Climate Protection and Overcoming Poverty Traps

Proposals for the realization of the UN Development Goals

Dr.-Ing. Dieter Seifert http://solarcooking.org/Seifert

Translated article to be published in the magazine „SONNENENERGIE“ 3/2019
(Organ of German Society for Solar Energy, International Solar Energy Society, German Section)

This article is a continuation of the author's two articles[1] in the magazine “SONNENENERGIE” (3/2017 and 1/2019), dealing with sustainable, adapted, Open Source Appropriate Technology (OSAT) in developing countries, and global cooperation on greenhouse gas emissions reduction. The proposals focus on Innovation Institutes and projects for households, small businesses and schools in developing countries and the creation of millions of jobs by OSAT and garden settlements. Funding by offsetting greenhouse gas emissions can be instrumental in meeting the challenges of climate change and poverty and lack of prospects in developing countries. The Paris Climate Agreement has created a suitable framework for combining climate protection and overcoming poverty.

Picture 1: Traditional fireplace in Nepal
(by courtesy of K. Schulte, Rotary Sweden,
SK14-project Bamti Bhandar)

Innovation Institutes

The size of the task requires an answer that goes far beyond the existing institutional capacity. Therefore, globally networking Innovation Institutes should be created, which serve the implementation of the UN Sustainable Development Goals (SDGs). A key objective of the Innovation Institutes should be the development and dissemination of OSAT. This facilitates to find and develop solutions through worldwide cooperation, avoiding undesirable developments and skipping unnecessary steps. Their realization is affordable, because the effort is orders of magnitude smaller than with a capital-intensive industry.

Since the proposed Innovation Institutes are independent of commercial interests and committed only to the common good, they should enjoy the highest reputation. OSAT is not supposed to be a laborious, ugly, short-lived "poor-people-technology", but pleasing developments. With an excellent holistic concept, the Innovation Institutes could demonstrate the great challenges and contribute significantly to their solution.

In organizing the Innovation Institutes, university institutes can serve as a model and basis. In his speech[2] on the occasion of the 150th anniversary of the Technical University Munich, its President, Prof. Wolfgang Herrmann, said on April 12, 2018: *"As an urgent task for the future, I deliberately call the African continent, which deserves the attention of a leading technical university, more than in the*

[1] https://solarcooking.fandom.com/wiki/Dieter_Seifert (Publications Jan. 2019 and Aug. 2017)
[2] W.A. Herrmann: 150 Jahre TUM. Innovation seit 1868. TUMcampus - Das Magazin der Technischen Universität München, 2/2018, p. 12-13

past." He then listed the "great challenges to society": Health and Nutrition · Environment, Climate and Energy · Natural Resources · Infrastructure and Mobility · Information and Communication**.** (Translation from German)

Problems of market mechanisms for emission reduction and solutions

Market mechanisms that favor the cheapest forms of emission reduction can be misleading. If, instead of the creation and following of strictly observable regulations for emission avoidance, a reward for the omission of the climate damage takes place, then this reward in the form of cheap credits can generate an almost arbitrarily large volume of trade and destroy probably every reputable market mechanism. Something similar has apparently happened at the Clean Development Mechanism (CDM) in recent years. There should be no competition for the cheapest type of emission credit generation, where the really helpful projects drop out.

Prof. J.D. Sachs, director of the Earth Institute of Columbia University NY, wrote[3]: "*The market system fails to solve four fundamental classes of problems: ecosystem functions (the bio-geophysical commons); population; extreme poverty (because of the very real dynamics of poverty traps); and technological pathways needed for sustainability."*

A fixation on market-based mechanisms is questionable. Unnecessary emissions should not be stimulated and then cheaply compensated on the market.

In case of voluntary compensation, misuse can be avoided if the emission credits (Voluntary Emission Reductions, VERs) are not traded but spent in the name of the purchaser. Voluntary compensation projects are already being prepared and published by charitable organizations and their partners in developing countries. A detailed account of voluntary compensation can be found in the book of Prof. F.J. Radermacher: "The Billion-Joker - How Germany and Europe can revolutionize global climate protection" (in German, 2018). What is needed is the integration of emission compensation into a comprehensive, common-good-oriented, major transformation to sustainability.

Expected emissions by overcoming the suppressed demand[4] should be included in the calculated reduction of emissions. Evidence of emission savings or permanent carbon storage (e.g., bio-carbon in garden projects, which also serves to improve soil fertility) is also to be provided through transparent presentation.

Advantages of climate cooperation for the host countries

Climate change projects involving voluntary compensation provide a variety of benefits to the host countries (i.e. the countries where the projects are implemented) because sustainable, appropriate technologies are disseminated in the host country, through jobs and training and because living conditions are improved durably. Exemplary, safe settlements can be created.

[3] Learn about the Food Crisis – Sustaining growth is the century's big challenge. Financial Times Comment, June 11, 2008, Response to Martin Wolf by Jeffrey Sachs

[4] http://unfccc.int/resource/webcast/collections/dna_manila/downloads/S3_Suppressed_demand_AR_UNFCCC.pdf

It is recommended that a multiple of the calculated emissions be compensated, so that a large part of the savings can be credited to the host country in accordance with the Paris Climate Agreement (but also to correct the misallocation of emissions from imported goods).
As an example of a highly efficient option for "bio-sequestration of CO_2" can be considered the harvest of invasive aquatic plants (e.g. water hyacinth), which can transform a plague (due to the rapid overgrowth of lakes in the tropics) into a blessing (basis for bio-carbon).

Millions of young people in Africa can create a paradisiacal continent if they are enthusiastic and effectively supported in learning, developing and producing together in the field of appropriate technology and horticulture, instead of living without prospects.

Household Energy Supply with Open Source Appropriate Technology (OSAT)

While the potential for saving emissions through solar cookers and the thermos technology in regions of firewood crisis is high, other necessary equipment of households in developing countries, e.g. PV lights, save less emission. This recommends a "bundling" of household energy projects.

An example of a transition from a poor technique to an appropriate solution is the replacement of the traditional laborious hearth (e.g. Picture 1) through a stove with firewood grate for primary and secondary air supply and an efficiency ring for gas conduction. With about 400 g small firewood sticks 6 liters of water can be brought to the boil in less than 30 minutes. Thus, the annual fuel wood consumption per household of about 4000 kg can be reduced to a quarter. The remaining fuel wood requirement can further be reduced to about 300 kg per year by using thermos and solar energy. No tree has to be felled; short rotation plantations are sufficient.

Picture 2: Comparison of firewood consumption of three-stone-fire with the combination of efficient firewood stove with thermos and solar technology

In Picture 2 this fuel saving is illustrated. Transition from the “Three Stone Fire” (left) to an efficient stove (Ben-Stove, right), a thermos basket and a powerful, versatile solar cooker reduces the consumption to about 1/12.

The saving corresponds to reduction of emission and of the burden from the smoke in the kitchen (the "silent killer"). The use of the thermos technique[5] e.g. for cooking dry beans (a staple food in many regions) is a little-known opportunity; it can save several hours of active cooking time per meal.

The versatile SK parabolic solar cooker is suitable also for applications where the three-stone fire can hardly be used, e.g. when baking and preserving food. On a sunny day, the solar cooker can boil about 40 liters of water. It can therefore meet the "suppressed demand" and avoid the rebound effect.

[5] https://solarcooking.fandom.com/wiki/Heat-retention_cooking

OSAT workshops and horticulture

A wealth of examples of freely accessible, appropriate technology has been tested. The solutions can be further adapted to special requirements. Local jobs are created, and on-the-spot expertise enables permanent care (Picture 3).

Picture 3: Solar cooker project SOLIN, Bolivia. (by courtesy of J.A. Garrido Vázquez, Madrid)

To estimate the scale of the tasks, one can assume that 200 million households in Africa are to be equipped with appropriate technology. The provision of household energy equipment alone requires about one million jobs per year. With an assumed power of 1 kW per household, 200 GW are to be installed, corresponding to the capacity of 200 nuclear power plants.

With the spread of the garden culture and the establishment of garden settlements millions of jobs can be created. The global importance of gardens and appropriate water technologies as necessary breakthrough innovations is barely recognized.

The required workshops can be financed if they focus on appropriate technology and horticulture, because the effort is then only a few percent or per thousand compared to industrial jobs.

Worthy settlements for refugees instead of dismal refugee camps and instead of desolate "reception centers" are financially viable; see also Chapter "Refugees"[6] in the manual "WORLDCHANGING":

Sustainable technology in the educational system

Despite the always positive experiences with solar cooker projects in schools, there is a lack of permanent school energy programs worldwide. In developing countries, school meals may allow entry into these programs. Theory and practice of appropriate technology should be part of the curriculum.

Emission savings can be used as a basis for financing these programs. The school programs are excellent for global cooperation in financing and sharing experiences.

Projects with schools were performed e.g. in Munich, Karlsruhe, Salzburg, Barcelona. An advantage of the school solar cooker projects is their relationship to all subjects and that the projects are particularly suitable for creative team work.

[6] A. Steffen (ed.): WORLDCHANCING – A User's Guide for the 21st Century. Abrams, N.Y., p. 203 ff