To spray or not to spray?

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CASE BACKGROUND

In real life, where the technology often overlaps social problems, there are issues and problems, which are resulting as a conflict between different kind of values. This applies to a situation presented in the case "*To spray or not to spray*".

The case is about several concepts concerning usage of DDT (Dichloro-Diphenyl-Trichloroethane). It is a well-known pesticide, that was discovered in 1874. It initially wasn't used widely, but - as in the middle of XX century insecticidal properties were discovered - it started to be commonly used for protecting people from mosquitoes spreading one of the most dangerous disease of our times – the malaria. Because of mosquitoes, the disease is very hard to control, and it spreads very fast.

Malaria causes approximately 2 – 3 million deaths annually, and there are 350 – 500 million people affected by this disease. It also causes economical loss, damages which are estimated at 1 billion dollars per year. Malaria is threat to 40% of world population, and is mostly threatening in poor, developing African countries. Sadly, more than 90 percent of those dying from malaria are children.

In 1939 it has been discovered, that usage of DDT can affect mosquitoes spreading disease, preventing infection and eventually leading to lower number of deaths from it. DDT started to be widely used for both millenarian and civilian (also agricultural) uses. There was also a high usage for public health purposes in developing countries, by spraying it over potentially threaten areas.

PROBLEM

The problem with DDT is, that is has a long half-life length (up to 15 years), furthermore it tends to bio-accumulate in human body and natural environment. Although no one has ever proven, that using DDT can cause death (and actually, no one died just only from being in DDT spoilt environment), therefore the real scale of how it does affect human is not really well-known.

United Nations Organization was considering banning the usage of DDT. It was 2004, when United Nations Secretary invited well known experts, which might give a further clue for deciding whether to ban or not this pesticide.

Experts did not have the same opinions – they generally argued between two options: opposing the ban, allowing DDT to be used and supporting ban on the other hand. Each side has its own values which are believed to be most valuable:

Main argument for	Main argument against
Using DDT **is highly efficient way of fighting with malaria,**	Using DDT **is not secure, as the real effect on human and environment is not known**

They all however agree, that DDT is more effective way of preventing and controlling of malaria than the natural pyrethroids, that have been extensively used as a replacement for DDT, but for which mosquitoes had already developed immunity systems. Also, it is commonly known DDT is much cheaper. The experts are about to make a decision whether the ban should be approved or not, until any better solution is founded.

THE OBJECTIVES AND ANALYSIS

The objective is to decide and answer this question, according to values, ethic and morality and with compatibility to technological and overall knowledge. The decision is about to approve or not U.S ban for using DDT. Unlike many other choices, this one seems to be a binary one.

The values

In this particular case, the most important values are

- Human health and life
- Natural environment, avoiding to spoil it
- Economical values (economy loss, money etc.)

The general choice is between keeping using DDT, and banning it. There is no clear stated third option, as other ways of fighting malaria are not efficient enough, as well as much more expensive (although being more environmental friendly). With values of both sides, there are two main methods of making this particular choice, which are widely confronted during discussion of this problem.

Risk/benefit analysis

Risk/benefit analysis is one of the method of deciding, whether the technology should be used. It is basically about pointing out the key benefits, compared with detailed risk, connected with process of implementation or usage. Supporters of DDT point following benefits of using:

- The most efficient and cheapest way of defeating malaria
- It's working, and there's no sure anything better will be discovered in nearest future
- Not using DDT increases not only number of infected people, but also accelerates this process (quadrupled number of infections after ban from developed nations for DDT)
- Economy profit (over half billion dollars to poor countries, lower cost of social and health care)
- Global warming and travel movements will lead to spread of malaria if it is not fought.

Experts representing that point of view are also aware of potential risks:

- Long half-life of DDT
- Unknown effect on environment
- Hard to control ways of using (meaning hard to define and control acceptable ways of using)

This method of making decision has disadvantage, that it is sometimes necessary to agree to take risk (sometimes even serious), providing that the purpose and effect of decision is worth it. It is however noticeable, that risk is measurable and easily definable thing, while safety is not, which mean, that different factors will have different power for different people. Next, there is a question involved: "How much risk can we take to achieve desired objective". Is it worth or not, and what will be the possible cost of that action? By taking this method of deciding we should keep in mind not to exaggerate either potential benefits and their weight, as well as potential risk (in either way).

The most significant advantage on the other hand is, that this method allows to keep effort on developing something, which not necessarily have to be perfect or if some kind of problems can be solved only by using experience after implementation. Without that, there would probably be no

such inventions like microwaves etc. Finally, risk/benefit analysis allow to be more creative and faster developing (by taking some risk/costs).

According to risk / benefit method, the choice of using DDT should be made. The reason is, that although we don't fully understand how it affects environment, this pesticide is the only way to save thousands of people each year. Without using it, we don't give them chance to live, so we shouldn't hesitate to take the risk of this action, which is yet unknown.

Precautionary principle

We of course cannot deny the risk. In this particular example, using DDT is strongly connected with yet unknown effect on environment and human health. It has been proven, that DDT bio-accumulates there. So far, it has not been discovered to have any influence on number of death, however if one eats or in similar way pesticide gets into the body, it can be cause of death, cancer etc. This doesn't include situation concerning human contacts with environment spoilt with DDT. Anyway, this threat cannot be ignored – it may be found out in future, that there is tremendous impact on people health by spraying DDT over. The areas in which DDT is used are so large, that if in case of bad impact on environment, large areas will be irreversibly spoilt, and people will be suffering there.

As long as this potential influence is not denied by scientific research – according to precautionary principle – there should be precaution and assumption, that it can be dangerous. Supporters of this idea give example of asbestos or Creutzfeldt-Jakob disease as examples of situation, when precautionary principle could save natural environment, people lives and health.

The precautionary principle is all about holding with implementing something, before it can be verified as non risky activity, even if risk is only theoretical. Therefore, according to precautionary principle, we should approve the ban, because there is strong risk of spoiling environment, and having unpredictable tremendously harmful effect in the future. This moral consciousness of result of our choice is principle in deciding in this way.

Comparison of risk/benefit analysis and precautionary principle

Risk / benefit analysis	Precautionary principle
You must prove the potential benefit is valuable enough to take some risk connected.	You must prove it is completely safe to introduce particular technology.
Focuses on proper management of the risk	Focuses on eliminating the risk
With precautionary principle, there wouldn't by such inventions like cellular phones, nuclear power plants.	With precautionary principles, there won't be ozone depletion, harmful effects of asbestos and haloalkanes etc.
We should not ban DDT. It can save a lot of human lives, with relatively low level of risk and cost.	**We should ban DDT. It can affects environment and human in unpredictable way – it's to dangerous and risky to proceed.**

OTHER OPTIONS

There are some solution, which are somewhere in between keeping usage of DTT at unchanged level and banning it. For instance, it has been proven that number of mosquitoes that are entering huts, protected with sprayed walls is 30 times lower than in protected. It is pointed out that this solution leads to lower environmental pollution. This somehow has many disadvantages: firstly, it is very

costly. Secondly, if you don't have control on DDT, you cannot be sure it serves its purpose as it was intended. Finally, this makes worse protection against mosquitoes outside the house, therefore not only it does not eliminate the problem, but is also time consuming and not fully environmental friendly. Spraying indoor will also not stop bio-accumulation of DDT.

CONCLUSIONS

We have to choose one solution, based on those both methods. We are aware that it is difficult, because the actual "right" choice does not exist. The decision which will be taken is a complex issue, that has social and scientific importance. On the one hand, there is environment prevention, and on the other malaria's harm prevention. We have to accept scope of consequences of the solution. So, it won't be a choice between good or bad. It will be choice between bad or worse, the choice of the "less worse".

Our discussion about problem of DDT and malaria was not clear. There were different points of view, and this case faces us up to an ethical and moral problem. We have to act according to general interest like public health. We can almost compare our situation to one of men, who has to press the button in death condemned cases. Nevertheless, most of us agree with conclusion from risks / benefit theory, so we would choose a settlement between full usage and ban, allowing DDT's use indoor. Indeed, we can't close our eyes on malaria infected people (especially in the underdeveloped countries), but the environment and potential risks are also very important.

We are aware of consequences of using DDT on environment and public health. However, it even can be more harmful and dangerous in different areas (both developed and underdeveloped countries) if malaria is not controlled by this chemical substance. This is why we propose another solution, a settlement between two options we provided before. We believe that it would be good, reasonable and careful decision to allow indoor usage of DDT for 5 years in countries, where malaria persists. This way is more costly, but also more environmental friendly. As we said before, there is always a risk, but following risk/benefits analysis we are ready to take it. After 5 years, we will be able to see statistics and researches, find out consequences and spend this time to research and analyze DDT's effects on the human being.

This case was mostly about present two different ways of deciding upon technology, and its conflicts to values. It can be argued which method is worse or better, but what we can't deny is, that they help to understand decision, to see all the viewpoints, finally to make our choices in most rational and responsible way.

And finally, we must notice how this case ended. The real decision of UNO was to allow DDT for fighting malaria until more effective solution is found. Since 2007, DDT has been started to be gradually phasing out. This proves, our choice is right.