

# **The Importance of Cooperation in Rural Development:**

Access to sustainable energy services in rural  
Kenya and Morocco

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Cover Images: Agadir Wijjane Village Development Association, Ruke Farmers Development Initiative, Kakamega Environmental Education Programme

## Introduction

This paper will investigate the role that cooperation can play in rural development. In doing so I will focus on the important role that increased access to energy services plays in facilitating rural development, using the cases of southern Morocco and south-western Kenya. This is balanced with the understanding that access to energy services alone is not sufficient for sustainable development, and that a transition to sustainable energy systems is also essential for all countries.

In the following sections I outline my research approach, the background information for this study, the findings of my fieldwork, and provide a brief discussion and conclusion. I have aimed to provide a broad overview of the potential for cooperative approaches to developing sustainable-energy services for rural development.

## Research Approach

### Research Questions

This paper seeks to answer this primary research question:

- How is cooperation important in facilitating development and access to energy services in rural Morocco and Kenya?

The following more specific questions were used to guide my research:

- What are the primary sources of energy being used, and how sustainable are they?
- What access do rural communities have to energy services, and what are their energy needs?
- What role is the present role of cooperation in development initiatives, and what cooperative institutions are being used?

### Research Aims

The aim of this research project is to investigate the role of cooperation in rural development, with a focus on rural sustainable-energy development. My hypothesis is that cooperation will prove to be an important pillar of successful rural development initiatives, especially through facilitating the pooling of individual capabilities and increasing the possible activities that group members can engage in. If so, this would support the case for greater emphasis on cooperation-centred development approaches.

## Methods

The groundwork for this study has been established through a review of literature on rural energy development, cooperatives, the role of cooperation in rural energy development, and the situation in the study areas of Morocco and Kenya. The findings of this literature review are outlined in the *Background Information* section.

The fieldwork component of this study was done in two parts. The first part was conducted in south-western Kenya, during July and August 2009. This research project focussed on the role that Legal Empowerment of Business can play in generating sustainable rural enterprise development, especially

enterprises that provide access to sustainable energy services. The main subjects of the study were enterprises that provide sustainable energy products and services, including: improved cooking stoves, briquettes that are a substitute to charcoal, and solar cooking devices. We also gathered information related to the energy needs of rural communities and the important role of cooperation in development initiatives.

For the purposes of this paper I will use a small selection of the respondents from that study, which is not yet published, highlighting the examples of the Ruke Farmers Development Initiative, the Kakamega Environment Education Programme (KEEP) and Keyo Womens Group. See map shown in Figure 1.



**Figure 1 - Map of Kenya Study Area showing study locations: 1 – Ruke Farmers Development Initiative, 2 – KEEP, 3 – Keyo Women’s Group**

The second component of fieldwork was a short visit to the Souss Valley area of southern Morocco. During this study I visited two argan oil production cooperatives and two village development associations. I discussed with these groups the role of cooperation in their rural development, and their energy situation. I was assisted during the research by Said Ziky, a local student who was also a valuable respondent on both issue and we visited his village of Touzaikou Village to see the development situation there. The village associations were the Agadir Wijjane Village Development Association and Tazoulte Village Development Association. The two cooperatives were Tiwizi Wargan Argan Oil Cooperative, and Afoulki Argan Oil Cooperative. The study locations are shown in Figure 2.

In both cases the fieldwork methodology was primarily conducted using semi-structured observational interviews (Silverman, 2005). These interviews were conducted in the respondent’s own environment, generally their cooperative, home or workshop as appropriate. This ‘narrative walks’ approach focuses on gaining an understanding of respondent’s stories, and gives a researcher the advantage of being able to observe and question respondents about things in their environment that are almost impossible to perceive from a university office (Olsson, 2009). It is particularly effective when working in unfamiliar cultural contexts - where the potential for misunderstanding is lessened by being able to observe the physical

environment that the respondents are describing, and relate one's questions and their answers directly to observations (Scheyvens & Storey, 2006).



**Figure 2 - Map of Moroccan Study Area, showing study locations: 1 – Tazoulte Village, 2 - Agadir Wijjane Village, 3- Afoulki Cooperative, 4 - Tiwizi Wargan Cooperative, 5 – Touzaikou Village**

There are clearly some risks in taking a ‘constructed understanding’ approach to fieldwork, but it relates to a grounded theory approach by seeking a consistent understanding where little new knowledge is being added (Moses & Knutsen, 2007). Our team felt that we had successfully reached that point in Kenya, and thus the examples used in this paper are indicative of that robust understanding. In Morocco I was not able to undertake such a thorough study, but the findings from there are useful even if they are only indicative results.

## Background Information

### Rural Energy Access

Access to energy services, and especially electricity, is essential for lasting rural development, yet rural areas generally lag far behind urban areas in access to electricity, as can be seen for Kenya in Table 1.

**Table 1 - Access to Electricity in Morocco and Kenya (International Energy Agency, 2008)**

Country	Amount of population with electricity (%)			People without electricity (millions)
	Total	Urban	Rural	
Kenya	15	51.3	5	32.8
Morocco	97	98	96	0.9

Small improvements in access to energy services result in large gains in human development. For those with no energy access at all, access to the most basic of energy services results in the greatest gains (Johansson & Goldemberg, 2002). While expanded energy services are not specifically one of the Millennium Development Goals, it is clear that the goals are unlikely to be achieved without them (Modi et al., 2005).

There are numerous ways to improve energy access, but eventually electricity provision is essential. More than 1.6 billion people in the world that go without access to electric energy, and the majority, around 4 out of 5 of them, live in rural areas (Barnes, 2007). The transition to electricity as an energy carrier represents a huge shift in access to energy services, even in the simplest form. A battery recharging system can provide a household with better light and battery recharging capacity, for less than half the present cost of kerosene (Modi et al., 2005, p.61).

Developing access to electricity in rural areas is a challenge. As transmission distances increase and population densities drop grid infrastructure becomes more expensive. At the same time rural communities in developing countries tend to have lower incomes, making them an even less profitable market. This means that committed and well-planned state support is essential to successful rural electrification, no matter what supply model is used (Barnes, 2007).

Rural areas in developing countries represent an opportunity for the decentralised supply of renewable energy services. While the developed world grapples with how to transition from centralised generation to decentralised sustainable renewable generation (Pepermans et al., 2005), the opportunity exists for many developing countries to skip a step by focussing on decentralised, locally appropriate and sustainable technologies and sources of energy to provide advances in energy services (Mapako & Mbewe, 2004; El Bassam & Maegaard, 2004). Indeed this is most probably their only viable option (Nersesian, 2007).

### Cooperatives as Social Enterprises

*A cooperative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise"*

(International Co-operative Alliance, 2009).

The livelihood that people engage depends on their capabilities represented by social, human, physical, financial and natural capital (Ellis, 2000; Sen, 2001). Cooperation helps people to aggregate their knowledge, resources, savings and ideas – essential capabilities, allowing them to achieve more as a group than they could alone. They also operate as democratic institutions in which all members have one vote, regardless of the size of their shareholding (Johnston Birchall, 2003).

Cooperatives have waxed and waned in favour as a rural development approach, with successes and frustrations to be seen in both the developed and developing world (Johnston Birchall & Ketilson, 2009). There is now renewed interest in the role of cooperation in development with strong support from the United Nations in proposing an International Year of Cooperatives (United Nations Secretary General, 2009), and resolution 62/128 of the General Assembly calling on nations to support cooperative development (UN General Assembly, 2008).



As a social enterprise, cooperatives are meant to pursue a 'double bottom line' of returns in social and economic capital. Ideally they pursue a 'triple bottom line' that adds environmental benefits (Borzaga & Defourny, 2001). They have the potential to tackle socio-ecological and human development challenges effectively and in an egalitarian way, as challenges are tackled by those most affected. In this sense they should be viewed as an essential pillar of sustainable rural development (Johnston Birchall, 2003).

There is a tension between a bottom-up development view of the role of cooperatives, taken in this paper, and a 'big business' view that is important to bear in mind. In the eyes of the US National Cooperative Business Association they are *businesses* that "Exist solely to serve their members" (NCBA, 2009). Cooperatives also have the potential to be appropriated by economic interests if they are not embedded in a proper oversight and capacity building framework (Johnston Birchall, 2004) – a scenario that will be discussed in the case of Kenya.

### Cooperation and Rural Energy Development

Cooperatives play an important role in energy access for rural communities in many parts of the world (United Nations Secretary General, 2009). The following two examples demonstrate the important role that cooperatives can take in rural electricity supply – summarised from *The Challenge of Rural Electrification: Strategies for Developing Countries*<sup>1</sup> (Barnes, 2007).

#### **Costa Rica**

In Costa Rica cooperatives have played an important role in a successful programme of rural electrification, supplying 20% of the rural population. The cooperative model for rural electrification was introduced in the 1960's and followed the model of other successful cooperative initiatives in agricultural development. An important aspect of their cooperative model is the principle that everyone deserves access to electricity. This approach leads a uniform distribution system to be developed, the fact that this is an expensive approach is mitigated by the fact that the cooperative is run not-for-profit – their focus is on reliability at the lowest possible price. The four cooperatives created in Costa Rica were supported with concessionary low-interest loans from the USA that have been essential to their long-term success. Strong and consistent national policy support and ongoing staff training have also been vital.

Management of the cooperatives is based on a policy of full cost recovery, which means the most remote people do end up paying more to be connected, but concession is offered to households that cannot pay – social pressure plays an important role in ensuring that this is not abused. With this policy of full cost recovery the cooperatives are able to avoid reliance on subsidies.

The local focus and small scale of the cooperatives has placed them in a much better position than the large public utilities to explore small scale renewable generation projects.

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<sup>1</sup> See Chapter 2 - Foley, G., *The Cooperative Experience in Costa Rica*, and Chapter 10 - Wolman, P., *The New Deal for Electricity in the United States, 1930-1950*



## ***United States of America***

While energy corporations now dominate the market in the USA, rural energy development was in fact led by not-for-profit cooperatives that served poor and remote customers, with federal funding and technical support. During the times of the World Wars and the depression, they extended electricity access to 4.4 million households

The experience was not as positive as the Costa Rican example, as cooperatives faced numerous challenges from electricity utility companies that resisted the role of cooperative suppliers in the electricity market. The support of some government leaders and the Rural Energy Administration was critical in supporting the cooperatives in resisting these challenges, and ensuring their success.

## ***Summary***

These examples show that the social and political context has a significant effect on the effectiveness of cooperation-driven initiatives in rural development. In the Costa Rican case the long term success of the rural electricity cooperatives is attributable to the wide state support and an egalitarian approach to supplying rural energy services. In the United States cooperatives had to fight hard for egalitarian goals of supplying electricity to the rural poor, who would otherwise have been ignored as uneconomic markets by utility corporations (Barnes, 2007).

Both cases demonstrate that a cooperative approach can be very effective in ensuring that rural energy development initiatives focus on the development needs of rural populations. They also show that adaptive, creative, strong and sustained support from state and development agencies is vital if cooperatives are to be successful.

## **Morocco**

### ***Energy in Morocco***

Morocco produced about 23,000 GWh of electricity in 2006, 8% of which came from hydro and wind, with the rest from coal, oil and natural gas (International Energy Agency, 2009). This is a significant reduction from the 30% generation from hydro in 1999 (Brown, 2002). In 2006 the electricity consumption was 685 kWh per capita (International Energy Agency, 2009). Almost the whole population has electricity access, with little disparity between rural and urban communities, see Table 1. Morocco imports almost all of its coal from South Africa, oil from Saudi Arabia, Russia and the UAE, and natural gas from Algeria (Brown, 2002).

Morocco's current energy system is highly unsustainable. Rising oil prices combined with a likely reduction in hydro generation due to climate change would drive the country towards greater coal consumption (Tsoskounoglou et al., 2008; Sorrell et al., 2009). Given the imperative for a global imperative to reduce coal consumption, Morocco needs to aggressively pursue a transition to a sustainable energy system (IEA, 2009). There is clearly a large renewable energy potential - especially in wind and solar (Malaki et al., 2009), and some movement can be seen – plans for a 2,000MW solar generation project have been recently been announced (Reuters, 2009b).

## **Cooperation in Morocco**

In Morocco the creation of formal village development associations has rapidly expanded in the last 20 years, but they reside in a long tradition of village cooperation, resting on traditional institutions of cooperative labour – *touiza*, and village councils – *jema'a*. The majority of rural villages now have a development association that works to coordinate projects for the villages development, the total number of associations is estimated between 25,000 and 35,000. The associations play an important role in facilitating development projects, working with emigrants from rural areas, NGOs, and government – including the National Human Development Initiative that started in 2005 (Charfi, 2009).

A growing number of projects in Morocco working to develop argan oil cooperatives are generating successes – argan trees are being replanted; the socio-economic status of women is improving; and tourism is on the increase (Charrouf, 2008; Rehaye et al., 2001).

## **Kenya**

### **Energy in Kenya**

Kenya produced 6477 GWh of electricity in 2006; 31% from oil, 5% from biomass, 51% from hydro and 14% from geothermal – the average consumption was 145 kWh per Kenyan (International Energy Agency, 2009). As shown in Table 1, only 5% of rural Kenyans have access to electricity, instead they are estimated to use around 270 TJ of biomass energy per annum (International Energy Agency, 2009). Rural electrification has increased in cost, but has failed to accelerate the rate of rural connections (Mapako & Mbewe, 2004).

Kenya's small amount of electricity generation faces numerous challenges and risks. This was clearly apparent in mid 2009 when drought and low water levels reduced hydro capacity and triggered blackouts and energy rationing across the country (Daily Nation, 2009; Reuters, 2009a).

### **Cooperation in Kenya**

Cooperatives were introduced to Kenya under colonial administration in the 1940's. Reforms in the 1970s made them into channels for farm inputs, which was a shift in focus from long-term orientated state support like education and infrastructure. Accompanying this was the spread of oppressive regulations that obstructed the independence and operations of cooperatives, perpetuating existing social inequalities (Gyllström, 1991). This led to calls for liberalisation of cooperatives that were cooperative in name only, not in nature, though the necessary role of state in providing education, infrastructure and oversight was emphasised (Gyllström & Rundquist, 1989; Gyllström, 1991).

In the 1990s cooperatives were heavily impacted by structural adjustment programme reforms, and the government drastically cut direct support for cooperatives in 1998 removing all advisory and auditing services. Without this oversight corruption, mismanagement and neglect became commonplace, as a few members sought to profit at the expense of others, and all but the strongest cooperatives collapsed (Barrett, 2007). The prior critique of state interference was probably valid, but the complete withdrawal of oversight and auditing has clearly undermined cooperatives even further. A new Act of Parliament in 2003 has started the process of restoring confidence in cooperatives as a mechanism for rural development (Onanda, 2009).

## Fieldwork Findings

### Rural Energy Sources, Access and Needs

#### **Morocco**

In the Moroccan case the benefits of rural electricity access can be clearly seen. As would be expected from the national data given above, all of the Moroccan villages that I visited are already connected to the national electricity grid system, and the vast majority of households have electricity connections. It is 'a little expensive', but not prohibitively so, most people just use electricity for lighting. Their cooking energy source is primarily bottled natural gas, the price of which is subsidised, and some wood fuel for cooking specific dishes and bread.

In general the people I met in Morocco were rather ambivalent about their energy needs given their secure access to basic energy services. They rated other concerns such as water and education as more urgent needs. Because people actually have access to electricity and gas, their main concern is cost of these energy services and improving their economic condition, thus being able to expand their energy use.

#### **Kenya**

Kenya represents a rather different case to Morocco. As highlighted in the Background Information, only a fraction of rural Kenyans have access to electricity, the cost of electricity is high if they are connected, and the supply is unreliable. The vast majority of people use wood and charcoal fuels for cooking. In addition, modern technologies for directly harnessing renewable energy sources are not widespread (Mapako & Mbewe, 2004). These findings were supported by our research team's observations, as demonstrated in the following examples.

The members of the Ruke Farmers Development Initiative are working to expand their agricultural enterprises, but most members did not have the benefit of electricity access, despite the fact that large transmission lines passed close by (electricity in high voltage lines is inaccessible without local switchgear and low voltage transmission infrastructure). Their fledgling sunflower oil production endeavours are hand driven, while the electric lighting that could extend their options for evening activities remains elusive.

The Kakamega Environmental Education Programme is a community run organisation that works for the preservation of Kakamega Forest, the last remaining tract of indigenous rainforest in Kenya. The greatest impact on the forest is the licensed gathering of firewood and illegal production of charcoal for cooking fuel – see Figure 3. The wood and charcoal are both used locally and transported to the main road to be sold. KEEP works to educate local people about the importance of the forest, and is starting production of briquettes made from waste materials that are a sustainable substitute for charcoal. There are local transmission lines in the area, but relatively few households have access.



**Figure 3 - Children Harvesting Firewood from Kakamega Forest**

These two examples capture the fact that rural Kenyans have much wider and more pressing energy needs than that of rural Moroccans. Reliance on wood and charcoal for cooking is socially and environmentally unsustainable, and the lack of modern energy technologies and electricity stands as a real barrier to rural development.

## The Role of Cooperation

### Morocco

In Morocco I visited two types of cooperative organisations – associations and cooperatives. The representatives of Tazoulte Village Development Association and Agadir Wijjane Village Development Association were emphatic about the important role that the village associations play in the development of these rural villages.

The Tafroute region, including Tazoulte, has experienced significant emigration to both Moroccan cities, and Europe, meaning that the population in this area has significantly reduced in recent decades. Their strong family ties mean that successful emigrants return for their holidays, to construct large summer houses and to contribute to local development projects. The result is relatively well developed, yet sparsely populated villages. It is the local association that provides the means for the community to decide on priority projects, and the channel for funding and expertise that makes development projects possible. In Tazoulte they have done a major road upgrade, and their current project is an irrigation system for 500 young olive trees that will be a resource for a new women's olive oil production cooperative – see Figure 4.



**Figure 4 - Village Development Association Projects in Tazoulte (New Road and Olive Plantation), and Mosque Reconstruction in Agadir Wijjane**

The Agadir Wijjane Village Association started in 2002, and about two thirds of the 600 villagers are members. There is a minimum fee to join of 20 Dirhams. The association committee highlighted that the village's major challenge was securing safe and secure water supplies. The association had successfully undertaken projects like restoration of the road and mosque - Figure 4, and is in the process of constructing a preschool; but a new well, water reticulation and sanitation system is a project beyond the association's technical and financial resources.

The Tazoulte and Agadir Wijjane associations demonstrate that village associations are effective in their role of engaging rural community cooperation to identify their development needs, and in generating group investment from the community in small scale development projects. However, the contrast between the two shows the importance of consistent state support for cooperative development organisations. Currently the villages are reliant on benefactors for larger projects, somewhat reducing their development to a matter of good fortune and good connections.

The two cooperatives that I visited represent an important contrast to the village associations. Being a Muslim country, the representation of women in the village associations is very low. There were none in the two associations that I visited, but the women of Afoulki Argan Oil Cooperative attributed the creation of their cooperative to a dynamic woman who works in the Ministry of Agriculture and sits on their village association.

The establishment of these women's cooperatives for producing argan oil represents a major opportunity for their members, and they already represent a major step forward in rural development by creating the freedom for women to engage in productive activities (Sen, 2001). The women in Tiwizi Wargan Argan Oil Cooperative enthusiastically described that even though the cooperative was not yet profitable, they gained immensely from both the productive and social aspects of the cooperative. They are also starting to use their cooperative for other socially enterprising activities, including a small nursery producing tree seedlings that they sell – see Figure 5. When I visited the Afoulki Cooperative, class was in session – the women members of the cooperative were getting literacy lessons from an educated woman from the village.



**Figure 5 - Tiwizi Wargan Cooperative Nursery**

The cooperatives also represent an opportunity for rural economic development. The Afoulki Cooperative was half way to paying off the loan that they had taken to convert an unused village Hamam (communal bath) into their production centre. The centre gives them the space not only to work, but to store materials, equipment and market their products. It is clear that no member on their own had the capacity to start such an enterprise, but by aggregating their capabilities and sharing the risk, the cooperative is working towards success.

### **Kenya**

The general finding from our Kenyan study was that groups succeed where individuals cannot. Ruke Farmers Development Initiative and Keyo Women's Group are small groups, KEEP is a community based organisation. Both of these organisation types are registered with the Ministry of Gender and Social Services, but do not have the legal standing of cooperatives and associations. This means that social capital is hugely important



to these groups, because they have little legal support to fall back on. Instead they rely on trust and good relations in their operations. This represents a limitation in some ways, but is immensely positive in others.

The Ruke Farmers Development Initiative is a relatively young group, but is already recognising the benefits of group saving and learning. They operate a saving scheme that members can individually borrow from to start their own projects, which has grown by 38% in the last year. The group was also able to obtain a loan that facilitated profitable sunflower oil production. They have used the profits to invest in breeding dairy goats with the goal that all members will eventually produce dairy products from goats. They also run a group nursery (Figure 6) and are developing a pilot forest garden. NGO's in Kenya have a strong preference for working with groups, and the Ruke group is supported by VI Agroforestry. This triggered the creation of this group, and is also where they obtain training, advice and new ideas.

Keyo Women's group are the most established and experience group working on the production of clay liners for improved cooking stoves, having been started in 1984. They have worked with a number of NGO's in that time, and members continue to make a valued income from producing liners, as well as being called upon to train other groups. Their product also contributes directly to the provision of improved energy services for both rural and urban Kenyans. The completed stoves reduce wood consumption by at least 30%, and burn more cleanly reducing indoor air pollution (GTZ, 2004). Production of their high quality liners relies on the communally owned and operated kilns - Figure 6.

KEEP is a large community organisation, but it runs primarily on voluntary contributions, rewarding members' efforts with 'tokens' for their work - shares of profits from their various enterprises. As well as the environmental benefits that KEEP aspires to, it creates numerous social benefits. Many of its members have shifted from illegal 'poaching' of charcoal, to become productive fulltime contributors. As KEEP has become more established and successful, it has attracted funding, tourism, ideas, and both national and international support into the area that would not be possible without the organisation.



**Figure 6 – KEEP Members Making Briquettes; Ruke Farmers Development Initiative Members and Nursery; Keyo Women's Group with Their Shared Kiln.**

## Discussion

In this paper I set out to investigate the importance of cooperation in facilitating access to rural energy services and rural development, using the cases of Morocco and Kenya. The following has been made clear:

- Rural Moroccans have generally good access to energy services, but there are significant challenges in the sustainability of national energy supply.
- Rural Kenya is still a long way from obtaining widespread access to modern and sustainable energy services
- In both countries, and in the examples from literature, cooperative institutions can play important and varied roles in rural energy development, but...
- While cooperative organisations are immensely important in aggregating the capabilities of their members, they are no panacea. To be successful they require well planned educational, technical, financial and political support; along with constructive legal frameworks and governance oversight.

### The Potential Role of Cooperation in Creating a Sustainable Energy Future

Given the importance of energy for rural development, universal access to modern energy services in rural areas must be a goal for any country. Ensuring the sustainability of these services through the challenges of climate change and peak oil, will be a major undertaking. One in which cooperative organisations could potentially play an increasingly important role.

#### **Morocco**

In Morocco there is a strong case for using a cooperation-driven approach to developing sustainable rural electricity supplies, as a pillar of the urgently needed transition to a sustainable energy system. A wide range of fuel and technology options exist for developing sustainable electricity generation systems in rural areas (El Bassam & Maegaard, 2004).

The sustainable energy resources of Morocco, especially solar (thermal and PV potential), wind, and potentially ocean energy are distributed across the country, and along the coast. Rural communities are well placed to capitalise on this geographic distribution and thus establish revenue streams from electricity generation. Strong village development associations may have the capacity to undertake renewable energy projects directly, or otherwise they could establish subsidiary energy supply cooperatives to represent the village. In either case such a cooperative driven approach to developing a sustainable electricity supply system will require the support of a well planned, financed and implemented national strategy.

#### **Kenya**

While the energy technologies needed in rural Kenya may be simpler in the short term, the role of cooperation may be even more important there. An ideal scenario would be a coordinated government initiative to support rural electrification cooperatives, and cooperative enterprises that provide modern energy services to rural communities. In the current political environment, this seems unlikely to emerge in the short term, as many mistakes from past government interference in cooperative operations need to be



rectified. Nevertheless, a good regional example is being set with the village of Urambo in Tanzania. There a successful rural electrification cooperative has been established, and others are following their model. In this case the Tanzanian state electrification company has provided technical support, with funding from the Swedish International Development Agency (Iliskog et al., 2005).

In Kenya it seems likely that NGOs will continue to play a central role of supporting cooperation in rural energy development for some time. Their requirement is to work with community groups and organisations, as they recognise the importance of group planning, saving, investing and learning. Large gains can still be made through simple modern energy technologies with improved cooking stoves, recycled fuel briquettes, and solar cookers - the production of which can be facilitated through cooperative enterprises. Cooperative ownership of local micro electricity generation, even if transmission is initially through a battery charging system, offers a possible leap forward in rural electricity access.

Cooperative institutions represent a powerful means to enable rural Kenyan communities to take control of their development, ensure that their most pressing needs are met, and reap the benefits of greater access to modern energy services.

## Conclusion

As the United Nations plans for an international year of cooperatives, cooperation in development has again come of age. A timely shift as the world grapples with how to meet the challenge of universal rural access to sustainable energy services.

From this analysis it is clear that, by aggregating the capabilities of rural communities, cooperation should be a central pillar of bottom-up development approaches. Cooperation offers great potential if used more widely as a basis for rural energy development initiatives. The qualification on this understanding is that the type cooperative institutions need to be appropriate to the local context, and also that they still need a great deal of support to be successful.

*5176 words - including citations, captions and footnotes*

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