Prominent among the 10 applications of nanotechnology which can, according to Salamanca-Buentello et al. (2004), support the UN Millennium Development Goals (see Nano & Justice) there is water treatment and remediation, including desalinization.

Especially in the developing world and with increasing pressure of scarcity, there is a need for water purification – not only to make it possible for everybody to have access to water that is not contaminated, but also to do something against future wars that really are likely to be battles for water. Devices that incorporate nanotechnological elements are already available.

The discussion around water purification is part of a larger theme that is sometimes summarized as "nanotechnology and the poor." Among others, the Meridian Institute (Meridian Institute's Global Dialogue on Nanotechnology and the Poor: Opportunities and Risks (GDNP)) publishes reports concerning this issue. "The goals of the GDNP are to: (1) raise awareness about the implications of nanotechnology for the poor; (2) close the gaps within and between sectors of society to catalyze actions that address specific opportunities and risks related to nanotechnology, especially those of most significance to developing countries; and (3) identify ways that science and technology can play an appropriate role in the development process. The GDNP is supported by the International Development Research Centre (Canada), UK Department for International Development, and The Rockefeller Foundation (U.S.)." (www.merid.org/nano).

Though everybody wishes that water filtration for developing countries will get better, there are also some questions one must not forget, e.g.:

(1) Risks to the environment, human health and safety. Should there be additional risk research concerning nanoparticles, their release or exposure to them during production and use by the end consumer? What happens to used items like cartridges? A life cycle assessment is necessary for the nanomaterials that are employed.

(2) Will solutions based on nano filtration make people dependent on global companies who sell filters and hold patents, or will local authorities be able to produce these nano solutions 'cheaply' themselves, as others claim?

(3) How are tensions between risks and opportunities for poor communities resolved? Also, is there a need for labeling, and how could this be enforced?

(4) Filtration methods need strong partners for distribution and adoption – who can do that for what price? Also, filtration devices often need costly energy input.

(5) Why are filtration technologies that are based on nanotechnology promoted at all? Is it because they offer the best results at the best conditions for the people who need clean water, or is it because they serve to prove the 'just' qualities of nanotechnologies in general? Could it be that there are other, conventional methods that are cheaper, safer, and more easily integrated into the society? This means that apart from all hopes and chances that nanotechnology offers in this field of application, the focus of action must lie on the people, not on the technology.

One example is the "Case Study of a Simple Water Filtration Method for Cholera Prevention in Bangladesh" in the report by Hillie et al. Here people in Bangladesh were very often affected by gastrointestinal problems caused by cholera bacteria that could be found in the local drinking water, small children were dying.

It has turned out that using local sari cloth as a filter for the water is a practicable and efficient solution. Boiling the water would also kill the cholera, but in order to ☛

☞ boil something you need fire, and wood is rare. This way of filtration is possible because cholera is dose dependent – the sari filtration doesn't remove 100 % of the bacteria, but enough to make the rest harmless for grownups and infants.

Another study in this report reports the successful installation of nano filtration in a South African community, showing that there are already nano applications that work and that could be integrated and accepted in such a community – and that appear to be affordable, at least in this case. The report also mentions, however, that due to optimism of the sponsors and the need of the community's peoples, questions of risk and risk assessment were not thoroughly discussed.

As a conclusion one could point out that, when it comes to heralding nanotechnologies as the universal remedy for the needs of developing countries, one should separate rhetoric from actual necessity, so that these countries and their inhabitants do not become a political (or economic) football in a game between advocates and opponents of nanotechnologies.

If the focus is on the people, one should use conventional and nano methods depending on actual parameters like affordability, acceptability in a society, autonomy, risk etc.

Stefan Gammel

Links to other Portfolio sheets:

Nano-Ethics | Nano & Justice | Ethics and Morality

Literature: Print & WWW

Meridian Institute: Workshop on nanotechnology, water and development. Workshop summary 10.-12. October 2006, Chennai, India. http://www.merid.org/nano.

Hillie, T. et al. (2006): Nanotechnology, water and development. Report. http://www.merid.org/nano.