Sustainable remediation assessment: How to include the societal cost in the equation?

Jan Haemers, Owner HAEMERS Technologies
jan.haemers@haemers-tech.com

Background

The widely accepted definition of sustainability in policy is to fulfill the needs of the current generations without compromising those of future generations. It has therefore been widely discussed whether our current policies with regard to land remediation, in particular the Risk-Based Land Management (RBLM) is sustainable.

Another presentation of sustainability is to put sustainable policies at the crossroads of Economic, Environmental and Social parts of that policy. When applied to contaminated land management, one can position the main policies on that graph (Figure 1).

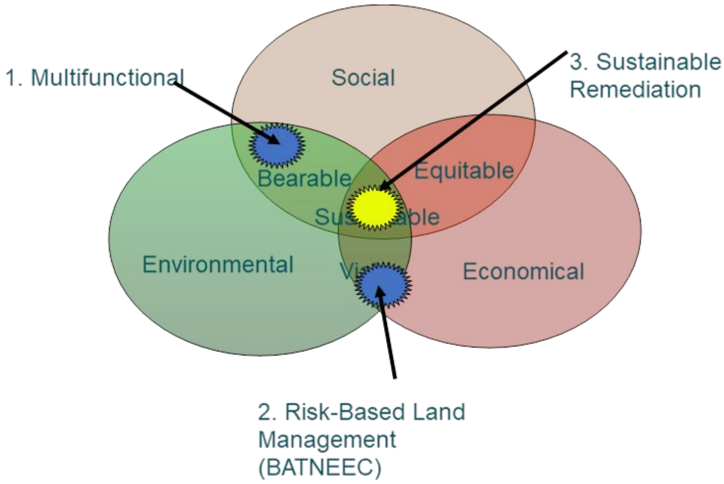

Figure 1: Sustainability applied to successive land management policies

A look back at history tells us that the first approach to soil remediation policy was to consider that the polluter should return the land in its pristine state, whatever the cost may be (the "polluter pays" principle). That was translated into 'Multifunctional' (Figure 1 – position 1), i.e. as a society, we should be able to decide unrestricted about future land use, as we do with 'natural' land.

Very quickly, this noble principle hit an economic limit. As shown on the graph, that position for multi-functional land management was 'bearable', as it took into account both environmental and social aspects, without considering economics.

The costs were unbearable. Mainly due to lack of technologies in those days (1980's – 1990's). Consequently, one came with the idea to manage the risks and impacts caused by pollution rather than to remediate completely, in order to keep the whole approach in balance with economical constraints. This concept was widely accepted as a method to **prioritize** the sites that needed to be fully cleaned-up and returned to society, and leave enough time for problem owners to finance the remediation, as well as counting on future technologies to bring innovative and more affordable solutions to restore the site in its pristine condition.

It was obvious that by imposing economically unbearable constraints, the factual result would be zero as problem owners would go bankrupt leaving the problem to the government.

RBLM is at the crossroads between economy and environment (the 'viable' section – Figure 1 – position 2). Indeed, it takes into account a minimization of environmental impacts while taking economic constraints into account. The social aspects are left out of the equation.

After almost 20 years of RBLM, there are more and more calls to move to the real center of the graph and have contaminated land management policies that are really sustainable, i.e. that integrate the social aspects.

Aim

Both policies (multi-functional and RBLM) can be illustrated by a simple example: A piece of land is contaminated with heavy hydrocarbons. There is no groundwater. The future use is undefined.

Under multifunctional land management, the site owner must remediation the whole site and bring all concentrations of heavy hydrocarbons to background level. Once that remediation is done, the local community can decide with no strings attached what to do with the site.

In RBLM, a possible solution is to reuse the site as a parking lot. A simple HDPE liner, covered by solid concrete will guarantee, based on a good environmental and human risk assessment that there is no risk of spreading the contamination and that a parking lot is a suitable use for the site, given its residual contamination and the constructive measures taken. Indeed, given the very limited potential exposure, the risks will be far within acceptable limits.

What this example illustrates is how the concept of RBLM has been misused. Indeed, where everyone agreed that the 'multi-functional' principle was unsustainable as it failed to take into account economic constraints, RBLM was supposed to be a carve-out to the 'Polluter pays' principle only if and when the multi-functional approach was too expensive. However, in most cases, that policy was stretched and the latter part of the condition (i.e. "if remediation costs are unbearable") was quickly forgotten. RBLM became the main policy, and people considered that the final objective is to mitigate risks, not to clean-up.

In other words, still referring to Figure 1, one went from 'bearable' to 'viable' without passing through 'sustainable'.

This abuse of the initial RBLM concept led to many instances of sites where remediation in the pristine state would have been perfectly bearable technically and economically, in particular with new and cheaper technologies existing today, but where they were not considered as they added no value to the problem owner. Governments have drafted legislation where Risk Management becomes the key drivers is remediation strategies and goals[1]. Therefore, economic actors will always choose the cheapest option if legal implications are equivalent.

Referring to the example above, for the problem owner, the case is fantastic as he will have almost no costs for his remediation, and will be able to use its land for economical benefits. One would argue that environmental issues are taken care of as it was proven that no contamination can leave the site since it is perfectly insulated, so there is no real environmental impact anymore, neither is there any risk for the people using the parking lot.

What is wrong with this approach?

Going back to the sustainable graph, this is the perfect example of a compromise solution between economic and environmental aspects. What is left out of the equation are the societal aspects. What are those?

By choosing for the 'parking' option, one has forced on society a land use it may not have chosen should all options have been open. The site might have been better suited for residential use for instance. Now residential development will have to be done elsewhere. Usually, this is then done at the outskirts of our towns and cities. Where agricultural land is turned into residential, creating economic windfall profits for agricultural land owners. Those areas are now built and people live there. Society will pay for extra roads, public transportation, utilities, etc. to be brought to those new developments. People will drive longer to work, creating mobility problems, but also more fuel consumption, pollution, etc.

This example shows that the RBLM approach, when it is applied without its legitimate restrictions (i.e. only applicable if and when proven that multifunctional remediation is economically unsustainable), will lead to private profits (for problem owners and agricultural land owners indirectly), and external costs supported by society (utilities, roads, mobility, less agricultural land available).

When evaluating remediation options, the immediate financial cost/benefit is always taken into account (total remediation costs are often #1 criteria and always in the top 3), whereas the societal costs are seldom considered.

One cannot expect problem owners to be candid and taken the societal costs into consideration when they choose which remediation is best for them. It is the government's main responsibility, as representative of society, to blend that element in the choice process. It is the government's responsibility to impose, whenever Risk Based Remediation is proposed, to demonstrate that multi-functional remediation would be economically unbearable. Failing to do so equates to transferring

[1] Often, a Risk assessment is compulsory as soon as soil contamination has been discovered. Even if and when it is clear that the problem owner is willing and able to fully remediate the site (very small sites for example), a risk evaluation will be imposed. Such Risk studies are meaningless and unnecessary burden if and when full remediation is economically viable.

the liability (i.e. the residual contamination) to the next generation, which is exactly the opposite of what sustainable development is.

Sustainable policies take care of the needs of current generations without compromising the needs of future generations. By leaving contamination behind, not only do we put a solid burden on the next generation (which will have to deal with it), but one compromises the quality of life of current generations elsewhere than on that site, as they will face the consequences of urban sprawl and agricultural land consumption, all of which are in part caused by our current policies allowing to leave contamination behind even if it is technically and economically feasible to fully remediate them.

Confusion about what social aspects mean for sustainable remediation

Sustainable Remediation is defined by The Sustainable remediation Forum UK (SuRF-UK) as "the practice of demonstrating, in terms of environmental, economic and social indicators, that the benefit of undertaking remediation is greater than its impact, and that the optimum remediation solution is selected through the use of a balanced decision-making process". Similar definitions were adopted by SuRF-US and similar groups.

The definition is relatively general and does not define further what the social indicators are. While looking more in detail, the various groups focus on the benefit for that site related to the local community for example. The larger aspects such as those mentioned above (urban sprawl, mobility, contamination left behind, etc.) are not addressed, mainly due to the difficulty to quantify them and to allocate those social costs. There is indeed no direct link between any given remediation and the larger urban sprawl and mobility issues, as there is no direct link between any CO2 emission and climate change. It contributes however to the problem, albeit its exact quantification is hardly impossible.

One should consider the social indicators as any burden transferred to the next generation. This aspect is essential is assessing sustainability, on site of far away from it.

Conclusion

Sustainable remediation is not remediating less, or greener. It is prioritizing the sites that need to be cleaned-up, using risk based land management, and once the sites are to be cleaned-up, to remediate until no contamination is left behind for the future generation.

Cleaning up land while leaving contamination behind is managing the problem, not solving it. It cannot be considered as remediation, and certainly not sustainable remediation.

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