENERGY SITUATION IN TANZANIA



- Biomass meet 90% of the energy needs
 - Accounts for more than 70% of cooking needs in urban and 90% in rural areas
 - Implications on long-term environmental degradation.
 - Gender dimensions – as women spend more time collecting fuel wood.
- Only 2% of rural homes have access to electricity (& only 39% in urban areas)
- In urban areas the poor spend 35% of their income on energy
- Various programs to improve rural energy situation have been tried with limited success
- Stoves development and promotion efforts are in line with government policy for biomass energy conservation and needs to scaled up for high impacts to be realized.

Cooking and heating Energy SITUATION



- More than 90% of the Tanzanian population derive their energy requirements for cooking and SMMEs provision of process heat from biomass fuels (charcoal, fuel wood and farm residues)
- Utilization of fuel wood in Tanzania is characterized by low efficiencies i.e. that of three stones fire places range between 12 and 15%
- Since 1980s there have been several efforts to promote improved biomass stoves in rural and urban areas of Tanzania.



Cooking Situation in Tanzania

Tanzania energy strategy and direction outline.



- Promoting affordable and reliable energy technologies and services to contribute to the achievement of MDGs.
- Reforming the market for energy services & establish adequate institutional framework – to facilitate investment, services expansion, efficient pricing mechanisms & other financial incentives
- Enhancing development & utilization of indigenous & RE sources & technologies.
- Taking account of environmental concerns in all energy production and use.
- Promoting energy efficiency & conservation.
- Increasing energy education & building gender-balanced capacity in energy planning, implementation & monitoring



- **About TaTEDO:**

- A Centre for sustainable modern Energy Initiatives and non-profit sharing organization established in 1990.

- **Vision:** Poverty free and self-reliant communities in Tanzania accessing sustainable modern energy services.

- **Mission:** To advance popular access to sustainable modern energy technologies in marginalized communities in Tanzania through technological adaptations, capacity building. Community mobilization and advocacy for increased access to sustainable energy.

- **Some key activities:** Capacity building, community mobilization, advocacy, energy technologies development and transfer, networking, energy related enterprise development services, etc.

- Has diverse partnership base, locally and internationally with GOs, LGAs, NGOs, Private Sector, Donors, and communities.

- Has field experience of more than 15 years on sustainable energy activities - studies, planning, implementation, enterprises support, monitoring and evaluation. Has multi-disciplinary staff of about 50 professionals.

TaTEDO' S SUSTAINABLE ENERGY TECHNOLOGIES: CATALOGUE SUMMARY.



WHY PROMOTE WOODFUELS STOVES



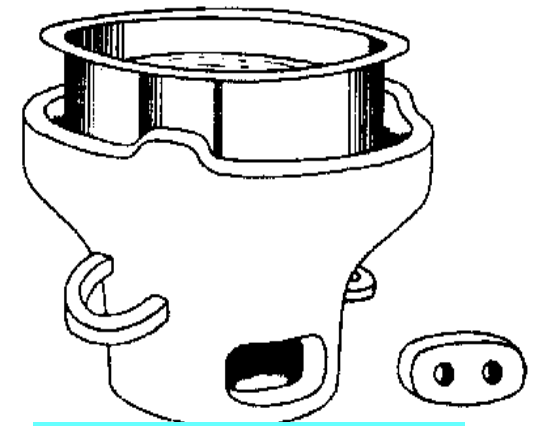
- To increase efficiency (optimize combustion and maximize heat transfer) of biomass resources use in households, institutions and SMMEs.
- To reduce indoor air pollution.
- To reduce drudgery and save time for women and children
- To reduce deforestation and land degradation
- To mitigate climate change.
- To enhance local income and employment generation.
- To scale up uptake and use of many smokeless, high efficiency, low to medium cost stove designs already in existence.

STOVES PROJECTS IN TANZANIA



There has been several stoves projects in Tanzania, among the early stoves project in Tanzania include: MOROGORO FUEL STOVE PROJECT (MFSP)

- ❖ In 1980s R & D on Morogoro ceramic and mud stoves was initiated by Agriculture Dept. at the SUA .
- ❖ In 1985 *Morogoro* Fuel Wood Stove Project (*MFSP*) was launched with support from NORAD, under this project:-
 - ❖ Two portable ceramic stoves were developed,
 - ❖ Improved clay Charcoal and fire wood stoves were developed,
- ❖ Emphasis of the project was on:-
 - ❖ Pilot production,
 - ❖ Training,
 - ❖ Promotion and,
 - ❖ Awareness creation on socio-economic and environmental benefits of the stove,



*Morogoro Ceramic
Stove*

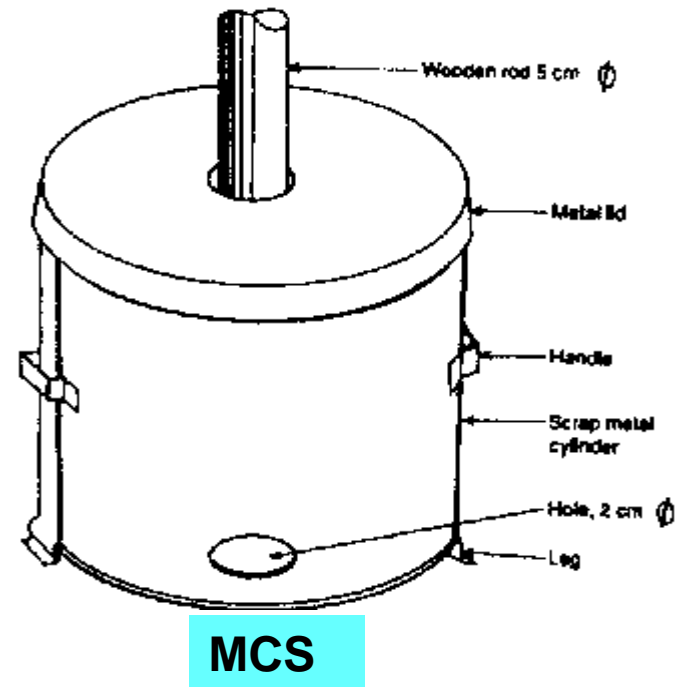
MOROGORO STOVES CONT'



- ❖ Morogoro ceramic stove reduced charcoal consumption by 45% compared with the traditional Metal charcoal stove,
- ❖ Setback of the stove was its durability, most lasted for a few months before breaking.
- ❖ Introduction of grate reduced cracking of stoves by 25%.

MAPUMBA (RESIDUE) COOK STOVE (MCS)

- ❖ MFSP introduced MCS which utilized cow dung, rice husk and saw dust as fuels - due to poor combustion and smoke, the stove was not popular.



Improvements made on the traditional metal stove to produce Dodoma stove included the following,

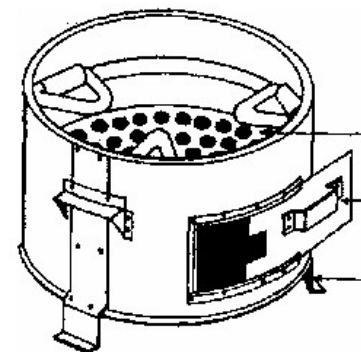
DODOMA STOVES

1. Double walled for air insulation,
2. Had air regulator,
3. Enclosure of the combustion chamber

Other physical properties of the stove were:-

- Heat transfer efficiency which was estimated to be 36%
- It was rather bulky and heavy

Initially stoves were sold in *Dodoma, Tanga, Arusha and Dar es Salaam* regions—due to high cost and production complications, it could not compete with the jiko bora.



Dodoma Metal Stove



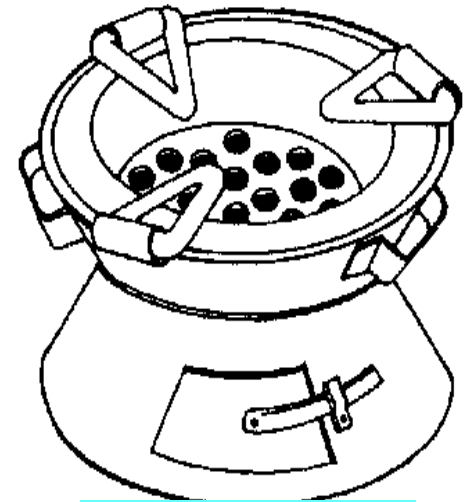
JIKO BORA- UNDER *REDPU PROJECT*

In 1988, the MEM under the Renewable Energy Development Project Unit (REDPU) launched a pilot project which aimed at:-

- ❖ Designing,
- ❖ Developing and,
- ❖ Disseminating improved charcoal saving cook stove

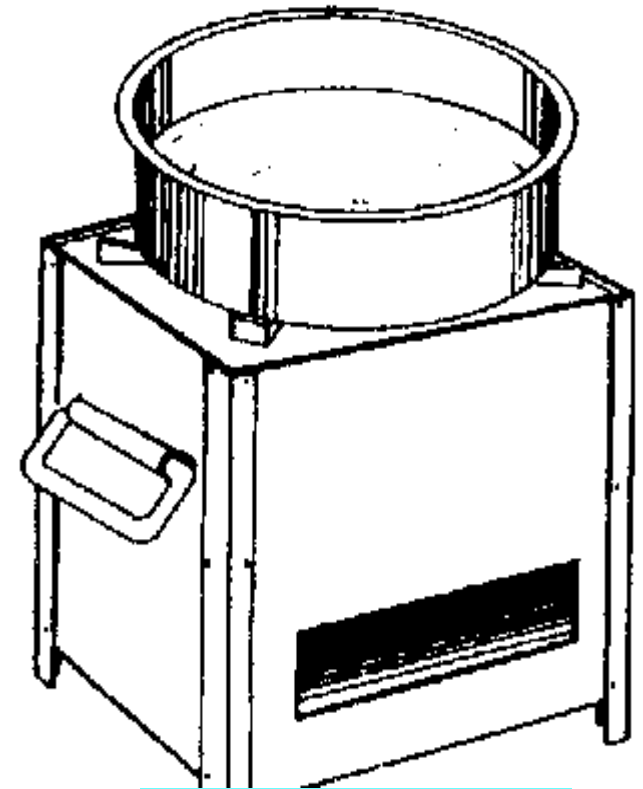
The pilot project was sponsored by the World Bank—through IDA credit.

The pilot project adapted and adopted the metal ceramic design stove from Kenya Ceramic Jiko (KCJ) and was renamed: Jiko Bora



*KCJ—Jiko
Bora*

- ❖ In 1989, community stoves were developed by **CAMARTEC with GTZ support.**
- ❖ Main purpose of the stoves was to reduce wood fuel consumption in institutions (Schools, hospitals etc),
- ❖ Fuel saving ranged from 70 - 85%,
- ❖ They were made from steel sheets or lorry rims aligned with fired bricks,
- ❖ Fuel in use was either charcoal or firewood
- ❖ Due to high cost of the stove, few were installed.



Duma Stove



TaTEDO STOVES DEVELOPMENT AND PROMOTION EFFORTS

- ❖ From 1992 TaTEDO continued with the responsibility to develop and promote on large scale; improved charcoal and wood fuels stoves *Jiko Bora* (ICS) *and OKOA respectively* in the country, dissemination was through local technical and business capacity building.

We are thankful to the generous support of the EU, Norwegian government and the Hivos of the Netherlands who have enabled TaTEDO to undertake stoves activities successfully.

- ❖ *Stoves promoted use charcoal , firewood and bio-waste as source of fuels,*
- ❖ *Stoves are for both consumptive and productive uses,*
- ❖ *ICS production and marketing has increased to more than fifteen thousand units per month in Dar es salaam city.*
- ❖ *More than 500 woodstoves are built country wide per month*

TaTEDO STOVES DEVELOPMENT AND PROMOTION EFFORTS



☐ CHARCOAL STOVES

- ❖ The following stove types are being produced on large scale,
- ❖ The stoves are widely produced micro-enterprises,
- ❖ Depending on the size can be used at households, institutions and SMMEs



Bellbottom

Thermal efficiency 30 - 35%



Straight Wall

TaTEDO STOVES DEVELOPMENT AND PROMOTION EFFORTS CTNUE--



❑ CHARCOAL STOVES CONT--



Double Box Type

Thermal efficiency 30 - 35%



Sazawa

Efficiency 44%



Double Stand with Stoves

Thermal efficiency 30 - 35%

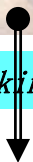
CONTINUE--

❑ CHARCOAL OVENS

The following stove types are used for productive purposes:-



Cooking and Baking Oven



Baking by Charcoal Oven



Charcoal Barbeque



Roasting Meat by Charcoal Oven

TaTEDO STOVES DEVELOPMENT AND PROMOTION EFFORTS CTNUE---



❑ FURTHER IMPROVEMENTS ON CHARCOAL OVEN



Charcoal Oven With Chimney

CONTINUE

❑ FUEL WOOD STOVES

Fuel wood stoves include the following:-

❖ Mud stoves, in most cases are used in rural areas where ability to pay is low



Three Stones Fire Place



Mud stove



Household mud stove in use

TaTEDO STOVES DEVELOPMENT AND PROMOTION EFFORTS



CTNUE---

❑ OKOA FUEL WOOD STOVES;-are of masonry construction with few metal parts integrated in the construction.

Okoa wood fuels stoves are clean and efficient in burning wood with chimneys to provide draft for more efficient combustion and to remove smoke from the kitchen environment.



Low cost brick made okoa fuel wood stove



Institutional Okoa Stove



Water tank

brick made okoa fuel wood stove with water heater.

TaTEDO STOVES DEVELOPMENT EFFORTS

CTNUE

❑ FUEL WOOD STOVES WITH OVEN AND WATER HEATER

- ❖ Multi purpose (cooking, baking and water heating) okoa wood stove.
- ❖ Ideal for use in restaurants and by food vendors

OKOA FUEL WOOD STOVE NO 3





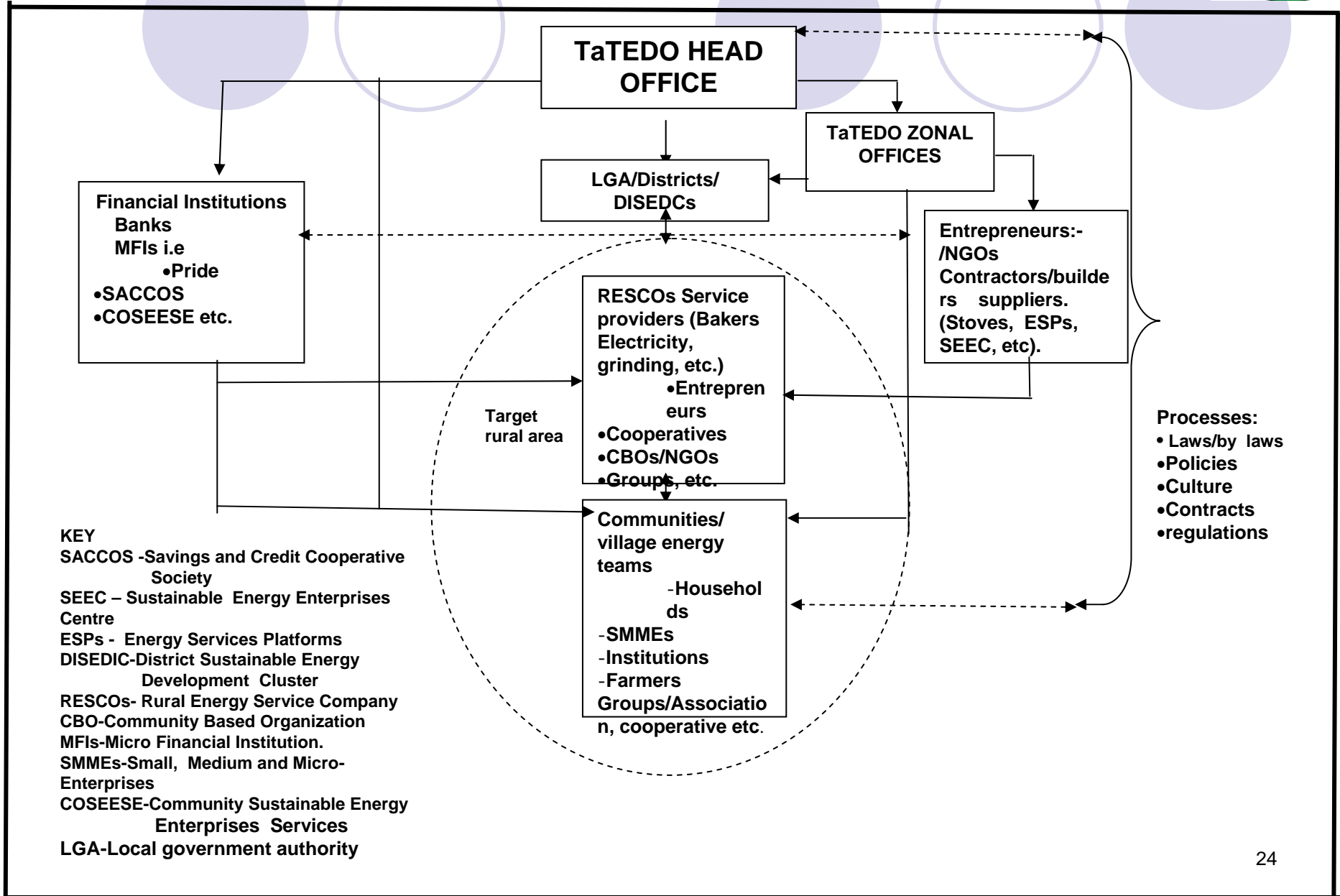
STOVES TECHNOLOGY TRANSFER TO THE COMMUNITIES AND MICRO-ENTRPRISES

Adopted approach to stoves Technology and skills promotion include:-

- ❑ Identification of project areas in collaboration with local partners (DiSED, CBOs etc),
- ❑ Baseline data/Indicators establishment
- ❑ Conduct PRA meetings to assess, needs, opportunities, stakeholders, strengths and determine self expressed local priorities.
- ❑ Participatory preparation of energy development action plans with targets
- ❑ Awareness Creation Through, posters, media and demonstration of relevant stoves
- ❑ Stoves micro-enterprises identification market assessment, business plans preparations
- ❑ Market development through technical and business management capacity building
- ❑ Monitor the project and businesses (collect key information on stoves quality and business performance.
- ❑ Capture Lessons, adapt the stoves technologies to help with scaling up, replication and mainstreaming successful initiatives in other local areas.



LOCAL LEVEL INSTITUTIONAL STRUCTURE AND PROCESSES FOR SE TECHNOLOGIES TRANSFER



STOVES TECHNOLOGY TRANSFER TO THE COMMUNITIES AND MICRO-ENTRPRISES CONT'



❑ Local Capacity Building (Technical and small business skills)



Training on Fabrication



Training on construction of mud stove



Training on Baking business



SOME SELECTED ACHIEVEMENTS AND IMPACTS

Among others the following are impacts realized from TaTEDO efforts:-

| YEAR / VARIABLE IN #S | STOVES (CHARCOAL & FIREWOOD) | | | OVEN | | INSTS/S MMES |
|---|---------------------------------|----------|---------------------|---------|-------------------|-----------------|
| | ICS | IWFS | ARTISANS TRAINED | PCS | BAKERS TRAINED | |
| 2008 | 180,000 | 4,255 | 71 | 84 | 64 | 400 |
| COMULATIVE 2000 – 2008 | 1,386,307 | 121,117 | 443 | 608,208 | 409 | 1,548 |
| Ha OF TREES SAVED IN 2008 FOR COOKING with ICS | MORE THAN 4,500 | TBWO YET | | | | |
| MONEY SAVED IN 2008 BY HOUSEHOLD COOKING with IFW | | 472,000 | | | | |

Including 95 partners (District Authorities, CBOs, NGOs etc)

SELECTED ACHIEVEMENTS AND IMPACTS CONT'

4. Socio-Economic impacts

Two hundred (200) SMMEs are involved either in production or provision of services from promoted stoves,

Baking with Charcoal Oven



Mechanization for mixing flour for cakes production.



Baking, a small factory with several ovens.

LESSONS LEARNT



Following are some of the lessons learnt so far:-

- ❖ There is considerable market for improved stoves in urban and rural areas.
- ❖ Initial market risks have to be taken up by development agencies, micro enterprises cannot afford the risks and also meet market development costs.
- ❖ Major issue in the design of well-functioning stoves is to account for site specific factors such as pot, fuel and food to be cooked, hence need to adapt to local socio-economic conditions.
- ❖ On site local construction of okoa stoves allows the construction team to maximize performance by making local design adjustment to specific site issues.
- ❖ On site construction of stoves reduce transport costs and help to meet site specific client needs.
- ❖ While training on construction is important, even more important is how to use the stove and troubleshooting competence.
- ❖ There is a need to carry out intensive marketing efforts to convince potential users on the many benefits of the stoves.
- ❖ Sometimes energy efficiency is not the primary motivation of stove users-quality of stove time for cooking, improvement of kitchen environment status symbol etc.

CHALLENGES



Challenges for dissemination of improved wood stoves include:-

- ❖ Inadequate policies and strategies for supporting improved stoves development and promotion.
- ❖ Inadequate financing and affordable credit facilities to support improved stoves related initiatives.
- ❖ Inadequate awareness on socio-economic and environmental of promoting improved stoves.
- ❖ Inadequate technical, business and marketing skills for many stoves SMMEs,
- ❖ Underdeveloped institutional framework for improved stoves skills transfer to local levels.,
- ❖ Poorly developed quality control and monitoring mechanisms of the stoves delivered to the end users.

WAY FOWARD



- ❖ Formulate and implement realistic and effective wood fuel conservation policies and strategies at all levels.
- ❖ Provide increased financial resources for R & D, large scale uptake and use of improved stoves through market mechanism.
- ❖ Enhance technological back-up, strategies, and resources for marketing and training for technical and business management of stoves enterprises.
- ❖ Capacity building for stoves technical and businesses are crucial for commercialization by potential entrepreneurs,
- ❖ Strengthen stoves quality control through market mechanism



MANY THANKS FOR THE OPPORTUNITY AND YOUR ATTENTION

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