

Trouble in Mawatubiki – Nanotech to the rescue of tropical island state? – Variant 3

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Disclaimer: The scenario depicted in the exercise is fictional, and it is not intended to represent real events or prejudice readers in any particular direction. It is designed for discussion and exploration of opinions. Similarities with real people – living or dead – are coincidental. The name of the company, product and island state are invented: should they bear any resemblance to existing names, this is pure coincidence.

Scenario and exercise:

As a result of climate change, the tropical island state of Mawatubiki has recently suffered a greater number and greater intensity of tropical storms than ever before in its recorded history. The agricultural economy is dependent on at least two annual harvests of the fast-growing bio-diesel producing variety of Tappi-tappi plant. A volcanic island, Mawatubiki's most fertile land is on hillsides, and hence prone to erosion. Traditionally the fields are planted with a variety of crops, some of which are harvested only once a year. Twice-yearly harvesting of the shallow-rooted Tappi-tappi plants makes the soil especially vulnerable to erosion by heavy rain-fall. In the past year, much agricultural land has been destroyed – literally washed down the hillside in tropical storms.

The Mawatubiki government called on international advisory agencies including the FAO (Food and Agriculture Organisation), but while the FAO was preparing a study of the situation, a US company "NanSolv" came forward with a possible solution. This involves a new nanotechnology product that claims to be able to bind the surface of fragile soil into a semi-solid crust. SurfaceSave is a nanoparticulate combination of an organic moiety that binds to humus (decaying organic matter) and silicate particles in the soil. It thus forms an amorphous structure that is relatively water insoluble but easily broken up by physical means (such as ploughing or tilling the earth). Sprayed onto the surface of the soil as a mildly alkaline emulsion, SurfaceSave penetrates to a depth of only 1 cm, and upon moistening with rainwater catalytically binds the surface into a crust, hence reducing erosion.

*The company has performed laboratory simulations (documented in test reports) that show the product to do what it is claimed to do in model situations, and to be environmentally harmless in relation to standard toxicological and other tests. Furthermore, the company claims to have performed a pilot study somewhere in the mountains of Bolivia, likewise with a positive result, but the study is apparently only insufficiently documented

(summary report of results is available, but no specific data). The company claims that the only potential negative effect discovered in the Bolivian pilot study is that SurfaceSave seems to hamper the growth of the Bolivian mountain potato. However, this plant does not grow in Mawatubiki, nor any close relative of the plant. Tappi-tappi is quite dissimilar to this potato. The presentation of the theoretical basis of SurfaceSave at international nanotechnology conferences has been received with substantial recognition of renowned experts in nanotechnology. It has since emerged also that the Mawatubiki application of SurfaceSave might act as a large scale pilot project for use in California, USA, where hillsides are regularly made vulnerable to erosion as a result of deforestation by fires.

Environmental protection agencies, notably NGOs Greenpeace and Friends of the Earth, have reacted with horror at the news of the experimental use of a nanotechnology product in Mawatubiki. Residents of California are also "concerned" to say the least, after hearing of the "secret" plan to use their neighbourhood as a beta-testing ground for the product. Mawatubiki farmers are desperate to save their land, and are keen to try any solution, but as the NGOs point out, a short-term gain could be accompanied by a long-term environmental disaster. "If this is some kind of catalyst, that means that it can carry on reacting with the soil for as long as it survives, and we don't know how long that is, or where it might end up over that time span" said Nicola Alvares of Friends of the Earth, continuing "We don't even know much about its toxicity to humans and other organisms, especially in the Mawatubiki ecosystem. This is yet another example of unnatural interference with the environment – we have to stop the cycle somewhere and say 'enough is enough'." The Mawatubiki government says it is prepared to discuss the "aid" from NanSolv, which would be provided free of charge according to a company spokesman. Mawatubiki's minister for agriculture said "Agriculture *is* our economy on Mawatubiki's. If we do not act soon, we may not be able to grow anything, let alone Tappi-tappi. That said, we do not want to become slaves to western technology, and must try to find long-term solutions to the problem ourselves."

Whatever the situation in Mawatubiki, a public challenge (mainly in the developed world) to the use of SurfaceSave, and even to nanotechnology itself, is growing. Basic researchers and technologists alike are becoming concerned at what this could mean for the public image and hence funding of their work at a time when it already arouses fear and mistrust. Indeed, NanSolv funds research projects that are ongoing at certain university laboratories, which rely on such funding to keep their heads above water.

The Mawatubiki farmers were able to change their agriculture because of a special deal from a US biotech company that markets a GM Tappi-tappi plant that produces higher yield and has greater pest resistance compared with the wild-type.

***Task:**

In light of the offer of the company NanSolv, the FAO has decided to establish a fast-working and interdisciplinary *ad hoc* committee in order to decide whether or not a precautionary course of action is advisable in this case, and what this would imply (i.e. based on the Precautionary Principle (PP)). Can any situation, however severe, justify the environmental use of a product that has not yet been tested in the intended scenario? Should the offer of NanSolv be accepted? Particular weight is to be given to the ethical basis and justification for what to do. You are expert members of that committee. After three days of intensive discussions in Rome, the group has to present its findings to an international audience, while being acutely aware that reference to the PP is not unproblematic in a global political setting. What do you say and recommend?