

Copyright © 2018 by Academic Publishing House Researcher s.r.o.



Published in the Slovak Republic
Biogeosystem Technique
Has been issued since 2014.
E-ISSN: 2413-7316
2018, 5(1): 87-109

DOI: 10.13187/bgt.2018.1.87
www.ejournal19.com



Considerations on Sustainable Land Use: A Contribution to the Movir's 50th Anniversary

Jan Diek Van Mansvelt ^{a, *}

^a Down2Earth foundation, Wageningen, Netherlands

Abstract

In this paper I reflect on plant breeding in the context of agriculture, agriculture in the context of society and society in the context of culture. Altogether a whole, created by interacting and interdependent humans, on a precious and limited globe. In order to rationally reflect on this whole, I use not only natural science [beta] notions, but refer to socio-economic [gamma] and cultural [alpha] science notions as well, in their mutual interactions. This to emphasise their interweavennes in all appliances of (agro and other) disciplinary sciences. Clarity on this interweavennes helps to understand the considerable problems that nature, environment, human health, animal welfare, crops and soil-ecosystems, labour conditions etc. are faced with by today's industrial, chemotechnical agriculture.

Keywords: agriculture, environment, human health, animal welfare, crops and soil-ecosystems.

Introduction

In this paper I try to see plant breeding in the framework of agricultural production, and agriculture in its social context. Society somehow always has the agriculture it demands. Only when groups in society shift their demands towards products from a socially fair and ecologically sound way of production, can producers changes their production accordingly. But at the same time: only when some producers start to take the risk of introducing products on the market that are produced in a way that complies with sustainable development worldwide, can consumers support that way of production by buying those products.

Today, looking back at 50 years of MOVIR research, it is clear how society's changing demands have changed the position and the strategies of plant breeding, compliant to the changes in demand form agriculture. Among the changing demands, the need for a more clearly elaborated focus on sustainable development – in Bruntland's sense – is paramount.

In plant breeding, this shifts the focus of high external input agriculture towards low external input; from soluble mineral fertilisers toward carbon-rich organic manures, from growth only to full ripening, from full single disease resistant lines to multiple diseases resilient lines and last but not least, from lines that do reasonably well in many places to lines that produce very well in their specific region (optimal soil/climate adaptation) (Brundtland, 1987).

In my opinion, over the last decades MOVIR has done very well to live up to the sustainable development demands. And so under the sub-optimal research conditions – to say the least – as they have emerged over those last decades. Great sacrifices have been made by the researchers and

* Corresponding author

E-mail addresses: jandiek@vanmansvelt.nl (J.D. Van Mansvelt)

their staff allowing continuation of the work started in the earlier decades of MOVIR, when agricultural research was still prominent on the national research agenda and budget. I herewith like to express my sincere appreciation and even admiration for that performance. Therein, I guess, the directorship of Dr. Sulukhan Temirbekova will be remembered as a crucial contribution of MOVIR's survival in the early 21st century. Let me finish these words by congratulating the Vavilov Institute of Plant Industry with the 50th anniversary of its younger sister, its Moscow branch: MOVIR. As a foreign member of the Russian Academy of Agricultural Science, I feel honoured to be invited to participate in this 50 years of MOVIR symposium.

Summary. Guideline for the reader

In this paper I invite you to look at plant breeding in the wider context of science in our today's society, wherein the latter always figure within a more or less explicit perception of man and nature: a world view, episteme or paradigm. Within those paradigms, social and economic perceptions are decisive, particularly where political decisions are at stake. And: science, including plant breeding, thrives and flowers or suffers and vanishes according to political decisions: governmental as well as institutional.

I will start with my view on two bipolar perceptions: conservative versus progressive and reductionism versus holism.

I then proceed to some steps between facts and targets, criteria and parameters, exploring their degree of objectivity versus subjectivity. It elaborates the reductionism – holism opposition.

Then the question arises how to position the various scientific disciplines, with their often conflicting interests, in a way that facilitates their cooperation in favour of sustainable development.

Some words on the People, Planet, Profit approach are followed by the presentation of an adapted Maslow model, which from thereon is elaborated in the rest of the paper throughout various realms of sciences: environment, ecology, economy, sociology and alpha sciences. By consciously reflecting on this hierarchy, planning partners can clarify their own position as well as that of their partners, to facilitate fruitful cooperation amongst them. Such reflections will also help to find ways on how to position conflicting interests of the different disciplines

The relevance of that approach for Russian Agriculture in general and MOVIR's plant breeding in particular is provisionally specified, stepwise, per item.

Finally some words are dedicated to the work of Herman Daly (1989, 1996) and to an option I can see within the broad range of perspectives for MOVIR's development in the next half century.

Two bipolar perspectives in science and society

Whatever plans for landscape and or agricultural projects are tabled by whatever actor, two opposite tendencies can be found, both in looking backward and in looking forward.

First of all there is a certain balance between an innovative, entrepreneurial, daring and modern-times approach with a firm base in science, and a conservative, history oriented, respectful and classical-times approach, with a good portion of scepticism toward modern, technocratic solutions. In the scheme below the two horizontal arrows between conservatism and progressivism represent those two tendencies. Now in each of these two, two other tendencies can be found. One more and one less aware, conscious and motivated to think of long-time effects. Obviously, long-term effects regard all people affected by the new projects, plans or policies. In Scheme 1 I marked the tendencies with a + that are compliant with sustainable development, including social justice and cultural multiplicity. On the other hand, those tendencies that are primarily focused on people's own group's short time interest, competing with all others, are given a – in this scheme.

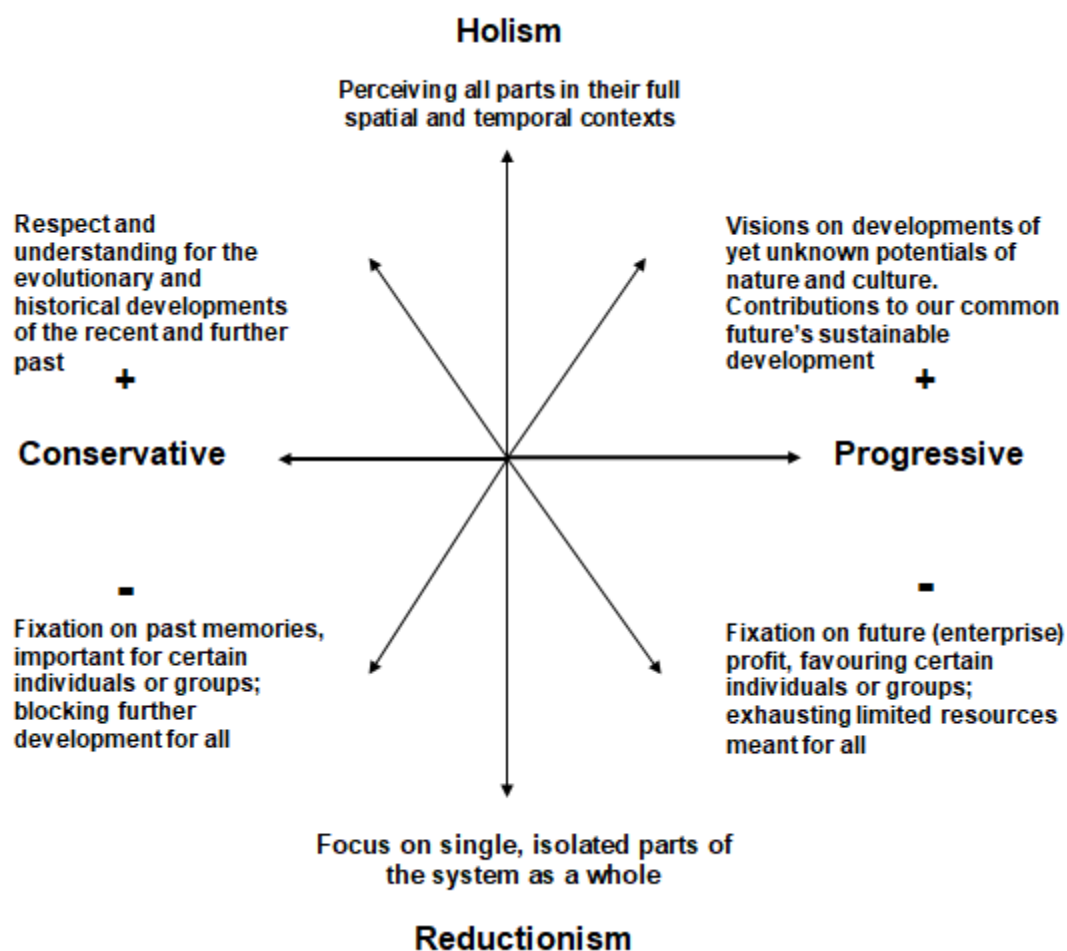


Fig. 1. Reduction and Holism in context

Figure 1 as presented here offers a nice tool for discussions on – for example – plant breeding, (agro-) landscape planning, food quality and the evaluation of their developments. It will be often noticed how easily people, in their presentations of plans or reports based on their particular expertises, tend to focus mainly on the + aspects of their own plans and on the – aspects of the opponent's. Each of those will do the same for their respective positions.

In the so-called SWAT analysis (Mind tools, 2018), this controversy can be nicely transferred, as therein, Strengths, Weaknesses, Opportunities and Threats of all expertises and options are made explicit and discussed. In my opinion, the above scheme nicely fits the SWAT approach.

Therein, by combining the strong points they have in common, and avoid their negative ones, they can altogether manage so called win-win strategies, wherein they focus on their common opportunities and take care to prevent the threats. Whereas the so called SWAT analysis is developed for business and personal consultancy, it works out fine for agricultural enterprises as well.

On Facts and Targets, Criteria and Parameters

In all discussions on agro-landscape design and management there is much to do about facts and targets, criteria and parameters, values, facts, intentions and so on. Quiet often arguments based on one of these get mixed up with such based on others, troubling clear and transparent decision making.

For example hard scientists, as specialists in their discipline, often focus on facts and figures, regarding everything else a waste of time. On the other hand, politically and sociologically aware generalists tend to stress goals and targets, values and opinions, leaving out thorough elaboration of relevant facts. In this often conflicting process, the specialists have implicit objectives and value systems, which are intrinsic in their discipline's way of thinking, observing and acting. On the other

hand, the philosophers tend to presume that the implementation of their wonderful ideas will somehow bring about all relevant and needed facts and figures.

The scheme below offers my view on how I see the mentioned positions inevitably linked. By consciously reflecting on this hierarchy, planning partners can clarify their own position as well as that of their partners, to facilitate fruitful cooperation amongst them.

This scheme is based on the notion that people taking initiatives often start with a holistic notion of their objectives (see the upper left). These objectives are as such invisible for the outer eye, yet clearly visual as an idea or concept in peoples' minds. On the other hand, starting from the lower right with the empirical data, they are clearly visible, touchable, concrete, measurable, countable and thus experienced as ultimately reliable.

However, the relevance of the data is not intrinsic in those data themselves. Their relevance depends on what they mean to each of those involved in their application, in the objectives set by those who apply these facts and figures to reach their goals.

Interestingly, a critical screening of leading people involved in management, land-use and agriculture can nicely show how both sides and their intermediates have their roles in linking theory to practice and vice versa. On [Figure 2](#) it looks like this:

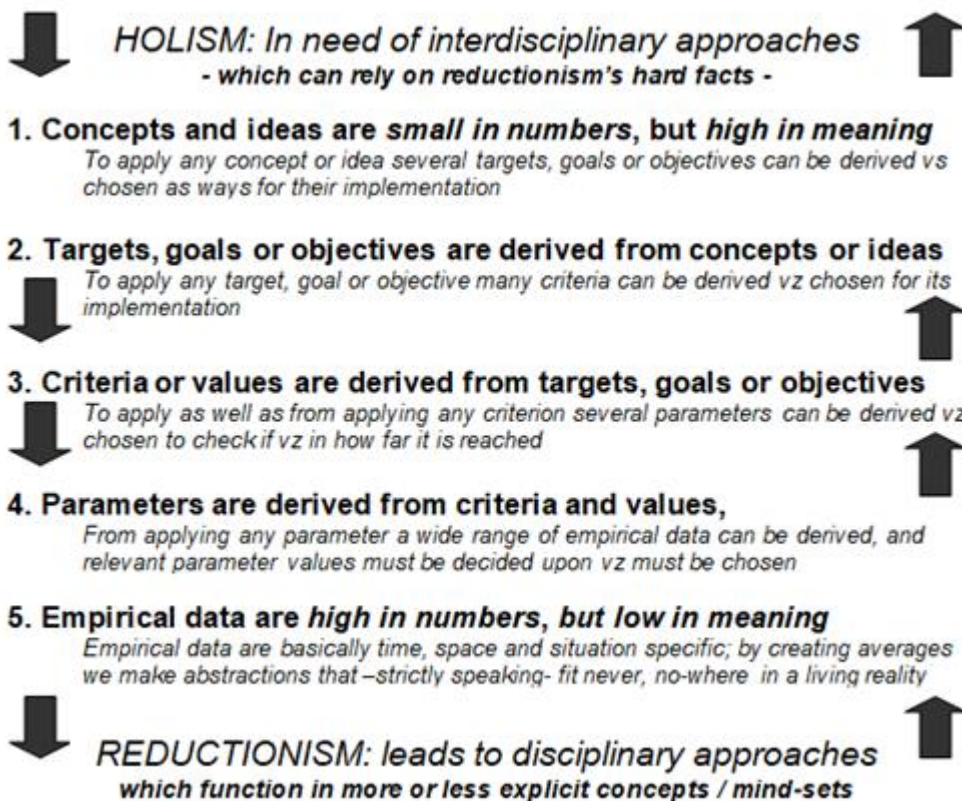


Fig. 2. Steps relating reductionism and holism

Starting with 5: when empirical data are presented in any discussion or publication, it is important to be quite clear: 4. what parameter they refer to, and then which criteria (3.) are chosen to be represented by that parameter (what does that parameter stand for), and 2. what values are represented by the criteria used and, finally, 1. what objectives are to be served by the criteria as chosen.

If you talk about hard facts such as inhabitants per surface unit, about production per labour unit or per large cattle unit, or about crop varieties' production or pests' resistance, you immediately can see the point of the crucial importance of figures. At the same time you are aware of their relative prediction value, as they are average figures, derived from various locations and times. The figures as such can be hard, but their meaning for the future of your investment (time, money) is less hard, or even useless. Seeing facts in their relevant – broader – context c.q. on a

meta-level, is crucial for understanding of the object under research, and fruitful for the applications of that knowledge, minimising failures.

If you talk about nitrate per cubic meter of soil or water, about ammonia per cubic meter of air: the circumstantial conditions, including the actors' objectives on the one hand and the sampling-method on the other hand, make or brake the meaning of the figure. For figures on varieties' productivity or on bio-diversity it is the same story: where and how did you measure what type of crop, on what soil, in what season? The figure is of no real meaning for any specific location without sufficient knowledge of the places' past and future: its history and its perspectives in the eye of the researcher viz. the manager who ordered the research.

This is not to say that any of them would be basically misleading! Just being professionally biased, as any expert almost inevitably is, gives all fact-findings its particular colour, trend, perspective or how you name it.

Regarding perspectives of Russian Agriculture and Plant Breeding for the next decades, the contribution of various specialists is needed to cover its different dimensions and aspects: in depths as well as width, regionally as well as national, in international perspective. Here policy and science should discuss with industry, based on a common vision of agriculture's position in society at large, with respect for consumer's and the agro-landscape's health as a reference.

As for plant breeding in particular: contributing to consumers' and ecosystems' health seems of utmost importance: today as well as for the next decades.

In such a mixed group of planning experts it is important that the chair person makes sure those present do move full consciously from one down to five as a start and then from five up to one (see the above scheme). In my opinion, over and again going down-and-up, up-and-down in the above scheme, is an itinerary process that should be organised to go on during all research and evaluation in agriculture and land management. In this process that meets the demands of the initiative do stepwise, per round, become more and more clear as do the possible contributions that the experts can deliver.

How to position the conflicting interests of the different disciplines

In discussions as advocated here, regarding for example agricultural research, planning and management, quite often the problem is how to position economic interests compared with those of environment, or how to place nature conservation relative to regional development, or how to appreciate aesthetics with ethics and both related to the company's efficiency.

More or less metaphorically we can compare that question with this one: how to balance the key wants & needs for human survival in ourselves: the needs for physical survival, for socio-economical survival and for ethical survival (somewhat like food, money, status and religion).

A 2nd millennium industry management instrument to set a balance is the well know triplet: People, Planet and Profit (Elkington, 1999). This instrument is based on the idea that three key issues: > human well-being, > sustainable management of nature and > profitability of the industry, should all be taken into account and then well balanced. When all three give in a bit of their one-sided expert ideals, then everyone can be happy. Thus says a simplified version of the PPP policy.

Critics of the PPP say that, first of all, each of the three P's has a wide range of meanings, which should be clarified in sessions such as for example those recommended in the five-step-scheme mentioned above. Imagine that you see a) *the environment* as sufficiently served when sticking to today's national rulings of you country, versus b) the perception of *the environment* as being the producer of healthy air for breathing and water ready for human daily consumption (quantity & quality). And going for b): what do you mean with healthy air and water? What diseased do you want to take into account? How long should people be healthy? And: which susceptible groups of consumers are included in - or excluded from - the sample? Is the sample representing the average inhabitant of that area or city, or is the sample's health-level adapted to society's vulnerable groups in particular? I guess you can make a similar exercise thinking on what is meant with Profit. So for example: who's profit, in what percentage of the turnover, and on what time scale do you think about? And then, regarding People, it makes a huge difference in planning and management if you see people in a Darwinian way, genetically programmed to fight each other to make the fittest survive and thus improve the human race over many centuries of time, ór that you see yourself as a basically social being, living to serve and enjoy the presence of the other

people. But if so, then the question still is: how to serve one another, and how to enjoy. How to handle (un)equality? What are your perceptions of education's potentiality and people's career perspectives?

In my opinion the 3P's are a way to make people in industry start to consider the balance between man, environment and society. They are a simplified and distorted version of Maslow's 20th century model (Maslow, 1943).

Maslow developed an earlier, more challenging and humane view on the balance between human needs. He refers to human motivation, in a still quite valid and useful concept, which I will present here in a somewhat adapted version. He argued that humans' acts are driven by their motivations. His second idea was not to limit himself to the average human (a mathematical construct) but to include such people in his study society really appreciates, people that set a role model for their culture. Because such models are that what most people say and show to strive for during their lives. So he measured people not on what they lived for in the average, but on what they strived for to do as humans.

From that research Maslow found out that we as humans have roughly three levels of motivation: physical survival, social survival and psychological development. He differentiated the physical survival into water for drinking and food to eat as the most basic motivation. In times of disaster all people's energy is dedicated to staying alive as a living body. Vice versa, when people hate to live, a known policy is that they start starving themselves to death.

The second sub-motivation for physical survival is having shelter of some kind against cold, rain, heat, sun and other dangerous exposure to the environment. The moment the hungry person finds some food, he or she returns to the shelter, to eat and/or feed those dependent on their food finding.

On the level of social survival Maslow differentiates between having a position in society and getting appreciation for your contribution to society from the position you are in. 'Being seen' is a most basic form of appreciation. Having a family fits in here as well. Decoration with awards, being mentioned in papers, climbing the ladder in the firm and/or increase in salary: these are additional ways to express and experience appreciation of your social setting.

But then Maslow noticed that neither salary, position, political appreciation, housing, and the like, make humans completely happy on the long run. Only the feeling that they do realise their true inner being, that they manage to develop their inner potential, makes people really feel good on the long run. It is this potential inner-being that wakes people up, in the night, on a long walk or on an unforeseen moment, asking them: was this the life you were born for? Irrational as it may sound, when such a call for the essential had been implemented by a compatible change of job, position or way of life, people report to feel reborn, finally happy on their track to ongoing development. Learning as a way of life, realising their unknown self.

Now Maslow points to an interesting feature of human motivation. He points out that quite easily a failure to reach a next step in a way that meets the person's own ambition, is to compensate that failure by satisfying one of the more primary levels of motivation. Eating and or drinking away any failure in society is not an unknown phenomenon. But also job-addiction (working harder and harder), a car addiction (more and more expensive cars), a house addiction (more and larger houses in richer neighbourhoods), and social status addiction (number of employees, financial turnover and profit): on all levels the status quo blocks the ongoing development. And, at the same time, a hampering inner growth, transitions included, feeds the tendency to have more of the known instead of some of the unknown.

To make all this relevant for management in plant breeding, agriculture, landscape planning and research, I propose the hypothesis that not only plants and animals, but also farm fields, farms and landscapes can be seen as complex vital systems. Somewhat like living organisms. Each on their particular scale and stage of development.

On all such levels, they have a physical base, a developmental history (a kind of biography, relevant to the scale), a social structure and a position in the surrounding next larger system, up to the regional landscape. They also have an identity that makes them unique on their particular scale, yet they always also figure in some kind of socio-ecological setting on the next scale.

In that structured system of the landscape organism, humans as well as nature play their role, figuring as the material base and the changing agent respectively. Or, in other words, as the sculptor and as the material which that artist is using to express his or her ideas and thus, at the

same time, expressing him or herself. Farms have an identity, rivers and mountains have an identity, estates, forests, meadows, bays and lakes: they all have their physical features, their history, their ecosystem and character as expressions of that identity.

Regarding Maslow's human triangle, it can 'mutatis mutandis' also be translated to groups of humans, teams, firms, societies and nations (Figure 3).

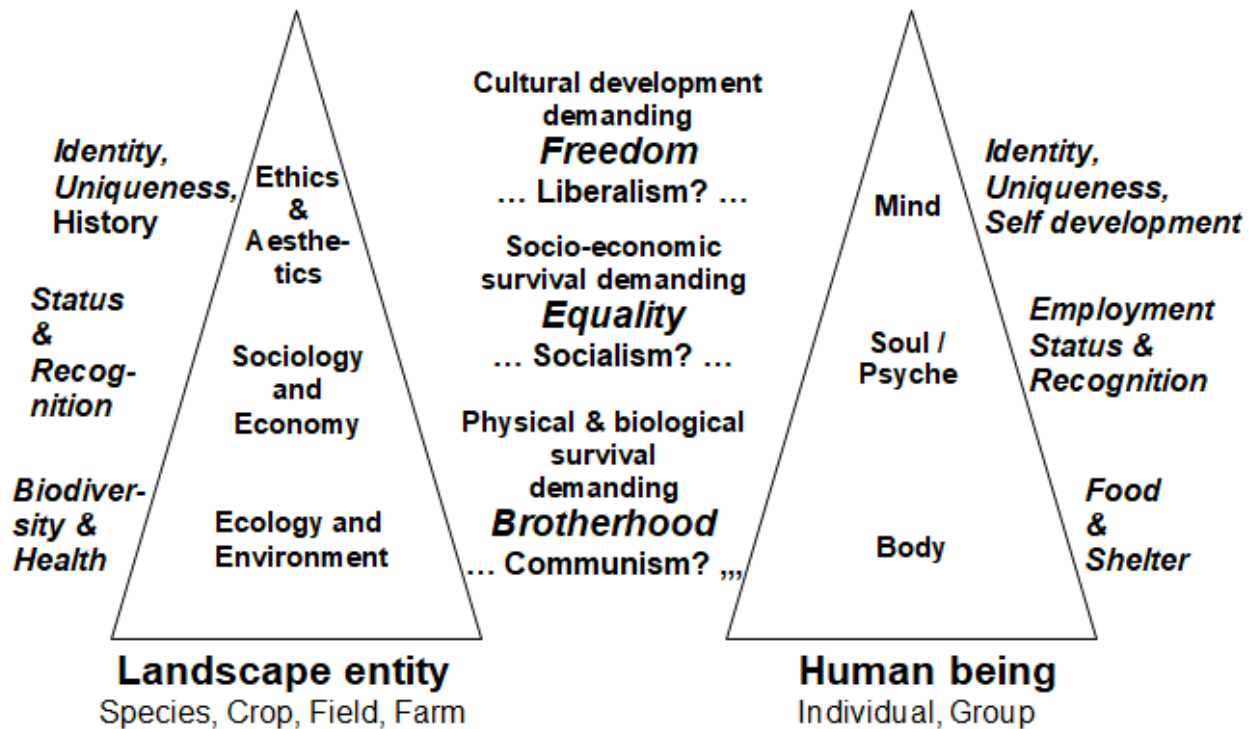


Fig. 3. Maslow adapted by the author. Links between People's and (Farm) Landscape's organisms

As you will see, I have added three well known value-systems – Freedom, Equality and Brotherhood – in this scheme. Each fitting the most appropriate position in the hierarchy, referring to the different qualities relevant in each of them. These key values stem from the French Revolution and elaborated during the past century in the so-called movement for Social Three-folding.

To illustrate the relevance of presenting the three value systems in their optimal syntheses, I add a few words on their tendencies when separated from one another and/ or put in rigorous competition.

As for crop species and varieties, they also function on each of those levels with their anatomy, physiology and ecology on the body level, their socio-economic value on the market on the psychological level but also on the level of unique identity.

How different disciplines' subgroup-interests may trigger conflict and biases

When the hard facts-and-figures are believed to be the world's one and only essence, a radical materialism emerges. Some call the extreme of this position autistic: no serious communication is possible as man's egocentric genes and nerve systems decide all. In this worldview individual responsibility is a chimera. The natural sciences' paradigm tends to support this position. Unlimited measuring and calculating absorb people's energy for ever. Everyone has to fight everyone else in order to survive (Hobbes, 1620; Darwin, 1872; Huxley, 1932; Dawkins, 1976).

When on the other hand people choose to believe that spiritual goals and value systems are the ultimate essence of life on earth, the question is who has access to what man's goals and ultimate values really are. Here cultural sects and dictatorship lie on wait. Some would call this tendency hysteric, in contrast to the before mentioned autism. The knower with access to the unknown, invisible essence he and nobody else is aware of will inevitably be made into a kind of

higher being by those admiring him or her. Here the cultural sciences' paradigm tends to paralyse people's individual responsibility by subordinating them.

When economy is perceived as internalising profits by externalising costs, the opportunism of social and political power is luring. References to facts and ideas are made instrumental to increasing wealth and power for few, disregarding their intrinsic values for all. Here Orwell's 'Animal Farm's line "all animals are equal but some animals are more equal than other animals" nicely fits. Leadership on all scales can be reviewed along this line of consideration.

A conscious awareness of how the natural, social and cultural sciences are basically complementary, having their roots in the human being as a whole, allows for optimal cooperation of the three in favour of a fair & sustainable development worldwide.

Within each of the larger science realms also the sub disciplines may be used to compete for recognition, influence, money, jobs etc. In plant production for example, soil science, fertilisation science, pest management, hydrology, plant breeding and mechanisation may fight for the 'most important' effect on the harvest: quantity and or quality. As said before, making one's expertise instrumental to cooperation for a commonly recognised goal facilitates optimal teamwork.

Applying Mansvelt's adapted Maslow triangle to land management

From hereon I'll elaborate what the Maslow (Maslow 1943) approach, when applied to land management (agriculture and environment in their socio-cultural settings) could mean in practice. This chapter more directly leans on van Mansvelt & van der Lubbe's (1999) book 'Checklist for sustainable landscape management'. For this MOVIR conference, I try to specify the relevance for its plant breeding strategies in the context of Russian Agriculture.

The Natural Science's Realm

I therein start with the respect for the site specific natural qualities, conditions and potentials. Environmental pollution and ecological degradation are here the main concerns. Improvement of the lively hood and the soil's production capacity is here the challenge.

1. Regarding the Environment the main criterion is its cleanness, meaning its long time availability for man and nature. They should be kept in or be returned to their status of being the clean basic material for life on earth.

Regarding Russian agriculture, the challenge is to revitalise the degraded (polluted, desertified and mineralised) lands all over the country, aiming at the restoration of lost soil fertility.

For plant breeding this could mean that – besides breeding for highest production under optimal conditions - also lines should be (re)developed that do well under poor conditions. Here such features as deep rooting, minimal nutrients requirement, drought resistance and the like are crucial, especially for grains and beans.

Generally speaking soils are the products of life processes in the recent or far-away past (flora and fauna in ecosystems of all dimensions interacting with weather/climate conditions and human management). Sustainable agriculture in general (organic/biodynamic agriculture in particular) relies on building the land (Land-bau, in German language). But also catching rains and buffering water, braking winds and making shadow are environmental functions of land management. As well the catching and storage of chemicals such as nitrogen (nitrates), carbon dioxide, and various minerals.

Thus land management in general, including forestry, wetlands and dry-lands, can be perceived and handled as a tool for a sustainable development. Making sure that next generations have water, food and shelter as needed.

In the same way (unpolluted) bio-topes inside the eco-topes should be managed in ways that allows for sustainable development.

The main target of a clean environment (a-biotic) can be defined as: the long term availability of resources, allowing for human and rural well being in a sustainable managed biosphere. In our view the ongoing development is an intrinsic part of well being.

1.1. For a fertile and resilient soil the target may be: prevention of soil degradation (pollution and loss of structure) and soil erosion; incentives for long term soil fertility improvement in rural or agro-sylvi-pastoral production regions. Soil structure and fertility are the key issues of

sustainable land-use. However, a minimal amount of natural erosion of the mineral soil is an intrinsic and appreciable aspect of the nutrient recycling within the biosphere. The natural erosion of the mineral underground, caused by natural weathering together with plant-root and edaphic activities, underlies the biosphere development per se.

Some parameters for a fertile and resilient soil are:

- Minimal soil pollution (heavy metals, pesticides etc.);
- Manure quality (C/N ratio);
- Stocking rate (SR) matching the soil and the carrying capacity of the system;
- Anti-erosive belts and contour tillage;
- Soil cover (winter or off-season);
- Crop rotation and crop mixture;
- Soil structure and organic matter content.

For Russia's degraded lands the challenge is to (re)build a fertile soil starting from the more or less degraded situation. In nature conservation areas at first a pioneer vegetation (ecosystem) should get established which then gradually should develop a humus' soil with its increasing resilience and fertility. Here the soil building policy must find a balance between focussing on a kind of sandy hydro cultures and the focus on long term soil building strategies.

The establishment of minimum external input systems of mixed (crops & husbandry) production seems quite sustainable, as many reports on organic agriculture clearly show. The exact implementation demands expertise on the regional potentials for specific plant and animal species (varieties), stocking rates and crop rotations. The regional species' appropriateness to be elaborated and improved with the expertise of MOVIR and the overall Vavilov Institute of Plant Industry.

1.2. For a clean and healthy fresh water (groundwater and surface water) the target may be: prevention of water pollution and water depletion, incentives for the long-time conservation of drinking water quality and water reserve volumes in the relevant rural or agro-sylvi-pastoral regions. However, most water pollution has its source in flow emissions from polluted soils. In addition, wastewater effluents must be carefully considered.

Some parameters for clean and healthy water are:

- Cattle units per hectare (enough to fertilise the soil; minimal competition with human food production);
- Level and time of manuring (quantity per hectare per year);
- Waste water treatment;
- Bookkeeping of minerals and additives;
- Bookkeeping of other potential pollutants;
- Water use and management.

For Russia's degraded lands good stewardship is crucial. The production of healthy drinking water, good for fish, crawfish etc., should be set as a firm condition for agricultural production. Regional species' appropriateness to be elaborated and improved with the expertise of MOVIR and the overall Vavilov Institute of Plant Industry.

Most probably drought resistance and salinity resilience are crucial selection features for agriculture's future.

1.3. For a clean, fresh and healthy air in the countryside the target may be: prevention of bad smell emissions and volatile emissions of pesticides and residues, which affect human beings and the ecosystem. But also wind-control to prevent damage to soils, crops and livestock must be considered. However, much air pollution is generated from soil-emissions, manure or slurry, and surface water emissions like volatilisation. But also direct emissions from pesticide sprayings and husbandry housing are sources of air pollution. However, a certain *intrinsic emission* from animals like breathing and flatulency and also their excretions of urine and manure should not be regarded as unnatural, but appreciated in the context of ecological nutrient recycling. By limiting the number of cattle units per – well sheltered – surface unit, a natural ecosystem buff can be warranted. See also for the stocking rate matching the soil and carrying capacity of the system, the anti-erosive belts and contour tillage.

Some parameters for air quality are:

- Ammonia and other emissions;
- Wind-shelter belts's presence;
- Presence of lichens and other vulnerable species (bees, butterflies).

For Russia's degraded lands minimising wind erosion, creating shadow for livestock and warranting cover crops for soil protection seem to be key issues. Optimal use of straw and other natural sources of celluloses prevents NH₃, N₂O & CH₄ losses (air pollution) from liquid manure. Optimal use of roughage in feed minimises N losses from livestock.

As you all are aware, Yeltsin signed in 1991 Russia's first comprehensive environmental law, On Environmental Protection. Modelled after a similar Soviet law, it made many general statements about the environmental rights of citizens without setting any specific goals. The law also defined numerous environmental functions for every level of government as well as for citizens and nongovernmental organizations, and it specified environmental regulation of every aspect of society, from health resorts to electromagnetic radiation. The sheer inclusiveness of such provisions made practical enforcement impossible.

The Commission on Ecological Security went into operation in 1993 under the Security Council: with great fanfare but little funding. Its assignment was assessing the most serious environmental problems as they endanger national security.

It seems an interesting option to show regional and national policy how

the expertise of MOVIR et. al. can contribute to environmental protection by breeding specific lines for ecologically sound / organic and soil recovery purposes.

2. Regarding the ecosystem management, three main targets can be distinguished:

Bio-diversity 2.1.

Ecological coherence 2.2.

Animal welfare 2.3.

2.1. As for bio-diversity the main target may be to safeguard a sustainable development of the regional landscape biosphere diversity, within the context of a well-structured and well-cultivated regional and supra-regional network of ecosystems. Therein, the biosphere network of ecosystems has a number of functions towards the a-biotic environment, which it supports and depends on, like soil, water and air. It has also has a number of functions towards the human society, which it supports and depends on, like the socio-economic and cultural environment.

Species' diversity, bio-tope diversity, ecosystems diversity are aspects of bio-diversity. They cover plant as well as animal species: macro, meso and micro.

Some parameters to be used here are:

- Species diversity per bio-type and bio-tope;
- Targeted Plant Species Diversity (TPSD), Target Trees Index (TTI) and Target Shrubs Index (TSI);
- Plant Species Diversity (PSD) and Plant Species Distributions (PSDN);
- Minimum standards for bio-topes per farm type;
- Minimum standards for types, numbers and size of ecosystems per landscape and region;
- Multifunctional landscape management;
- Regional specifications on presence (quality) and abundance (quantity).

For Russia's degraded lands situation of today is diverse. There is a East – West gradient as well as the N-S gradient, with mountainous and lowland areas therein.

Regionally appropriate biotope variation in time and space is important, on scales relevant for optimal biodiversity, to balance seasonal climate effects and pest occurrence in the crop as well as in the herb, fruit and livestock production. Organic agriculture and Biodynamic agriculture are established all over the world as applied – food productive! - biodiversity. Thus soil life, aquatic life and airborne life are to be included here in the objectives of agriculture. Worms, ants and bees (wax & honey), for example, included.

For MOVIR et al this could mean the establishment of cooperation with honey bee conservation and breeding institutes, national as well as regional, as their common interest is so obvious.

2.2. As for Ecological coherence, it should be seen as complementary to the mentioned diversity of species, bio-topes and landscapes, as it implies that diversity is found within a unifying context. If not, unnatural sites like zoos, botanical gardens and mega cities would be the ultimate examples of successful bio-diversity management. However, diversity as a criterion for sustainability of landscapes, refers to an ecologically coherent diversity. Compliant to the before mentioned targets, the idea is that each species can only figure and function within an eco-system of other flora and fauna species. Such a system relies on and also contributes to the common environment of different species. Now it should be noted that technically, crops and animals can be kept or produced in “hors sol” and “off-season” conditions by supplying them with an artificial environment including nutrients and waste-management. However, such an artificial environment does not produce a sustainable ecosystem nor the appreciated landscape that our urbanising society increasingly demands. In order to warrant the sustainable management of the (agro-) landscape, a keen awareness of the various connections and links of species and bio-topes with one another and their environments must be generated or at least encouraged.

Some parameters to be used here are:

- Site specific indicator species;
- Site specific habitats and ecosystems;
- Species coherence;
- Habitat and eco-system coherence;
- Full lifecycles of species and systems;
- Seasons compliant management: availability of nectar for ‘flower-insects’;
- Seasons compliant management: timely differentiated hedge and woodland management;
- Seasons compliant management: timely management of water-bodies;
- Seasons compliant management, timely optimised management of permanent pastures;
- specifications on presence (quality) and abundance (quantity).

For Russia’s degraded lands situation of today is diverse. There is a East – West gradient as well as the N-S gradient, with mountainous and lowland areas therein.

Regionally appropriate biotope variation in time and space is important, on scales relevant for optimal biodiversity, to balance seasonal climate effects and pest occurrence in the crop as well as in the herb, fruit and livestock production. Organic agriculture and Biodynamic agriculture are established all over the world as applied – food productive! - biodiversity. Thus soil life, aquatic life and airborne life are to be included here in the objectives of agriculture. Worms, ants and bees (wax & honey), for example, included.

For MOVIR et al this could mean the establishment of cooperation with honey bee conservation and breeding institutes, national as well as regional, as their common interest is so obvious.

2.3. As for animal welfare conditions, the target is to respect their species’ intrinsic behaviour’s demands. In view of sustainable landscape management, or in other words, the landscape’s welfare, the most important aspects for husbandry are:

- Cattle and husbandry should fit and respect the carrying capacity of the regional ecosystem (see environment);
- Cattle and husbandry should be instrumental to the landscape management. Intensive, ‘hors-sol’ and outdoor livestock production systems do not fit into this concept.

However, at the moment, society may largely prefer other concepts and priorities, such as cheap meat and high returns on investments. Examples of landscape management with livestock are dairy farms in the mountains of Switzerland, Austria, and Norway and nature conservation areas with sheep and ‘wild’ horses or ruminants. Obviously, these parameters are to be specified, per species and per region, with local experts.

Some parameters for animal welfare conditions are:

- Space for natural behaviour (that is: living in a sufficiently species specific merger of free-range & appropriate housing);
- Shelter against adverse weather in the free-range conditions;
- Preventive health care (to come away from sickening livestock conditions covered by cyclical or even permanent medication).

For Russia's degraded lands the challenge is to make crop production and animal husbandry in their widest sense instrumental to the creation of locally adapted, coherent and bio-diverse agro productive ecosystems. They are to provide for a fertile soil (manure) as well as grains, greens, meat and dairy products for human consumption. The use of roughage and crop residues not fit for human consumption is included in this function. Relaxed lives for animals – free range husbandry - surely makes the food they produce less stressful for the consumer than meat, eggs and dairy from intensive animal production systems (battery breeding).

Here it becomes clear that for MOVIR et al, not only the requirements for human nutrition are at stake, but also those of the performance of specie's breeding lines performance as roughage for animal production and manure.

3. The social sciences realm: economy and sociology

In the development of sustainable agro-sylvi-pastoral (rural) landscapes, norms, attitudes and processes of the socio-economic sphere are crucial. All decisions made by whoever are based on some kind of prioritising: in whatever group(s) in charge for whatever part of the landscape: its people and industries. Although the agro-landscape is usually seen as an object of either natural ('hard'/quantifiable) or anthropological ('soft'/arguing) sciences, underlying all decisions that earlier or later sort visible effects, deliberations on values, feasibility, profits, and interests have been weighed and traded out in some sort of transparency (see scheme 2). People take decisions on all kind of aspects with all kinds of arguments and these decisions take place within social structures.

In the end, these decisions are reflected in the biosphere, agricultural production and quality of the people's nutrition. Decisions within and on plant breeding fully fit within the before said.

Here, the social realm, representing the qualities of the social environment, has been subdivided into economy (goods, money and services) and sociology (power and access to responsibility for decision-making) see schemes 2 and 3. The argument to start here with economy is that it focuses more on quantifiable issues/parameters than sociology.

The economic and social criteria represent the trade-out area between the human (and society's) physical survival and its ethical survival (individual development). That trade out area can also referred to as between the human and the humane.

Here way people and societies decide to spend their money and to participate in socio-political activities is at stake. It reflects their empathic coherence with the sources of the purchased product or service and or the ideals pursued in the political or other social actions they support.

From this point of view, buying (all purchases) and political decision-making are both phenomena of implemented *sympathy* or *antipathy*, or in other words phenomena of implemented *engagement* or *alienation*. This can be found clearly reflected in the original market status, where the acts of meeting (socialising) were at least as important as those of the trading (economising), with the bargaining as an expression of the quality of that personal meeting.

Although it is now widely perceived that these days most decisions are made on economic grounds, the identity of actual beneficiaries of those economic considerations may not be always very clear to the public. For example, few actors are fully aware that economic "laws" are the reflections of historical and regional habits, attitudes and the appreciation of societies. Theoretically they are open for modification by societies: if they want to.

For example, perceiving the farmer's income as necessarily based on the sales of their food, feed and fibre production, and the landscape as an issue of public services, is a socio-political choice with considerable impact. On the other hand, perceiving farmers as the major managers of landscape's ecosystems and the environment, with the food and fibre production as main products but landscape as an inseparable side product to be fairly remunerated, is another one view. Moreover. calculations on the economic effects of such decisions fully depend on the factors included in the calculations as well as on the number of factors which are kept fixed ("business as usual") versus factors allowed to be changed in compliance with the new policy to be proposed. The political dilemma on all relevant levels – firms' management policy as well as political policy – is to generate sufficient changes to reach the targets as they have been set without, however, changing too much of vested interests' positions and prospective. Opting for win-win solutions, to be reached within an acceptable time-span, seems the only way-out. This means here that the challenge is to make ecosystems as well as cultural systems gain a benefit from all socio-economic actions (Daly, 1996; Daly, Cobb, 1994; Appendix).

The importance of parameters as presented below, soft or hard as they may be, is that they facilitate more a clear and conscious decision making. Here we presume that the more trade-offs are known, the less surprises or unforeseen side effects will occur on the medium or long run.

In this study, equity in the sharing of the earth's limited resources and inter-human equality in the participation to decision-making – with compliant sharing of the responsibility – are seen as the leading objectives in the social science realm at large.

For society as a whole, the process of specialisation and spatial concentration has led to an enormous increase of production and consumption volumes, together with increased flows of goods (transport), services and finances. In the rich countries this led to overproduction and over-consumption, in particular of energy and animal proteins. It also went along with increasing power and wealth for less and less leading (upper class) people, and increasing dependency of increasing numbers of others: middle class people and poor.

In the biosphere realm it led to an increased waste of resources and an increased production of refuse. It also led to the removal of wildlife habitat, ecosystems degradation, decreasing species diversity and landscape features. All these changes led to a painfully perceived reduction in environmental quality and the loss of rural area's multiple values for other than industrial, urban or traffic uses.

To overcome the negative (side) effects of this development, a well-balanced coherence between society's vested and future interests seems an objective worth striving for. This statement holds for society's industry as a whole, as well as for agriculture (food production and landscape management) as one of industry's specific sectors. At the moment, agribusiness has a lot of power in the whole chain of food, feed and fibre production, ranging from farm (primary production) to household (final consumption). Global agribusiness at large still tends to demand for uniform standards: same units, same quality, and same product types (homogenisation and monocultures). Such a specialised economy tends to lose the benefits of diversity and so does a specialised agricultural sector wherein farmers get fully dependant on the demands of agribusiness (not necessarily consumers'). They restrict their farming to the production of large quantities of a limited number of products (raw materials for industrial upgrading). The contrast between fast food and slow food symbolically shows today's choice.

If private producers of valuable rural landscape do not receive any contribution to their costs of soil and landscape production, they will be reluctant or unwilling to invest in agro-landscape production or ecosystem's maintenance. The same holds for the challenge to make new wetlands or deserts productive for agriculture in an ecologically sustainable way.

Societies that tend to consume their soils, spoiling them, will sooner or later face bankruptcy as they will be unable to feed their people. Paying for their food with money earned from whatever mineral mining (oil, metals etc.) is on the long run not compliant with sustainable development's demands, as those minerals are fundamentally limited. Soil building societies will live as long as photosynthesis is cultivated in an ecologically sound and safe way. For economists and sociologists an crucial notion to apply their expertises in a responsible, ethically sound way.

Here another aspect of Russia's identity, its political history as well as its perspectives for the future generations, is at stake. The challenge as I see it is to elaborate a strategy to include ecology in the economy or, in other words, root the economy back into the regional, national and ultimately into the global ecology. Therefore, leadership explicitly dedicated to sustainable development is badly needed on all levels. This includes leadership with a proven capacity to formulate, coach and implement appropriate policies for all relevant ministries, to make them cooperate instead of compete. Cooperation with NGO's for fair sharing of the earth's limited resources seems efficient.

As for MOVIR et. al. in the context of sustainable development, the challenge as I see it is to find and establish new socio-economic partners along the food, feed and fibre chain as well as along the chain of landscape management and biosphere production. Thereby, tuning in into the various Russian regions' particular opportunities and demands, seems to open new doors that add to those of centralised institutions. Breeding lines that perform excellent in specific regions may be much more promising than such that perform medium well in many. However, the latter are more interesting for centralised breeders, as they can sell larger volumes. The more environmental & biodiversity performance is included in the profit calculations, the more a shift to regional production will be recognised as a sustainable development.

3.1. Regarding the management of the agro-landscape's economic system, three main issues can be distinguished:

- Good farming should pay-off: 3.1.1.
- Greening the economy: 3.1.2.
- Regional autonomy: 3.1.3.

3.1.1. Good farming paying-off means that farmers' subsistence and thus farming systems' subsistence should be warranted. Therefore, good farming should pay-off, to make sure that the good farmers remain in or move to the rural areas in need of good agro-landscape management. As said before: farming is good for the food and landscape quality only when soil and landscape are included as such in farming's objectives. This obviously makes all farming multi-functional. Chapters 1. and 2. provide for the criteria of good farming as meant in this paper!

Some parameters to be used here are for example:

- Total net farm income;
- Total farm family income;
- Return on labour;
- Farm's market orientation;
- Financial autonomy.

For Russia's agricultural future, key issues are regional self sufficiency for food and fibres on a level of human basic needs for a healthy development. As energy prices boom, transport and processing together with exports and imports get increasingly expensive. When transport, storage and processing prices (waste product management included), are fully internalised in the food prices, a sustainable balance between exotic and rural food consumption will get established before too long. Moreover, regional production gives incentives to capacity building (appreciation, recognition), which again contribute to social welfare in the regions.

Accordingly, MOVIR et al would be encouraged to follow a regionalising policy.

Examples of on-farm multi-activities that increase the added value and farm income are:

Production of high quality products such as regional products, ecological and bio-dynamic products.

For Russia's wide range of particular regions - river basins, mountainous areas, plains – as well as historic ones, product diversification is definitely an option.

Creation of appropriate jobs and living conditions in the rural area.

For Russia's degraded lands this seems an option worth considering. Over urbanisation de-roots society. Land-flight leads to slums for jobless people with all the related problems such as increased criminality. Nowadays, with electronic connectivity spreading the country, (part-time) working in the urban fringe may well be an option for a reappraisal of the countryside life's Dascha culture.

Decentralising part of MOVIR as mentioned contributes to regional job creation.

Management and production of nature and landscape.

For Russia, in view of its enormous low populated areas, not so much the landscape's aesthetics as the landscape's environmental production seems an issue here. Fresh air and clean water for drinking, together with non-eroding soils (humus building) can be recognised as important for the urban population's food, fibre and climate production.

Agro-tourism, health farming, recreation.

Together with the before said, this will become increasingly important as a by-product of (agricultural and forestry) land management. Far away from urban stress and the presence of well cultivated biotopes (dry, semi wet and wet) can be cultivated compliant to each regions' particular character in various degrees of management intensity.

Farms facilitating care-tasks for people who need professional care (mentally handicapped, psychologically disturbed, burnt-outs, rehabilitation of criminals etc.).

For Russia this is a serious option for upgrading life on the land indeed. Training people to work with the mentioned client groups (agriculture and crafts) could be an additional goal for the people living on the land. In addition to the traditional 'Kurorts', Sanatoria and the like. Here good contacts with Russia's health & care organisations (governmental as well as non-governmental) is needed. In many European countries successful mergers between respectful (!) care for mentally disabled people and medium scale agricultural production have been

developed. Fair recognition for their reliable craftsmanship and serious motivation contributes to their social self acceptance which again stimulates their performances. This is especially the case in communities with mixed clientele (different diagnoses).

3.1.2. ‘Greening’ the economy means an approach focusing on fysiocracy or in other words: including the ecosystem into the economy. This means that costs which today are largely not calculated, because they are regarded as external costs, are to be internalised in the calculation of the benefits. That is: they are incorporated in the production costs and thus in decision making of producers and consumers. This then is instrumental in adjusting society’s behaviour away from today’s ‘eating the earth out’ policy towards a sustainable mix of production and consumption. Thereto economic calculations at farm level and at regional level should include environmental costs and benefits. Although our society is nowadays perceived as highly economised, not all external benefits from multiple land use are yet included into the neo-classical, mercantilist, (semi-) capitalist economy prevalent in “western” society. As this approach to economy is oriented toward externalisation of production costs for the private entrepreneur as well as for each government, internalisation of environmental and social costs does not come easy. Studies like Herman Daly’s ‘Limits to growth’ (Daly 1986) and ‘Beyond growth’ (Daly 1996) treated the issue already quite clearly in the ’90’s, focusing on the concepts of economy. Key notion is to distinguish physical growth from technological and cultural development. Growth relying on the earth’s limited resources, development relying on the unlimited possibilities of intellectual and spiritual capacities.

More recently Nicky Chambers, Craig Simmons and Mathis Wackernagel (2000) published ‘Sharing Nature’s Interest: Ecological Footprints as an Indicator for Sustainability’. And somewhat parallel William McDonough en Michael Braungart (2007) developed the so called ‘cradle to cradle’ policy (C2C) which fully complies to greening the economy. They phrased their policy for industrial development ‘Design for Reincarnation’, meaning that all materials used should be re-usable after their primary use (remnants ready for reuse). They argue that what we call ‘waste’ is basically a lack of thinking seriously.

Parameters to be used here are for example:

- Dependency on non-renewable inputs;
- Share of non-renewable inputs in total costs;
- Share of re-used on-farm production value in total costs;
- Costs-benefits ratio of investments in agro-landscape, environment and nature.

For Russia – large and resource-rich country as it is – there is a wide range of opportunities to contribute to a truly sustainable development of its agriculture for now and future generations. Re-cultivation of deserted lands will decrease future costs for society as a whole, though, in the non-sustainable way we calculate today, it means higher costs for agricultural production for the short time. As long as agriculture’s costs of human health, nature’s resources and environmental disasters are not calculated as costs, there will be no way to stop such abuses of the global ecosystem earth’s life depends on.

3.1.3. Regional autonomy means that the region’s own agriculture, fishery, and/or forestry provide for the rural region’s subsistence. Obviously, wherever possible, the region’s food and fibre surpluses can and should be used to serve neighbouring urban areas. Regional (rural) development policies can play an important role in favour of this regional autonomy. Today’s on-farm specialisation and the excessive urbanisation (to macro and mega-poles) have led to considerable alienation between the rural area’s farmers and the consumers. The latter expecting the farmers to produce fine landscapes and a clean & healthy environment, but only willing to pay for the cheapest foods as produced by agro-production systems that degrade precisely those much wanted ‘by’ products of their food’s production. Re-linking consumer’s awareness to the region’s farming units they’re eating from, which goes together with farmer’s awareness of the consumers that appreciate their products, definitely contributes to an increase of product quality: directly and indirectly.

Parameters for regional autonomy are for example:

- Transport distance per food unit;
- Resource efficiency and regional labour possibilities;

- Swaps from single commodity support to management system's support;
- Translation of the good farming and greening of the economy to the regional level;
- Market access for regional speciality produce (Slow Food policy).

For Russia the challenge is finding a balance between the income production based on export to the urban area's and the world's wealthy consumers on the one hand, and the own regions' relatively poor people on the other. As you all know, Russia holds the world's largest natural gas reserves, the second largest coal reserves, and the eighth largest oil reserves. Russia is also the world's largest exporter of natural gas, the second largest oil exporter and the third largest energy consumer. Energy export makes about 60 % of Russia's export revenues. But its energy production accounts for over 98 % of its CO₂ production is related to precisely that production because of outdated technology.

3.2. Regarding the socio-systems' management four main targets can be distinguished:

- Well-being in the area: 3.2.1.
- Permanent education of the rural community: 3.2.2.
- Access to participation: 3.2.3.
- Accessibility of the landscape: 3.2.4.

3.2.1. Well-being in the area focuses on the conditions allowing for ongoing acceptable life in the rural landscape: a pre-requisite for social reproduction of sustainable (agro-) landscape management. It is not only the farmer him/herself who is looking for sufficient well-being, but the farm family. Improvement of the well being counteracts rural degradation by increasing the social viability of the agro-landscapes. Serious perspectives for farmer's succession, warranting sufficient farm income and welfare services in the area are necessary social conditions. Here also land property and land-management structures from farm to regional level are crucial.

Some parameters to be used here are:

- Options for farmers' succession;
- Financial income for the rural community (tourism, local crafts, support services);
- Welfare services in the region (health, education, culture).

For Russia's non-urban regions both the regional people's nutrition and also their labour opportunity can be envisaged as an objective. The more people will be able to flourish in a region, the more such facilities as mentioned will pay off. Appropriate decentralisation is a wonderful tool to diminish the eco-terrorism of today's over-urbanised society. This is particularly the case as Russia still has more than half of its bio-capacity as yet as its eco-reserve (where The USA and the EU are more than 50 % in eco-deficit).

Short notice, history will look back at the kolkhoz and sovkhos period as a failed opportunity to establish a sustainable and socially fair land-use policy. We would now perhaps prefer to call them sustainable, land-based food and landscape production societies (cultures). With good electronic communication and fair public transport connections countrywide, many people will prefer life on the land over the stressful urban life (as they prefer slow food over fast food). At least so for a considerable period of their lives.

3.2.2. Permanent education of the community is a must to warrant sustainable agro production, land use and landscape management. Farmers and other community members should have several possibilities to start and go on developing their knowledge about issues such as ecological and bio-dynamic agriculture, landscape management, etc. On farm processing of regional products, in village development of rural crafts (Slow Food etc) are parts of that development. Here the people's opportunities for self-realisation, as mentioned by Maslow's theory, is at stake (Maslow, 1943).

Some parameters for permanent education of the rural community are:

- Available levels of education in the area (up 'til pre-high school; then high school and university in subsequently wider circles);
- Participation in study circles, training and courses relevant for sustainable landscape development, forestry and all crafts related to food and wood production.

For Russia's degraded lands this complies with the plea for de-urbanisation.

3.2.3. Access to participation. The aforementioned global landscape degradation in general is often seen as a result of alienation between the various rural stakeholders and the values of rural landscape. Only an increased awareness of the mutual interests and interdependence of farmers, the rural community, urban people, and government will facilitate possibilities to co-operate (empathic coherence). At the moment there seems to be a lack of information, knowledge, understanding, and awareness among those actors regarding their common interest. That common interest of farmers and local community can merge in win-win solutions: farmers are paid for landscape production, which is appreciated by the local community, including consumers (empathic coherence). Here is a possibility of the before mentioned cross-compliance. Access to participate in local community and in farm activities will increase responsibility among farmers as well as among local community for sustainable landscape management. There are various ways how these two way participation and involvement can take place, e.g. through the membership of in regional councils, farmers' organisations, co-operation with NGOs and consumer groups, professional and lay excursions, etc.

This main criterion is subdivided into the following sub-criteria:

- Farmers' involvement in activities outside their farms: 3.2.3.1
- Outsiders' involvement in farm activities: 3.2.3.2.

3.2.3.1. Farmers' involvement in activities outside their farms can take place at various levels, from colleagues to governmental level, and will increase farmers' and other members of the rural communities' awareness of sustainable landscape management. The question here is where and how farmers and other rural people have access to participate in activities that will increase their awareness and willingness to contribute to the landscape development?

Some Parameters for farmers' involvement in activities outside their farms are:

- Membership to farmer organisations and farmer groups;
- Working part-time in the region;
- Involvement in organising outlets for their particular products;
- Co-operation with NGOs involved in landscape development;
- Membership of regional councils;
- Access to professional expertise and support programmes;
- Access to participate in dissemination programs.

For Russia's degraded lands this complies with the earlier plea for de-urbanisation.

3.2.3.2. Outsiders' involvement in farm activities can take place at various levels, from colleagues to municipal or regional level, and will increase farmers' awareness and willingness on sustainable landscape management.

Some parameters for outsiders' involvement in farm activities:

- Access to participate in landscape management in co-operation with the farmer;
- Professional and layman excursions to the farm;
- Community supported/shared agriculture (CSA);
- Financial commitment to landscape programmes;
- Access given to farmers to buy/rent and manage lands owned by landscape and nature institutions in a commonly agreed sustainable, ecologically and socially sound way.

For Russia's degraded lands this complies with the before said plea for de-urbanisation. All relevant activities can be developed in dialogue with the regional workers, their family's and local leadership. Here a renaissance of dacha's and dacha farming could be at stake. For dacha's surrounding large farms, situated in their fringes, would allow a closer contact between both: farmers, villagers and urban people.

3.2.4. Public accessibility of the (agro-) landscape, this is crucial to let the rural community experience and appreciate the landscape as such. If farmers do participate in the decision making process and responsibility of the local community, then this local community wants to 'consume' what they are paying for. Accessibility of the landscape facilitates commitment of consumers to farming practices and landscape management. Farmers, like other professionals of any job, want and need appreciation for their products. But farmers are not always enthusiastic about public accessibility, because they feel as disturbance of their privacy or damage to fields and animals.

In former days, public access to “church-paths” (School paths) and “rights of way” were general accepted by farmers and the local community. Farmers that become initiative in participating trough excursions of consumers, NGO, etc. to their farms may reduce the threshold of resistance towards accessibility and will facilitate commitment of consumers to their farm practices and land use and landscape management.

Some parameters for the accessibility of the landscape may be:

- Excursions to and on the farm;
- Rights of way;
- Tracking roads crossing the countryside.

For Russia’s degraded lands this complies with my earlier plea for de-urbanisation. All is to be considered in the balance between over – exclusive fencing-out of all ‘others’ (not part of the party) and loss of identity by failing limitation of the socio-ecosystem’s use.

4. Human sciences and the (agro-) landscape: landscape psychology, physiognomy and identity

Here we come to the agro-landscape’s cultural sphere of history, architecture, anthropology, aesthetics and ethics. Therein we meet the land in its least material phenomena, in its most non-excludable and non-depleting use. Here it is the perceivable appearances of the earth’s surface, which result from the interaction between man and nature. At large, its colours, smells, structures and its picturesque qualities are open for public consumption with little threat of being worn down from that sensorial consumption.

All peoples’ histories are embedded in (combinations of) landscapes: the sea, the mountains, the desert, the steppe, the forest, the delta, the riverside, the small or the large towns cities and mega-poles. Landscape as seen as characteristic spatial arrangements of land-units. Therein the *characteristic arrangement* of the units (species, bio-topes, infrastructure, buildings) refer to an artistic, aesthetic notion, addressing the vision of the whole. It is that perception of the pictorial quality that makes the landscape into a landscape. The landscape as a whole delivers the context wherein the mentioned elements of the nature, which can be analysed by natural sciences and used for design by technical sciences, do figure. Those landscape elements of nature and culture must be discerned within and reduced from the landscape as a whole, before they can be analysed in one way or another. Therefore, it makes no sense to consider landscape as a static phenomenon that should definitely be conserved in a certain fixed state, and thus landscape and sustainable development fit nicely together.

In broad circles of European society and authority, restoration of the ecological quality of the landscape is seen as a step further in the cultural development. Organic, Biodynamic and Permaculture types of agriculture do play an important role in this restoration process, as they represent a feasible style of farming based in a concept of respect for and an attitude of co-operation with nature and the environment. Thus quite contrary to a large trend of modern agro-production’s eco-terrorism indeed. In general, the three before mentioned styles already provide a clearly richer type of landscape with more naturalness than non-organic (conventional) farming.

Amongst the landscape problems at stake, the following major categories of detrimental effects can be indicated:

1. Desertification or standardisation of the landscape, as its regional diversity decreases together with the vanishing of many natural landscape elements from the rural area (bio-topes of various sizes);
2. Fragmentation of the landscapes, especially in the neighbourhood of urban areas, took place as new infrastructure lines were recklessly forced upon the existing ones;
3. Simplification of the landscape, as too many extensive and abrupt changes have too often been taken place, disturbing the appropriate development of landscape elements, making mature landscapes that show the full potential of their features and qualities rather rare;
4. Ongoing and alarming decrease of bio-diversity, along with the before mentioned trends.

For Russia these trends are quite recognisable, and need appropriate policy to change toward sustainable development.

For MOVIR et al, such policies as recommended before, do fully fit here as well.

In addition, here the issue of species’ collection and conservation is at stake (Gene banks). This holds for edible and pharmaceutical species as well as for aesthetic ones, odorous and

painting pigment producing ones. Thereby it has become clear that the localisation of such banks influences the genes stored therein, particularly through the need for reseeded to keep the seeds alive. The rationalisation of plant breeding as argued before, nicely fits the demand for rationalised gene banking.

4.1. The (agro-) landscape's psychological features, as spontaneously experienced and appreciation by all participants, are important for the landscape's sustainable development. If the land is experienced as worthless no-ones-land, people tend to contribute to its degradation. On the other hand, the more people appreciate its features the more they will effectuate social control to warrant its quality.

For all the various demands of its farmers, inhabitants, tourists and people who need to recover from stress, mental or physical diseases, the landscape should offer appropriately fitting niches. Places and possibilities in the landscape to feel comfortable, at home, secure, inspired and empowered to recreate, relax, recover, or, on the other hand, be efficiently engaged in professional production activities. Therefore, landscape's multitude and ranges of qualities should provide sufficient interesting information and artistic pleasure.

Features to check are for example:

- Compliance to the natural environment, understood as the clear presence and cultivation (conservation) of the region's special natural features like water-bodies of all sorts;
- slopes, peaks, marshes, forests, river basins, dunes and cliffs;
- Good use of the landscape's potential utility, understood as:
 - Rationality of the sustainable land-use and the way it looks like. The good used of the land should be visible;
 - Percentage of sustainable areas in proportion to the whole landscape and those managed in unsustainable ways;
 - Possibilities for activities other than food and fibre production, their feasible locations and their appropriate intensity of actual use;
- Presence of naturalness:
 - Presence of natural, non-productive sites/areas;
 - Balance of natural elements, lines, patterns, materials, as compared to artificial ones;
- A rich and fair offer of regional specific sensory qualities, such as forms, colours, smells and sounds;
- Experiences of unity as for example in: completeness, wholeness and spaciousness;
- Experienced historicity, in elements of art and crafts and in historic landscapes patterns;
- Presence of cyclical developments, for example growth cycles and seasons.

Nearly half of urban Russian households grow food on their dacha plots. In her study, the American anthropologist Jane R. Zavisca (2003) investigates the meaning of this activity for both those who embrace it and those who reject it. Existing scholarship frames the post-Soviet dacha as a survival strategy and debates its efficiency. Ethnographic evidence reveals that the dacha provides not simply a source of food but a discursive arena for debating the rationality and morality of the transition to a market economy. Due to their rich history, dachas may be interpreted as sites of production or of consumption, as economic necessities or status signifiers. This ambiguity makes dachas particularly salient in disputes over the proper relationship between economic power and social esteem in the shifting stratification order.

This obviously is far from today's dacha's of several Russia's oligarchs and successful entrepreneurs, athletes, pop musicians and mafia bosses now choose dacha as their primary residence. Their estates, often surrounded by solid fences equipped with barbed wire, surveillance cameras, and/or motion detectors, and are sometimes even protected by heavily armed guards, are quite contrary to the culturally, socially and ecologically integrated land-use advocated here.

4.2. The (agro-) landscape's physiognomy and cultural geography

They are objective features showing the regional landscape identity and can be studied in:

- Diversity of landscape components:
 - Diversity of landscape types per country;

- Diversity of landscape units (bio-topes) per landscape type;
- Diversity of elements (crops and planting) per landscape unit;
- Diversity of species per bio-tope.

- Coherence among landscape elements:

- Hydrology;
- Infrastructure;
- Farming;
- Ecology.

- Continuity of land-use and spatial arrangement:

- Cultural history;
- Duration and continuity of land use and spatial arrangement;
- Presumed future sustainability.

For Russia, Christopher Ely wrote the study 'This Meager Nature. Landscape and National Identity in Imperial Russia' (2002). Two poems cited therein:

1. *Fedor Tiutchev's poem of 1859, 'These Poor Villages':*

These poor villages,
This meager nature:
Long-suffering native land,
Land of the Russian people!
Proud foreign eyes
Will not notice nor grasp
The light that shines through
Your humble barrenness.
Worn by the weight of the cross,
The Heavenly King in the guise of a slave
Has passed through all of you,
Native land, blessing you.

2. *Nekrasov's, 1867, 'Who can be Happy ?*

You are wretched
You are abundant
You are downtrodden
You are all-powerful
Mother Russia

5. On agro landscape planning an management

From the paper as presented it will be clear that in the authors' view agro-landscape planning and management are tasks for interdisciplinary teams. The term interdisciplinary meaning here that the team members are aware of the way in which their expertise's strong and weak points can be beneficial *to* as well as compensated *by* those of the team members and their disciplines. Therein the awareness of the mutual dependence of holism and reductionism, as equally important steps in research, helps to see facts in context and define concrete steps in sustainable developments over long periods of time.

Therewith we presume to contribute some tools to Russia's agro-landscape planning debate.

5.1. Integration of the diversity

Now, after proposing such a long range of themes and parameters for (agro-) landscape research, it seems wise to propose as well a scheme on the interrelationships of the mentioned issues.

In the scheme below, referring to the scheme on links between People and Landscape organisms earlier in this paper, I elaborate on the Maslow triangle, placing to Scheme 4 the various scientific disciplines mentioned above in a consistent context (Fig. 4) (Maslow, 1943).

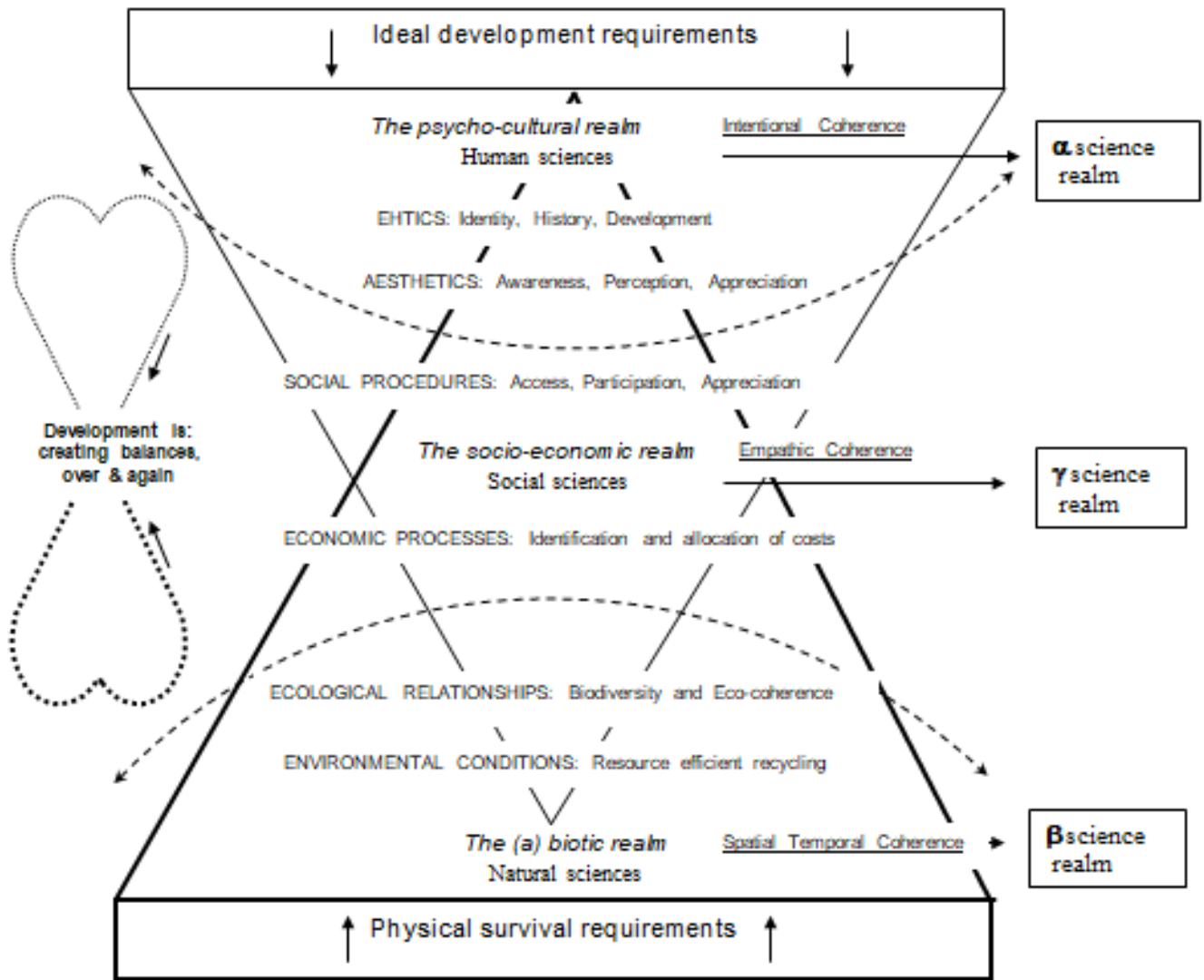


Fig. 4. Maslow's triangle adapted to the agro landscape management by the author

Human, social and natural sciences are mentioned again, but each in their own realm, and each realm now including its particular type of coherence: intentional (goal oriented), empathic (appreciation oriented) and spatial-temporal (ecologically oriented) successively.

It also shows how all three together they are instrumental to balance the fundamental opposition between ideal developments on the one hand and physical survival on the other, or in other words 'the world or agro landscape as it is' versus 'the world or agro landscape as it should be'.

Supportive ideas for MOVIR and the Vavilov Institute of Plant Industry

We all know that plant breeding is meant to serve agricultural crop production (forestry included), which again is to serve people's use of plants for human and animal nutrition, fibres and flowers, as well as pharmacy. We're also aware that, at the same time, agriculture is to warrant the agro-ecosystems autonomous production capacity, landscape quality and environmental health.

Thus I here list some demands from society on plant breeding for the future, which are to make sure there are lines available that suit for more then only quantitative food, feed and fibre production. But subsequently, I add a list of compliant demands from breeders on society, which must be fulfilled by society in order to empower plant breeders appropriately.

- Demand on breeders
- regional adaptation
 - food (etc.) quality

- roughage production for livestock
 - deep rooting for soil upgrading
 - economic use of water in dry areas
 - optimal nitrogen fixation
 - weed suppression
 - pest tolerance
 - salt tolerance
 - drought tolerance
- Demand from breeders:
- integration in the food (industry) chain
 - integration in the regional society
 - participation in farmers / agronomists education
 - participation from farmers / agronomists education
 - cooperation with plant and animal production research
 - cooperation with human nutrition research
 - cooperation with soil research

References

- [Brundtland, 1987](#) – *Brundtland, G.* (1987). Our common future. World Commission on Environment and Development. Oxford University Press.
- [Daly, 1989](#) – *Daly, Herman* (1989). For the common good. Redirecting the Economy toward Community, the Environment, and a Sustainable Future 2nd, Updated Edition. Beacon Press, Boston.
- [Daly, 1996](#) – *Daly, Herman* (1996). Beyond Growth. Beacon Press, Boston
- [Mind tools, 2018](#) – Mind tools (2018). SWOT Analysis. URL: www.mindtools.com/pages/article/newTMC_05.htm
- [Daly, Cobb, 1994](#) – *Daly, Herman and John Cobb* (1996). For the Common Good. Boston.
- [Darwin, 1872](#) – *Darwin, Charles* (1872). The Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life (*6th ed.*). London: John Murray. OCLC 1185571.
- [Dawkins, 1976](#) – *Dawkins, Richard* (1976). The Selfish Gene. New York: Oxford University Press. ISBN 978-0-19-857519-1. LCCN 76029168. OCLC 2681149.
- [Elkington, 1999](#) – *Elkington, John* (1999). Cannibals with Forks: The Triple Bottom Line of 21st Century Business, Capstone. John Wiley And Sons Ltd.
- [Hobbes, 1620](#) – *Hobbes, Thomas* (1640). Human Nature, or the Fundamental Elements of Policie (chapters 14–19 of Part One of the Elements of 1640)
- [Huxley, 1932](#) – *Huxley, Aldous* (1932). Brave New World, Chatto & Windus, London.
- [Maslow, 1943](#) – *Maslow, Abraham* (1943). *A Theory of Human Motivation, Psychological Review*, 50(4): 370-396.
- [Mansvelt, Lubbe, 1999](#) – *Mansvelt, Jan Diek van, Lubbe, Marja van der* (1999). Checklist for sustainable landscape management. Elsevier, Amsterdam.
- [Chambers et al, 2000](#) – *Chambers, Nicky, Simmons, Craig, Wackernagel, Mathis* (2000). Sharing nature's Interest. Taylor and Francis, Earthscan, New York.
- [Braungart, McDonough, 2007](#) – *Braungart Michael & McDonough William* (2007). Cradle to Cradle. Rodale Press, New York.
- [Zavisca, 2003](#) – *Zavisca, Jane R.* (2003). Contesting Capitalism at the Post-Soviet *Dacha*: The Meaning of Food Cultivation for Urban Russians. *Slavic Review*, 62(4): 786-810.

Appendix. Herman Daly's (1996) requirements for sustainable development:

- Reduce the physical demands on our global ecosystems. They are all essentially sensitive and limited. The earth is round!
- Distinguish between growth (quantity) and development (quality), starting with GNP. Whereas growth should be limited in face of the earth's limited resources and ecosystems (the earth is round), development is as unlimited as mankind's ever creative mind. This holds as well

for sub national units like regions, micro projects and individual households. They can not, however, be left to the latter alone.

- Settle fair prices on depletion and pollution of the earth's limited resources as they are no free assets.

- Set socio-political limits to resource throughput on a sustainable scale.

- Total consumption (population x per capita consumption) should be stabilised to warrant sustainable development worldwide.

- Reduced levels of consumption are badly needed; reducing throughput (growth) is a tool to induce progress (development).

- Greater sharing, more population control (education!) and true development are badly needed.

- Costs of depletion and pollution to be internalised in the product's prices.

- Tax throughput instead of income & tax high incomes instead of lowest incomes.

- More growth for all without any sacrifice is a misleading illusion: definitely unsustainable!

- After scale and distribution have thus been settled: let the individualistic market rule allocation.

- The world's nations are key instruments to start implementing this policy.

- Irreducible uncertainty about new technologies' environmental effects are real costs, to be included in the price of the commodity that imposed the costs. To be paid as assurance bond and returned over time as experience reduces the uncertainty.

- Thus liability of industry should be strengthened and the general public not be burdened by industrial development efforts.

- The fair demand for free institutions regards market's freedom from monopoly as well as collective social freedom to democratically enact rules for the common good.

- GATT, WTO and Codex Alimentarius do not at all comply to this fair requirement. They are by and large tools for trans-national industry to increase their monopolising position.

- Free trade among regimes of different degrees of cost internalisation will result in a spiral of standards lowering competition worldwide. Trans-national corporations will take over standard setting from democratic governments; see GATT, WTO and Codex Alimentarius.

- Self sufficient countries are less likely to go to war then countries depending on other countries for their welfare.

- Advances in science and technology are beneficial, increasing both our understanding and range of choices about how humanity and the environment relate. This holds when technologies for new sustainable developments are meant. It does not hold when only unlimited up-scaling and growth of existing technology are concerned.