

Compensation of CO₂ emissions as a global opportunity for climate protection

1. Global cooperation on climate protection with additional benefits

Global cooperation on climate change was defined as the **Clean Development Mechanism (CDM)** in Article 12 of the Kyoto Protocol. It enables the financing of climate protection projects in developing countries by companies in industrialized countries, whereby the emission savings through CDM projects are credited to the project partner in industrialized countries as tradable emission credits (carbon offsetting). The aim of this "flexible mechanism" of the Kyoto Protocol is to minimize the costs of CO₂ savings and to promote sustainable development in developing (and emerging) countries through appropriate technology transfer.

Objections to the CDM were from the beginning, with misunderstandings (comparison with sale of indulgences) often played a role. The generation of a large number of cheap **Certified Emission Reductions (CERs)** has led to a collapse of the CER market in recent years. A renewal of the CDM taking into account the climate agreements of Paris is in preparation. In the field of voluntary compensation (for example in air traffic), CERs continue to be valuable, especially those verified by the "gold standard".

The book written by Prof. Dr. Dr. F.J. Radermacher: "The billion-joker - How Germany and Europe can revolutionize global climate protection", published¹ (in German) end of 2018, describes opportunities for compensation of greenhouse gas emissions through global cooperation.

Oxfam has determined that the richest 10% of the world's population accounts for half of the emissions. In his book, Radermacher shows ways in which the "top emitters" can and should offset their emissions account by voluntarily offsetting billions of tonnes of CO₂ emissions. Compensation is provided by emission reduction measures (technology transfer, efficiency increase) and permanent carbon storage (especially in the form of bio-coal for soil improvement in degraded soils). It is stressed by Radermacher that the immense opportunity of emission compensation must not be destroyed by misinformation.

The generation of high-quality carbon credits is tied to a complex and lengthy process and to qualified actors. For the implementation of extensive compensation programs, new ways must be taken to generate the required large number of valuable credits.

Instead of using the cheapest compensation, more than the calculated emissions should be compensated. Then a large part of the emission savings could be credited to the host country (i.e. the country where the climate protection project is performed) because it has emission-saving obligations under the Paris Agreement (in contrast to the redeemed Kyoto Protocol).

¹ F.J. Radermacher: Der Milliarden Joker – Wie Deutschland und Europa den globalen Klimaschutz revolutionieren können. Murmann Verlag Hamburg (2018); ISBN: 978-3867746120

2. Innovation institutes in Africa as agencies for climate protection projects

Essential improvement of living conditions in Africa requires the creation of African sustainable development institutes. For this centennial task, a corresponding "infrastructure" with the necessary competence is needed in Africa, i.e. institutions for the sustainable development of the continent. Therefore, the creation of **African Research and Technology Institutes for Sustainability (ARTIS)** is recommended also for the realization of carbon offsetting programs in Africa (see http://solarcooking.wikia.com/wiki/Dieter_Seifert / Publications).

The transformation with the help of cooperation in the compensation of CO₂ emissions can open up many opportunities not only for climate protection, because high-quality emission compensation results in a variety of benefits (co-benefits) in the host countries.

These innovation institutes should be designed as centers of excellence committed to the common good in African countries and operating in a fully transparent manner. They can develop and supervise the diverse projects required in Africa for climate protection and sustainable development. This includes piloting pilot households and communities that comply with the Sustainable Development Goals.

To start with pilot centers at universities may be advantageous, because initial barriers are easier to overcome and the institute can be started on any scale - financially and personally. A famous example of an institute for development and diffusion of appropriate technology is the D-Lab at the Massachusetts Institute of Technology (MIT), founded about 15 years ago by Amy Smith, which is also exemplary in global cooperation.



Picture 1 shows a tunnel dryer for drying food with solar energy developed at the Technical University of Munich (German-Indian Solar Drying Project)

Source:
Dr.-Ing. J. Blumenberg,
Institute of
Thermodynamics,
TU Munich

This proposal is in line with the call of Executive Secretary of the United Nations Climate Change Secretariat, Patricia Espinosa, at her presentation on 10 January 2019 at the Bauhaus University in Weimar: *“We know governments alone cannot address climate change. We need all segments of society to work as hard as possible to drive specific global climate action. ... Academia has a key role to play as well. You are more than a fertile ground for where great ideas take shape. You can help develop the specific tools for solutions—whether that’s through technology, innovation or targeted research.”*

3. Renewal of the Clean Development Mechanism (CDM)

When renewing the CDM, or replacing it, under the Paris Agreement, its benefits but not the old disadvantages should come into play. Through global cooperation on climate protection, a concept can be implemented that comprehensively and permanently overcomes the misery in developing countries. This should be done with the intention to overcome a hitherto customary restriction to projects focused on cheap emission reductions.

Otherwise, destabilizing side effects can be expected, as compensation projects can lead to more emissions through the rebound effect or elsewhere (leakage issue), or the savings have completely different effects than improving local living conditions.

4. Millions of new jobs each year in Africa

The large number of jobs to be created annually in Africa would be made possible above all by the development and dissemination of freely accessible adapted technology - **Open Source Appropriate Technology (OSAT)**. Suggestions for OSAT and ARTIS are presented in the internet (see http://solarcooking.wikia.com/wiki/Dieter_Seifert and www.terra.org / artículos)

In efforts to overcome unemployment, we should follow the recommendations of E.F. Schumacher (Small is Beautiful, chapter 12 "Social and Economic Problems Calling for the Development of Intermediate Technology"²). This advice is still barely considered, although it solves the main problem: unemployment in developing countries.



Picture 2 shows the cutting of high-gloss aluminum sheets in a workshop in Bolivia for the production of parabolic solar cookers of SK design.

Project SOLIN
by J. A. Garrido Vázquez, Madrid

The investment cost per OSAT workplace may be in the range of a per mill of the cost of a high-tech workplace. Misleading would be the attempt to create cheap industrial jobs in Africa. This work is very easily transferred to automats in today's industrial world (Industry 4.0).

5. Garden communities instead of slums

An immense task, which requires all forces available in Africa, is the spreading of the garden culture, i.e. the adapted intensive agriculture. Unfortunately, the poorest in society are often the least informed about opportunities.

² E.F. Schumacher: Small is Beautiful – A Study of Economics as if People Mattered. Vintage Classics (2011); first published in 1973 by Bland & Briggs Ltd. ISBN 9780099225614

A new gardening culture could be the much-needed breakthrough innovation: the spread of garden settlements instead of rural exodus to the slums of cities. If 2000 family gardens with 500 square meters each are connected to a garden community with community facilities, then such a garden community nucleus has an area requirement of approximately one square kilometer (sq. km) and accommodates approx. 18,000 inhabitants. If we assume that also a 35 times as large economic area (commons, forest, pastures, trade, etc.) belongs to the garden community, then 36 sq. km are needed of 18,000 people (500 inhabitants / sq. km). In an area of the size of Zambia (about 750,000 sq. km), about 1/3 billion people in a pleasant environment could lead a sustainable life.

Radermacher's book emphasizes the importance of carbon storage in the soil. Gardens are certainly suitable for sequestration of bio-carbon, so that the transformation of a large part of Africa into garden land, creating millions of jobs, could be financed through cooperation in climate protection.



Picture 3: Xero-Cultivation under extreme conditions, using plastic to take advantage of the thermal oscillations capable of originating collectible moisture.

Abb. 15-b (unten).—Mit Plastik unter den Steinen an der Oberfläche kann auch bei kargen Regenfällen den Pflanzen zusätzliche Feuchtigkeit zugeführt werden; bei Starkregen allerdings könnte „Überschwemmungsgefahr“ bestehen ...



Picture 4: Using plastic (under stone and gravel) to take advantage of any casual moisture.



Picture 5: simple drop irrigation using plastic containers

Abb. 16.—Mehrere mit Wasser gefüllte Plastikbehälter für direkte Tropfbewässerung. Die Behälter werden dem Boden zu angebohrt und das Bohrloch (z.B. mit einem Zahnstocher) halbverstopft. Professionelle ziehen natürlich das leitungsbedingte Tropfbewässerungssystem vor.

Pictures 3 to 5 are taken from p. 45 of the book “Gärten und Gärtnern in Trockengebieten”, first edition: “Jardinería en Zonas Áridas” (Gardening in Arid Zones) by Günther Kunkel, with drawings by Mary Anne Kunkel; Ediciones Alternativas, Almería (2002) and Alhulia, S.L. Salobreña

Combating the causes of flight needs inspiring prospects for millions of young people. The recently discussed "refugee reception centers" in Africa are creating a picture of depressing places. But it is not just the case of only elementary livelihoods. A comprehensive concept for "garden communities" would improve acceptance among host countries too. These communities would realize valuable solutions, exemplary also for the host countries, which offer appropriate technology and diverse garden culture with hardly overestimable opportunities.

The garden culture has a millennia-old history. Drawing on this wealth of experience and transforming Africa into a "garden continent" is certainly one of the most inspiring tasks of the century.

It is a matter of the humane solution to social issues in Africa, where funds from the compensation of greenhouse gas emissions can make a decisive contribution.