

MILITARY ACTIVITIES AND THE HUMAN ENVIRONMENT
Some research proposals

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I have been requested to make some comments in connection with the newly initiated SIPRI/UNEP project "military activities and the human environment", and will do that on the basis of the study I carried out for UNEP 1981/82 with Dr. Arthur Westing as a major consultant. The study has been published, with a preface by Ulf Svensson (then Director, UNEP Regional Office for Europe) under the title, Environment, Development and Military Activity (Norwegian Universities Press, Oslo, 1982, 143 pp). As always when a study is carried out it leads to more questions than answers, and it produces inevitably in the author some thoughts about what more could and should have been done.

I see three major fields of enquiry in this connection. However, before mentioning them just a note on the frame work of analysis that was used in the EDM study mentioned above.

Basically, environment, development and military activity were all three broken down into components presented and discussed in the first chapter - appended here as tables 1, 2 and 3, copied from the book. Such typologies can be much more refined, and it does matter how one cuts reality in order to achieve good points of attack for an analysis. It is also important that the lists are complete: had I done it today I would certainly under military action have added "new weapons", meaning particularly laser weapons and particle beam weapons. Hence, I would imagine that much work would have to be put into the task of making these typologies as adequate as possible. In the study now to be undertaken, however, I understand that "development" will not be included - it is the military activities/human environment interface that is to be explored.

For the exploration of such interfaces the "matrix approach" was used. The typologies of tables 1, 2 and 3 were simply multiplied (in the sense of cartesian products) with each other. The focus was particularly on the M x D, M x E matrices. These matrices were then to

some extent filled in in the text, using some of the key information from the literature.

Then, the three major fields of enquiry as I see them, based on my experience with this particular work.

First, there is of course the problem of filling in the matrices with great accuracy. It should be noted that the entry in a cell in a matrix is not a figure, but a function: how much environmental degradation as a function of how much military activity, be that in the form of preparation or the form of military action. The exact form of the function may not be known, sometimes not even knowable because of the highly insulting impact to nature of the weapons in question. However, if not the exact formula at least the form of the function should be well estimated, meaning that a good typology of functional forms should be developed (for my own effort in this field see figure 3 in the appendix to the report). Most important would be the search for discontinuities in this functional form, in other words the threshold of military activity beyond which a steep increase in environmental degradation takes place.

It may also be important to make the entries in the matrix more space and time specific. They should be, as is done in most of the literature but not in the book quoted, discussed relative to the ecosystem, with a good typology of such systems. But they should also be made time specific so that the process can be better understood. Thus, military activity in the world is increasing, so is environmental degradation. Does this mean that we are moving on the same functional relation, curve - or could it also be that the curve shape itself is changing over time? The latter would be an indication of synergism at work. This would probably require some very hard work on time series to be fully understood, but with the amount of time and good people involved in this project that should be possible. The study is so well conceived, and so extensive in space and time that it should be possible to assemble a vast amount of data, to establish good, up to date, data files

that would continue beyond the time frame of the project - provided the subject matter of the study, the impact of military activity on both humans and the environment so permits.

The second line of inquiry is in a sense exactly the opposite of the first line: not only to assemble more data, but to present them in a concentrated way, with a good theory, and easily understandable. My own tool in the work quoted was matrix multiplication. But it was used as a heuristic only, tracing through the matrices chains and cycles of particular significance. Real multiplication was carried out, to some extent, in order to see which combinations were particularly rich in chains and cycles (not reported explicitly in the book). I think much more could be done in this field, but some mathematician would have to explore the mathematics of matrix multiplication when the entries are not necessarily functions, but functional forms. This should be a very attractive task for a mathematician sufficiently close to the subject matter to develop something useful. And in this connection the whole problem of synergy should be taken very seriously, as a major part of the study. I think the literature has only started touching this subject, much more can be done - some of it still of a more conceptual kind. Thus, I feel that much more has to be done about the resilience of eco-systems. When they are degrading the recovery mechanisms are also destroyed, partly because the diversity of the system is reduced, but I think also because the symbiotic mechanisms on which the resilience is based (in addition to diversity) are degrading. Photosynthesis should be explored in more detail in order to establish a continuum between "normal functioning" and "green plants dead or dying". What level of military activity harms photosynthesis to what extent? I am sure there would be many other examples of this kind, very important for the better understanding of the phenomenon.

In this connection the pedagogical aspect should not be underestimated. Some SIPRI publications are good in this respect, some are not. It is not a question of having good diagrams showing how much destruction there is, that can be done easily. It is more a question

of showing the dynamics of it, showing what would be the impact of even more military activity, how would it affect us tomorrow and the day after tomorrow in addition to how it already affects us today. For the mathematically inclined matrix approaches in general (and Markov chains, as an example, in particular) will do this job. Obviously other forms of presentation also have to be found.

Then, the third line of inquiry. This may or may not be inside the scope of this project, but I think it should be inside: alternative security doctrines (the sub-title of the book quoted above). I have a very strong feeling, based on considerable experience, that there is nothing much to be gained almost anywhere from more studies of the negative impact of military activities in terms of public opinion, including government opinion. They are all relatively convinced that the impact is negative, both the preparation and the action. However, they have other concerns that are more important: immediate economic gains today as opposed to possible economic losses due to military activities tomorrow; threats to security today as opposed to the costs of military activities. Hence, the question of alternatives will come up. I think the argument could then be made that the search for alternative security doctrines should also be ecologically guided. Unless one takes the highly unrealistic point of departures often used in United Nations resolutions (and I think with very harmful consequences) of "general and complete disarmament" the question should be posed: what is the kind of military activities that would be less harmful on the environment, in fact so much less harmful they might even be acceptable? Nobody will be helped by the statement that the only level is zero level, and this is unfortunately the direction in which most United Nations thinking will tend to guide people. My own views are put forward in chapter 4 of the book quoted (The table of contents is also appended as a reference); this is just scratching the surface, and I am sure much important work can be done in this field.

In conclusion let me only try to say something about the concrete questions in the letter of request. The alternatives presented

are of course all of them well taken, and my immediate answer would be not only both-and, but 50%-50%. However, I am not sure this is a fruitful way of approaching the study. I feel the answers to the dilemmas posed will have to follow from what one wants to study, and above three indications are given. Let me only say that I think it is very important to have some military people with a very open mind with regard to the problems posed by the peace movement participate in the study, but not so much to give data as to be imaginative when it comes to alternatives. Thus, I am not so sure that it is a question of "means of restoration and rehabilitation" - that is a general environmental approach. I think it is much more a question of alternative security doctrines. One is reminded of the Indo China wars: the party that lost, Washington, D.C., not only lost but left in its wake almost undecipherable levels of environmental degradation. The party that won, Hanoi, not only won but seems to have obtained that victory in an environmentally almost painless manner. There is something to learn from this, but how, and who is going to do it?

When it comes to bibliography I am afraid I have nothing to offer beyond the selected literature on the effects of military activity already presented in the book quoted (pages 141-143), most of them very well-known in the literature.

And then, finally, a word of warning. I am not yet convinced there is that much new to be learnt from this type of study. Hence, it is important that the empirical part is done better than before, with new and better data that the theoretical part brings in with the phenomenon, and that the praxecological part gives some concrete new ideas about new approaches, more promising than the devastating road on which the system is now moving.

Table 1. Environment: a typology of components and interaction

<p>COSMOSPHERE</p> <p>Components: bodies (celestial) space</p> <p>Interaction: energy transfer (light, heat, ultra-violet rays, etc)</p>	<p>BIOSPHERE</p> <p>Components: micro-organisms plants lower (non-flowering) higher (flowering) animals lower (invertebrates) (molluscs, crustaceans, insects) higher (vertebrates) cold-blooded (reptiles, amphibia, fish) warm-blooded (birds, mammals)</p> <p>Interaction: desert tundra grassland forest tropical temperate non-conifers conifers fires</p>
<p>ATMOSPHERE</p> <p>Components: oxygen nitrogen CO₂, H₂O ozone space</p> <p>Interaction: temperature water (including precipitation) drought winds, hurricanes, typhoons lightning</p>	<p>HOMOSPHERE</p> <p>Components: humans, human artefacts human settlements (in order of magnitude): single farms 10¹ nomadic communities 10² settled communities (villages) 10³ towns 10⁴ cities 10⁵ metropolises 10⁶ megapolises 10⁷</p> <p>Interaction: micro-space (peer groups) meso-space (local level) macro-space (national, regional, global levels)</p>
<p>HYDROSPHERE</p> <p>Components: inland waters oceans, off-shore oceans, high seas</p> <p>Interaction: waves, tsunamis, floods</p>	
<p>LITHOSPHERE</p> <p>Components: fossil fuels minerals soil area</p> <p>Interaction: landslides, avalanches, soil erosion earthquakes volcanoes</p>	

Table. 2. Development: a typology of human and social dimensions

HUMAN DEVELOPMENT

Sustainable satisfaction and development of human needs so as to facilitate, or at least not impede, the human development of others, with neither under- nor over-consumption of "satisfiers"

- (1) *Survival needs* (Negation: violence)
 - for realization of potential biological life-span, unhampered by direct and structural violence; for reproduction
- (2) *Wellbeing needs* (Negation: misery)
 - for food, clothes/shelter, health care, schooling, "comfort", transportation/communication; for energy etc.
- (3) *Identity needs* (Negation: alienation)
 - for closeness to self and others; to society, culture and nature; for something to believe in; spiritual needs
- (4) *Freedom needs* (Negation: repression)
 - for the possibility of a choice in how to satisfy the other needs; for consciousness of choice

SOCIAL DEVELOPMENT

Human-made environment compatible with human development and so as to facilitate, or at least not impede, the social development of others.

- (5) *Production*
 - in a broad sense (formal and informal; goods and services), with the priority of production to the satisfaction of basic human needs, then for further development
- (6) *Distribution*
 - so that priority is given to those most in need, building *social justice* and increasing *equality* among classes, racial and ethnic groups, sex and age groups, within and among countries
- (7) *Institutions*
 - building institutions for the implementation of these goals, avoiding excessive sectorialism and gigantism
- (8) *Structure*
 - building equity at all levels with shared control over means of production - building, through participation, *self-reliance* at the local, national and regional levels - as much as possible with self-sufficiency in production for the most basic needs and equitable exchange for the rest
- (9) *Culture*
 - doing all this in a way compatible with those aspects of the endogenous culture that are compatible with the above
- (10) *Nature*
 - maintaining and building, on a sustainable basis, ecosystems with optimal level of maturity to prevent depletion and pollution

Table 3. Military activity: a typology of components and interaction

MILITARY PREPARATION	MILITARY ACTION
Doctrine	Piercing/impact
Organization structure capital	Incendiary flames heatflux oxygen consumption
Humanpower quality (mentality and education/training) quantity (numbers)	High explosives blast high velocity fragments
Research humanpower research facilities	Chemical/toxic Biological
Development/testing	Radiological
Production/stockpiling land, raw materials energy capital labor production facilities; organization storage facilities	Nuclear electromagnetic pulse blast thermal radiation ionizing radiation – initial (primary) – radioactive fallout (secondary)
Training maneuvers	Geophysical biosphere (fires) atmosphere (climate, ionosphere, ozone, lightning) hydrosphere (tsunamis, ocean currents, river floods) lithosphere (earthquakes, vol- canoes, landslides, avalanches
Deployment domestic abroad (bases; land/sea, outer space)	
Proliferation secondary production trade	

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