

OSAT: OPEN SOURCE TECHNOLOGY FOR AFRICA

FREELY ACCESSIBLE AND APPROPRIATE

Almost the entire practical knowledge, which we use, is freely available, i.e. not reserved by patents. Also the rights are expired for most of the more than 95 million patent documents, from the 19th century to the present, which the European Patent Office has published in the internet in excellently structured form. On the Internet you can find portals for information about Appropriate Technology (AT).

For solving actual technical problems in developing countries the problem less that knowledge is missing, but that knowledge for those who need it, hardly is known or inaccessible and that often insuperable obstacles hinders the deployment of knowledge. More than two billion people are caught in the trap of poverty, helplessness, environmental degradation and hopelessness. They can attain a life in dignity, but not with inappropriate technologies that only could be realized if humanity would have some earth globes in reserve. There is a lack of opportunities in developing countries to raise and deploy the existing helpful knowledge about AT. In no case this should depreciate the manifold initiatives for overcoming poverty and helplessness often organized by external helpers. But it should be pointed to the chances of a worldwide open cooperation in the solution of pressing tasks.



Picture 1: Cooking of porridge on a traditional charcoal brazier in Lusaka / Zambia

Freely accessible and appropriate

With the Open Source Appropriate Technology (OSAT), the attempt is made to translate the positive experiences with Open Source Software also on the general use and further development of Appropriate Technology. In principle, abilities and experiences from many participants shall be included through open exchange in the development process.

"OSAT is made up of technologies that are easily and economically utilized from readily available resources by local communities to meet their needs and must meet the boundary conditions set by environmental, cultural, economic, and educational resource constraint of the local community." (J.M. Pearce: The Case for Open Source Appropriate Technology)

"Ever bigger machines, entailing ever bigger concentrations of economic power and exerting ever greater violence against the environment, do not represent progress: they are a denial of wisdom. Wisdom demands a new orientation of science and technology towards the organic, the gentle, the non-violent, the elegant and beautiful." (E.F. Schumacher: Small is Beautiful - A Study of Economics as if People Mattered.)

Criteria for appropriate, sustainable technology:

- 1) They improve the living conditions of the population;
- 2) use only renewable resources (renewable materials, renewable energy) and, if any, only totally recyclable non-renewable resources;
- 3) do not cause danger when operated under normal conditions; do not cause major danger in case of faulty operation;
- 4) operate as independently as possible;
- 5) are easy to use; are fault tolerant, even if operated under sub-optimal conditions;
- 6) have a long service life and can be repaired easily at low cost;

- 7) can be adapted to local conditions and can be developed iteratively if required;
- 8) they are beautiful.

Application and dissemination

Pointedly formulated, Africa could be a paradise. However it squanderers its resources and destroys its habitats if it doesn't turn to sustainable ways. Establishment of institutes for sustainable development is necessary for the improvement of living conditions. These could be named "African Research and Technology Institutes for Sustainability (ARTIS)". They can be crucial to establish the urgently needed millions of diverse, valuable and sustainable jobs.

Let us imagine that young people in a country south of the Sahara waiting on a marketplace for a job which could give them income for that day and with whom they also could support their family. Most of them wait in vain; they have no training and there are no jobs. An alternative: The young people go in the morning to the local branch of ARTIS. There they have a variety of possibilities and the community kitchen ensures that no one is hungry. These institutions may only be dedicated for the common good and work completely transparently to pave ways to prosperity for the whole African population. They should strengthen the local population in their abilities and their responsibilities. The costs per OSAT-workplace would be low in comparison to high-tech workplaces in the industry.

"Intermediate Technology would have to be of national interest and not, as it is currently the case, a neglected field of isolated working specialists. A similar plea might be made to supranational agencies which would be well-placed to collect, systematized, and develop the scattered knowledge and experience already existing in this vitally important field." (E.F. Schumacher)

E.F. Schumacher founded more than 40 years ago an organization for Intermediate Technology which continues under the name Practical Action. NGOs can show exemplary solutions but they cannot substitute the national and transnational facilities already demanded by Schumacher, because the size of the task demands efforts of a dimension that is magnitudes higher.

African countries hardly pursue their own research and development for the needs of ordinary households. Creating of the urgently needed large institutions may be hindered by the opinion that overcoming the poverty is primarily is a task of well-intentioned helpers to whom the responsibility is transmitted. The main task of ARTIS innovation institutes should be the development and dissemination of OSAT technology. With this technique, to be adapted to African requirements, mistakes are avoided and unnecessary development steps are leapfrogged. Experience of established institutions for training, development and technology transfer can be helpful.

As the ARTIS institutions are independent of commercial interests and only committed to the common good, they should enjoy highest reputation. Proposals to OSAT and ARTIS contain the contributions by the author on the website of Solar Cookers International.

Destructive firewood crisis

As OSAT is not a matter of large technical plants, but primarily of decentralized appliances, there could be a misleading opinion about the size of the task. It should be considered that e.g. the power supply for 200 million households in Africa with a net power of 1.5 kW each, with adapted, sustainable technology is an installation of 300 GW, corresponding to the capacity of 300 nuclear power plants - however with low cost, without the danger of hazards and without problems of supply and disposal.

Picture 2: Smoke-free villages project in India;
Photo courtesy D. Gadhia and J. Reddy, NEDCAP



Picture 2 shows a project for smoke-free villages with the combination of household

biogas plants and parabolic solar cookers in India.

In Africa, a "Billion-Dollar-Business" with charcoal has been established, which sacrifices the trees of the continent within one generation if no turning point occurs. A tree was perhaps a hundred years old, on one day it was logged, after a few days it is charred and in a few hours the charcoal is burnt on primitive braziers (Fig. 1) in urban households.

The worldwide destruction of tree population for cooking purposes causes greenhouse gas emissions on the order of magnitude of 1 billion t CO₂e per year that is more than the emission of Germany. It can be calculated that every household in regions with firewood crises emits - by the unsustainable wood consumption - a CO₂ emission that corresponds to a car ride of the length of the earth's circumference.

The loss of the trees often is a result of the "tragedy of common property" (J. Diamond: Collapse. How Societies Choose to Fail or Succeed).

Spread of garden culture

Monastery gardens, kitchen gardens and famous urban gardens are models, also for self supply.

"The city maps of Augsburg from the Middle Ages until the modern times show extensive areas of gardens adjacent to the city wall outside the surrounding wall and surprise by large gardens, in some parts also within the walls." (R. Pfaud: Das Bürgerhaus in Augsburg)

The map of Wolfgang Kilian from year 1626 shows that the garden areas outside the city wall are as large as the city area within the wall.

The Barli-Institute for rural women, founded by Dr Janak McGilligan in Indore is exemplary also for garden culture for a worthy living in the countryside. Every household in Africa should have access to a family garden and every young people looking for a job should get the opportunity to become a gardener. The transformation of a large part of the African continent in gardens can create millions of jobs annually.

Pilot institutes for OSAT in Africa

The tasks of the ARTIS institutes result from the question: How can perspectives and dignified living conditions be create for all the people of Africa. The answers refer to, amongst others, on nutrition, health, energy, water, accessible information and education system for all.

The continent offers ideal conditions for the use of the solar energy, also to generate income (see picture 3).



Picture 3: Possibilities for generating income with products from the SK-Parabolic Solar Cooker

Referring to garden culture is to be considered to teaching gardens, botanical gardens with cultivation of adapted plants, gardens in arid areas, carbon-storage in soil and soil improvement through bio-carbon, water storage, village development and avoidance of rural exodus.

There is an incredible abundance of opportunities to overcome poverty and lack of prospects in Africa and to reach and surpass the UN goals for sustainable development.

To the author:

Dr.-Ing. Dieter Seifert
bdiv.seifert@t-online.de

The article is a translation from the publication "OSAT: Open Source Technik für Afrika" in the magazine "SONNENENERGIE", Deutsche Gesellschaft für Sonnenenergie: [http://www.sonnenenergie.de/sonnenenergie-redaktion/SE-2017-03/Layout-fertig/PDF/Einzelartikel/SE-2017-03-s052-International-OSAT Open Source Technik fuer Afrika.pdf](http://www.sonnenenergie.de/sonnenenergie-redaktion/SE-2017-03/Layout-fertig/PDF/Einzelartikel/SE-2017-03-s052-International-OSAT%20Open%20Source%20Technik%20fuer%20Afrika.pdf)

