

Solving the food crisis – On an ocean planet

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Stating the Obvious

The UN has predicted an imminent food shortage, with an ensuing acceleration of such problems as famine, over-fishing, deforestation and global conflicts. As a result, food prices are already soaring, and riots have already broken out in at least a dozen countries. And yet, our problems haven't even begun.

Riots have so far only emerged in third world countries, where people already are dying of hunger related causes. A conservative estimate suggests a death toll of about 25,000 people per day. This situation has so far not been brought about by a food shortage as such, but by uneven food distribution. An actual food deficit, therefore, means that redistribution through the WFP (World Food Program) will no longer be an option, because the WFP is entirely dependent on surplus food from affluent countries.

A total disaster has so far only been avoided by overharvesting our natural resources. However, the only problem with this policy is that the long-term effect is exactly the opposite of the intended effect; food will become even scarcer. For example, some marine resources have been reduced by more than 97 percent over the past 40 years.

So what do we do about it? By and large, our response has been to improve our efforts in agriculture and to renegotiate fishing quotas, knowing full well that the best agricultural areas already are in use, and that many marine capture fisheries are depleted to a point where they can no longer be sustained. As if this was not enough, we also know that the production capacity of both agriculture and fisheries are likely to fall as a result of CO₂ emissions and climate change, and that the food deficit will increase even further, due to overpopulation.

Since overpopulation is the root cause to all of the above, one can't help wondering why our world leaders haven't yet called for a population control program. However, they do subscribe to such measures as "legislation, control, governance, integration, trade and tax policies" (excerpts from UN and EU reports), trading CO₂ quotas and giving more money to the WFP. And in the very latest UN report, it is actually suggested that we "build on existing mechanisms and programs."

Reading these reports is a somewhat surreal experience, because it is painfully obvious that our general strategy toward food production is practically unchanged, all while the food deficit not only continues to grow, but in fact acceler-

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ates. It is therefore equally obvious that what we need is a radically new approach, and not a continuation of the policies that caused the problem.

Aquaculture

We already know from which field such a solution will have to come. Contrary to popular belief, aquaculture is today recognized as the most energy efficient and prudent production method of **animal protein**. This should come as no surprise, since aquatic animals are more energy efficient than their terrestrial counterparts, because they spend little or no energy in maintaining body heat or fighting gravity. Add the cultivation effect, the possibility of utilizing lower trophic levels and the fact that 71 percent of our planet is covered with water and the conclusion is inescapable. A substantial increase in the world's food production can only come from aquaculture! It is less clear how this should be done, but we do know that if we persist in our role as hunters and gatherers of the oceans, we are doomed.

Clearly, the answer lies in aquaculture research, so maybe our research institutions already are in the process of solving the problem for us? However, that is not the case. In spite of valiant efforts from such institutions as the World Fish Center in Penang, the aquaculture research establishment as a whole fails to provide us with viable solutions. Not only does the aquaculture research community fail to come up with a solution to the general food deficit, but incredibly, it also fails to tell us how to prevent an imminent seafood deficit, which is expected to reach a level of 40 million t in about 10 years. In other words, we fail completely in the only area where it is possible to succeed!

The obvious reason is that there has been far too little priority on aquaculture research. Less obvious, but no less important, is the fact that aquaculture research

is wholly inefficient and ineptly organized. The result is, among others, that we pursue development programs that have little or no chance to succeed. Examples from the European scene are the halibut program, the scallop program, a sea ranching program for salmon and the wolffish program. Some 25 years after the inauguration of these programs, little or nothing has been achieved, but perhaps more disturbingly, there is no public or political reaction. This raises yet another question; how can such complete failures escape the scrutiny of the public eye for so long?

Stating the Not-so-Obvious

The answer is that researchers initiated these programs themselves, but by the time they had become skeptics, the programs had been politicized, and all criticism was swiftly confined to the corridors. The reason is simple; if you want governmental research money, then pick a field that agrees with governmental research policies. If you don't, you're dead. Thus, Atlantic halibut became a politically correct species, in pretty much the same way as Brabazon and Concorde in their time became politically correct airplanes. To understand how this is possible, it is necessary to take a brief look at the dynamics behind aquaculture research policies as a phenomenon.

Management

It is deadly serious when governments resort to such feeble-minded measures as legislation, control, governance, integration and WFP donations in the face of a global food shortage. But it is even more serious that they turn down new ideas with references to protocol, without even looking at them. Protocol means that the rules are such that the UN cannot consider new ideas unless they are presented by national governments, which in turn cannot consider new ideas unless they are presented by certain governmental institutions, which not surprisingly, are committed to current governmental policies that are based on old ideas! Unbelievably, the UN still called for new ideas after the food conference in Rome last summer. I asked my own government whether they had come up with any suggestions, and their answer was that they "support the UN Comprehensive Framework for Action."

This form of pretzel logic is not only maintained by bureaucrats, which is to be expected, but by politicians as well, who seem to be caught up in the greater bureaucracies of the UN and the EU. To make things worse, they are tangled in a constant battle with ill informed environmentalists, who claim that aquaculture is a waste of resources, because non-marketable fish are used as fish feed! Right, but the alternative of course, is to leave it to nature to process the same resources with a poorer results, feed it to poultry and pigs again with a poorer result, or turn to eating baitfish and zooplankton rather than farmed fish. Oddly enough, these options are not mentioned in the public debate.

As a result, our politicians are paralyzed, and feel more comfortable addressing peripheral issues than fundamental ones. As an example, certain Norwegian politicians resort to gender politics and educating African farmers when con-

fronted with a looming food deficit. Now, you can allow yourself to be amused by this, but the harsh reality behind it is that our politicians have no intention of coming to grips with the problem. In the following portion of this essay, however, I will attempt to present a breakdown of the core problems, and give a solution in the form of a work model.

Coordination

I know from experience that scientific knowledge is quite often not even accessed when important political and financial decisions are made, so there are most likely two reasons for our predicament: Firstly, aquaculture research is generally politicized and poorly coordinated, while research institutions are highly specialized and are left to compete rather than cooperate. Hence, both creativity and cooperation suffer, while the totality is lost and fundamental questions are never asked. Secondly, the worlds of science, finance and politics have different agendas and, thus, possible synergies among these three worlds are also lost.

The result is politicized science that is bidding for money and that politicians and investors operate alone with very limited knowledge. The effect is that neither the individual nor the combined capacity of science, finance and politics are exploited and we have effectively become inefficient in an area that requires full efficiency if we are to solve maybe the most important problem of our time.

A Solution

However, there probably is a solution, and it begins by recognizing three basic premises. First, existing knowledge is used more efficiently through coordination than through competition, because a coordinated research environment can allow itself to 'know' that some measures are more likely to be effective than others. This is not necessarily true of an uncoordinated and competitive research environment, which will tend to maximize the use of its own expertise, rather than attempting to maximize the overall result by employing the most relevant expertise. Secondly, the art of hypothesizing is better left to scientists than politicians, and thirdly, knowledge will be more useful when made available to both politicians and investors. By using this insight, it is possible to define an area in which optimal synergies among science, politics and finance can be maintained continuously. This can be done in a variety of ways, but allow me to suggest a general approach, followed by two examples.

Begin by accessing an R&D network, and ask which scientific solutions are the most effective with respect to any given task or problem. This will leave us with a list of prioritized scientific measures, of which some will be more promising than others. Today, such priorities are generally not made. Secondly, take the best suggestions to an experienced market-economist, preferably with an investor network for a similar analysis and exclude less profitable ventures. Next, take any remaining ideas to an experienced politician with an international network, because marine resources are international by nature, plot and rank syner-

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gies and mutual interests and give preference to those areas that receive the highest score. Finally, identify and select prospective partners and convene to detail programs.

If this method is applied to the choice of future aquaculture species, for instance, two conclusions appear almost immediately. First, 25 years of halibut research has very likely been in vain, while a prolonged ignorance of such species as bluefin tunas has been equally unwise. Secondly, semi-governmental programs between states like Norway and Haiti should be initiated immediately, with the aim of developing farming methods and restocking programs for northern bluefin tuna. Typically, the commonalities of such solutions are shared spawning and feeding grounds, mutual interests in capture fisheries and the fact that the species in question often are over-harvested.

These types of assessments often have rather interesting side effects with regard to resource distribution and international peace work. Fast-growing species are often associated with warm waters, and warm waters are more often associated with developing nations than not, which means that the model not only encourages international cooperation to increase global seafood production, but leaves more of the production to the developing world. Both approaches are known as effective preventive measures in the field of security policy.

But we could just as well start at the other end, by establishing an international investment fund and ask the R&D network which investments have the highest scientific potential for improvement. R&D institutions will often have 30-40 years of experience (individually) in anything from refining feedstuffs to improving water quality or designing breeding programs. This means that the network, simply by experience, can both identify and quantify bottlenecks and accurately estimate the costs and effects by removing them. Again, the end result is likely to be a higher efficiency in the seafood industry, increased revenues and a closing of the ever-widening gap between supply and demand.

I, therefore, suggest that an international aquaculture development program be initiated, based on biological and financial sustainability, optimal synergies and maximum effects. This is the only way to combine increased production rates with stricter conservation policies and dwindling feed resources.

The alternative is to hope for investors or politicians to see these possibilities all by themselves, without the same amount of information, then act on them. Or to hope that highly competitive, specialized and politicized research environments will recommend any other expertise than their own.

Notes

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