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Renewable Energy Resources for Better Economics and Sustainable Living in Rural and Desert Areas

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Abstract: Reliable and affordable energy is the key for the socio-economic development in rural and desert communities worldwide. While energy can be used for consumption purposes such as Lighting, Access to Information, Comfort and Entertainment, productive use of renewable energy is the key enabler for SMEs and Economy to grow. The paper examines the complex interactions among Energy, Materials, Water, Food, Building, Employment and Environment. It also discusses the implementation of renewable energy technologies to overcome some of barriers faced by rural villages and desert communities. It shows some of the special applications and approaches used over the past few decades in energy conversion, consumption and conservation to achieve poverty reduction, social justice and sustainable development. Field experiences in Basaisa projects, Egypt showed that open free dialogues with all stakeholders, site-specific education and training, appropriate local financing systems and access to knowledge are key-elements and essential factors for achieving green economy and sustainable community development. The coming decade will see a continued expansion of knowledge about renewable energy resources and its useful applications as systems friendly to the environment and as tools for economic activities, sustainable living and growth in rural and desert communities.

Key words: renewable energy resources; economics; sustainable living; development; rural and desert; communities; Basaisa; Egypt

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1. Introduction

Food, water and energy are three important components of life that we can't live without. Food for example needs water to grow (crops) and with energy you can transport the water to the crops and you can produce energy. It's basically like a cycle made out of three components and each component needs the help of the other two to grow/get produced while it helps the other components back. It's a fact that agriculture uses around 70% of the global water withdrawal, which is a huge amount of water.

Population growth could lead to a shortage in water, which could lead to a shortage in food because the people are more (they need more water and food) but we still have the same amount of water and food that is not

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enough in some regions. But to prevent that from happening we can use energy to desalinate water and will be able to provide the water needed. Here again we come to the connection between water, food and energy.

Depletion of fossil fuels is unavoidable because of the existing unbalance between consumption and production of resources. Population increase and demands for development can't be satisfied by the existing resource constraints. The necessity to face the negative impacts of climate change on water, food, and health are the biggest challenges facing humanity. New and renewable energy resources represent our hope to face such impacts and to deal with the present constraints. What is needed is an intelligent mix and some behaviour changes in human activities for a creative balance between consumption and production and for sustainability. Both formal and informal education and training should be employed, and target groups are several: School and university students, politicians and decision makers, media people, business leaders, formal and informal leaders, and teachers, to name the most obvious ones. Also appropriate policies and financing approaches are needed to encourage citizens to conserve energies and use renewable energies. The principles for high quality education and training and the roles of the different sectors and groups in the society are shown in Figure 1.

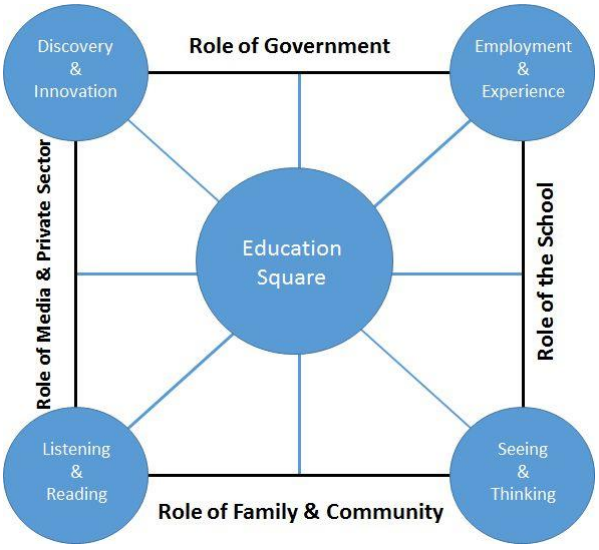

Figure 1 Model of Education and Training for Sustainable Development. The Principles for High Quality Education and Roles of the Different Sectors and Groups in the Society.

2. Field work

Two case studies (Basaisa village in Sharkiya Governorate) and (New Basaisa community in South Sinai Governorate) exist in Egypt that one of the authors (Arafa) has been engaged in over the past 45 years, as well as on going and present activities (Arafa et al., 1978, 2002, 2015). The field work is based on action research and integrated approach. It emphasizes the importance of high quality community-based education and training, see Figures 2-9.

Figure 2 Dr. Arafa Leading One of the Weekly Arranged Community Dialogues in the Village of Basaisa Where All Are Invited to Attend and Participate.

Figure 3 Inside the Basaisa Village Mosque Dr. Arafa is Presenting the Communal TV and Explaining How It Is Powered by Solar Energy.

Figure 4 A group of Basaisa Village Children Are Watching an Educational TV Program on the Communal TV Set Powered by Solar Energy (1976).

Figure 5 Installation of a Solar System on the Roof Top of a House in the New Basaisa Community As Part of Community-Based Training and Local Capacity Building.

Figure 6 A Local Trainee Is Explaining the Work of Some Solar Systems to a TV Reporter at the Technical Center of the Basaisa Village in Sharkiya.

Figure 7 Solar Energy Systems (PV and Solar Water Heater) Installed on the Roof Top of the Common Room in the New Basaisa Community (1996).

Figure 8 A Training Program Session on the Use of Computer and Internet in Development Held in the Basaisa Community Technical Center. The Attendees Are from the New Basaisa Community as well as from Surrounding Local Communities of the Ras-Sudr Area in South Sinai.

Figure 9 The Newly Installed Solar System for Irrigation and Water Resources at the New Community Project "Paradise of the Valley" in the New Valley.

3. Methods

The basic interest in doing the field work was a social responsibility towards the development of rural and desert area and to find appropriate approaches in promoting the implementation of renewable energy technologies and to address how community interventions with active citizens participation can improve the human wellbeing and empower poor and illiterate citizens and communities to achieve sustainable development (El-Simi et al., 1995; El-Tawila et al., 2013; Prasad et al. 2017).

Important among all the technological specifics were: (a) emphasis on equity; (b) giving priority to community expressed needs; (c) closing the gender gap so females, girls and women, can fully share equal rights and responsibilities; (d) empowering the local NGOs and encourage cooperation between them as well as exchange of experiences and transfer of knowledge; (e) developing appropriate access to finance and soft loans for SME's; (f) ensure the transparency and social justice in all community meetings and actions.

Emphasis were mainly on the well informed citizens empowered by appropriate community-based education and training to be an active participant and responsible citizen in the process of community development.

4. Results

Experiences showed that well informed and well educated citizens are prerequisite to any sustainable development efforts. Community-based education and training and community-owned systems are key elements in achieving sustainable community development.

5. Discussion

Success in the efforts carried in Basaisa have been dependent on the ability of the project leaders and actors to keep the human dimension in all the on-site activities (Arafa, 2002) and the delicate balance required for survival between the maintenance of the traditional pattern of values that serves as the basis of cohesion and adaptation to knowledge that requires a revision of the traditional technologies and value system.

It was important to keep our attention firmly focused on the two primary pillars of the community development process: Education and Justice. Both can promote a sense of belonging and commitment and ensure success. We all know that knowledge is power but half the knowledge is to know where to find it and to get an easy access to it.

6. Conclusions

Field experiences showed that open free dialogues with all stakeholders, site-specific education and training, appropriate local financing systems, and access to knowledge are key-elements and essential factors for achieving better economics and sustainable living in rural and desert communities worldwide.

Our shared vision is: Children are the future of our nations, renewables are the future of our planet, education, training, innovation and entrepreneurship are our way towards a sustainable future.

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