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Suitable or not suitable, how right are we when applying FAO framework?

A. Farshad (1) S. Mantel (2)

(1) ITC, P.O. Box 6, 7500 AA, Enschede, The Netherlands (farshad@itc.nl / Fax: +31 53 4874336)

(2) ISRIC, Duivendaal 9 6701 AR Wageningen, The Netherlands (Stephan.Mantel@wur.nl)

Almost 40 years have passed since K.J. Beek and J. Bennema (in Brazil), Ph. Mahler and his team (in Iran), and many other experts (in a number of FAO land development projects) were working on standardization of information and establishment of a framework for land evaluation. This resulted in FAO Soil Bulletin No. 32, issued in 1976. The principles of the framework (land utilization type, land quality, land use requirement, land characteristics, matching process etc.) were the basis of guidelines for general types of land uses: rainfed and irrigated farming, grazing, and forestry.

With the publication of the FAO guidelines for land use planning in 1993, land evaluation, which aims at allocation of land areas to various land uses, became just one step in the entire planning process chain. Conflicts over land use became more intense with increasing population and resource scarcity, especially in the less developed countries (LDC), exactly where most use is made of land use planning guidelines.

Although European experts participated heavily in the development of FAO procedures, these were not adopted as such in Europe, because land use planning and land resources evaluation already had a strong tradition. In Europe the emphasis was on increasingly-quantified methods.

More recently, the dynamic process of land use planning, the high demand for information on the suitability of land for various uses, and the advances in IT opened the possibilities to opt for more automated systems where data storage, processing (rule-

based), retrieval and iteration are facilitated. This is when software packages such as ALES (Automated Land Evaluation System) and LUPIS (Land Use Planning and Information System) were introduced.

The FAO method at first was purely qualitative. Matching land qualities (supply side, the land) versus land use requirements (demand side, the products) is the core of the FAO evaluation procedure. Proper data for characterization of the land use demands (land utilization types) were often lacking. The need for quantified projection of land potential and the potential impacts of constraints or management on crop growth and yield stimulated the application of crop growth modeling for agricultural land evaluation. However, any model is a simplified representation of the complex real world, and to some degree empirical, meaning that the obtained results must be critically examined in the light of the practical experience and the results of field experiments.

The actual results of land evaluation exercises have been heavily criticized; this has been answered by the belief that it is the poor application rather than a flawed framework that is to blame. Meanwhile the FAO has not been idle, and has recently published a discussion paper on a revised Framework.

After presenting this brief overview of the evolution of land evaluation, starting from the time we said this soil is good or bad for this or that use, to the stage where we can "simulate yield", and through the increasingly-complex challenges to land use planning, you may have asked yourself: WHAT NEXT?

This question was tackled in a "thematic day" organized by NBV (Dutch Soil Scientists Society) at ITC, in Enschede, The Netherlands. Several experts (Dutch, German and Belgian) were invited to present their views on the future of land evaluation.

A wide range of issues in the field of "land evaluation for land use planning"(LELUP) were tackled. It was shown that when talking about the "land evaluation for land use planning" not only soil/crop, but also other important biophysical as well as socio-economic-derived issues (e.g., fauna, flora, water, social, economic, cultural and political settings) are vital. Discussion when limited to the FAO framework for land evaluation is deemed to focus mainly on "matching", but also on "land utilization type", "land use system", "land quality", "land characteristics", "key attributes"....etc. Should we solely stick to the biophysical aspects of the land we are then too short in defining the 'land utilization types", using such key attributes as farm size, land tenure, farm power, labor intensity, capital intensity... etc.

In the wrap out session, while looking back through the presentations some conclusions could be drawn:

Scale, one of the main issues in any landscape related aspect, which is often over-

looked, not only by laymen, but also by the specialists. A semi-detailed soil map, for instance, is expected to provide information on farm lying, irrigation, reclamation, and fertility, all being meant to be used at parcel level. This indirectly means that either the awareness on the issue of variability is poor, or it is neglected altogether. Scale is not a confined issue of the biophysical maps (GIS layers) but it is also a valid issue at decision making level, in both land evaluation as well in land use planning.

Mixing terminology: Land evaluation (LE) and land use planning (LUP) are often **interchangeably used**, while knowing that the same FAO (of the framework for land evaluation) considers the LE as the 5^{th} step in the LUP process. Farmer's perception is often compared with the results of land suitability (evaluation= LE) maps prepared by the expert. Often it is concluded that they are not similar, simply because the expert has done land evaluation on the basis of matching between land qualities/ land characteristics (supply) and a number of selected land use requirements (demand), which are resulted from the adaptation of the theoretical knowledge (literature review-based) to the prevailed conditions in the study area. The farmer obviously has gone steps further, not only because he knows the crop variety and, to a certain extent, its physiological habits, but also because he has got further into the process of land use planning (decision on land allocation. . . etc). Here again, scale is involved too!

Should we not pay attention to participation, that is, neglecting the stakeholder involvement, we have done a classical exercise, with no practical value in the real world.

Incompatibility between data: Considering that LE (FAO-oriented) is on the basis of matching between the supply and the demand, the problem of data compatibility arises. Are the data on the side of supply (the land) compatible with the data on the demand side (the LUT)? In the supply side, are we considering all land components equally? What about the water?

Sustainability: Is matching required everywhere? Soybean can be a booming crop in Brazil (ref. E. Smaling), but what about its sustainability (as one of the principles of LE)?

Bureaucracy: Often, **too many assumptions** are formulated to comply with a refusal and bureaucratically done land evaluation.

Don't we expect too much from the land evaluation (the FAO framework)? It is probably good to also convey the statement that "since there are many questions (in various cases) there should also be many tools (in the toolbox)", of which a selection can be made.

Is **soil survey interpretation the same as land evaluation**? Reference can be made to the discussion paper published in 1991 in Advances in Soil Science 15 (Cees van

Diepen et al.). Land evaluation, although has its bed in soil science, as a follow up of any soil survey, is a multidisciplinary activity/ process. Besides the definition of “soil survey” in the Soil Survey Manual” the FAO soil bulletin No. 8 on “soil survey interpretation and its use” is an example to refer to in order to find the answer to this question. Soil surveyors are instructed not stop with their job once the soils are mapped, but complete the job with the soil survey interpretation, where next to the suggestions on the suitability (of the soils) for the current (and also potential) use, also some recommendations on applying fertilizers are given (USDA, 1951).