Proceedings of the workshop on land evaluation for extensive grazing (LEEG)

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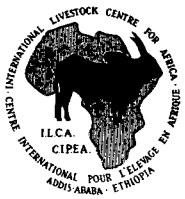

The Food and Agriculture Organization of the United Nations. FAO

The International Institute for Aerial Survey and Earth Sciences ITC

A committee, consisting of Prof.Dr.I.S. Zonneveld, Dr. W. Siderius, Dr. P.N. de Leeuw, Dr. H. van Gils and Ir. W. van Wijngaarden, was responsible for the preparation and organization of the Workshop.

Proceedings

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Preface

Under the auspicies of the International Society of Soil Science (ISSS) and in close cooperation with the Food and Agriculture Organization of the United Nations (FAO), the International Institute for Aerial Survey and Earth Sciences (ITC) and the International Livestock Centre for Africa (ILCA) organized the international Workshop on Land Evaluation for Extensive Grazing in Addis Ababa from 30 October to 4 November 1983. This Workshop is one of a series dealing with the application of the FAO Framework for land Evaluation for major land utilization types.
Past workshops have included land evaluation for rainfed and irrigated agriculture and for forestry, and a future one will be held for conservation and land use planning in sloping areas.
The current workshop drew most of its participants from countries where extensive grazing fills a major role in the national economy, with emphasis on developing countries.
The organizing committee consisted of Prof. Dr. Ir. I.S. Zonneveld (Chairman), Dr. P.N. de Leeuw (liaison with ILCA), Dr. W. Siderius (Secretary) and Dr. H. van Gils and Ir. W. van Wijngaarden (members).
The smooth conduct of the Workshop at ILCA's headquarters in Addis Ababa was largely due to the effective cooperation of the staff of ILCA's Training Department, notably Dr. E. Mukasa and Miss Sahlewerk Demessie, and the organizing committee. The publication of these proceedings is the fruit of cooperation between ITC and ILRI.

The editor.

Contents

Abstract

The international Workshop on Land Evaluation for Extensive Grazing (LEEG) was held under auspicies of the International Society of Soil Science (ISSS) and organized by the International Institute for Aerial Survey and Earth Sciences (ITC) and the International Livestock Centre for Africa (ILCA), in close cooperation with the Food and Agriculture Organization of the United Nations (FAO).
Forty-two participants from 20 countries presented 26 papers on various subjects and representing different backgrounds around the central theme of the Workshop. The working group sessions (A to F) generated additional reports, and the delegates expressed their opinions on a number of issues in the Recommendations and Conclusions.

The edited proceedings are grouped as follows:

Part I papers presented by key speakers reviewing rangeland inventory and evaluation techniques
Part II papers concerning the FAO Framework for Land Evaluation
Part III background papers for the Working Group sessions
Part IV general papers
Part V reports on the Working Group sessions

By nature of the Workshop the diversity of the papers is large. Both the opinions expressed and trends followed are occasionally divergent. They may, however form the basis for a follow-up to this workshop in the form of a manual or guidelines for land evaluation for extensive grazing.
To retain the opinions of the individual writers, as little as possible has been changed in their texts, the contents of which remain the full responsibility of the authors.
The editor is grateful for suggestions which these proceedings may initiate in view of future manual publication.

The editor

Recommendations and conclusions

The Workshop delegates and participants agreed upon the following recommendations:

1 that the recommendations of the working group sessions be incorporated in the general recommendations, since they have been adopted by the working group delegates.

2 that the Proceedings of this workshop be published in the near future (within six months).

3 that the Proceedings form the basis for the publication of a manual (guidelines) on land evaluation for extensive grazing for which purpose further consultations between the delegates and other persons and/or institutions are necessary.

4 that the FAO takes the initiative towards the publication of this manual.

5 emphasizing their grave concern over the rate at which extensive grazing lands continue to deteriorate, the delegates suggest that those who conduct land evaluations and prepare the guidelines should orient their work to directly assist the small, low income pastoralist, as well as the planners.

6 that in further deliberations on the preparation of the manual, and in land evaluation for extensive grazing in general, scientists with experience in the social sciences, economics and animal nutrition aspects take an active part.

7 that land evaluation results should be made available in forms understandable by the land user, the extension officer, the planner and the decision maker.

8 that the concept of 'extensive grazing' should be that given in the definition developed during the workshop which anticipates the introduction of more intensified production systems (which may include supplementary feeding and forage banks), interactions with agricultural land, etc.

9 recognizing crop requirements as the yard stick for matching land qualities to crop farming, that the requirements of animals should receive equal, adequate attention at all levels of land evaluation for extensive grazing.

10 that to broaden the integrated approach of land evaluation procedures, the input of social and economic disciplines should be sought and elements of other research approaches (e.g., farm systems research and elements of

project analysis) should be included in land evaluation for extensive grazing procedures.

11 that because land evaluation is intended for purposes of land use planning, management and development, the manual should take into consideration the nature of the practical decisions on land use for which evaluations supply guidance.

12 that the results of land evaluation, for extensive grazing should be made available to the users within the shortest possible time.

13 that although the quality and the quantity of the information is cost bound, distribution should never be hampered by a too stringent budget.

14 that management specifications that have a direct bearing on the improvement of land use should be incorporated and specified to make an economic analyses possible.

15 that, because carrying capacity estimates are always approximate and because carrying capacity changes in time, range conditions and secondary production should be monitored.

16 the development of appropriate methods to determine range conditions and to establish critical limits of range condition.

17 that qualitative land evaluation is carried out parallel with economic evaluation, or that the latter coincides at least in the latter part with the former.

Conclusions of the working groups

(summarized, for full text see pages 317 to 320)

Working group A: Dissemination of Information (Presentation of Results of Investigations and Surveys.

1 The main reasons for past failures to make proper use of inventories are:
- lack of action oriented maps
- lack of understandable information with regard to the various users
- lack of correlation between action at primary and secondary production levels (veterinary versus range mangement action)
- lack of incorporation of social and economic data

2 The target groups of the land evaluation reports are:
- politicians, planners and decision makers
- scientists
- extension workers
- farmers and other users of the land

Report adaptation is necessary in view of the variety of people involved.

3 The results of an evaluation are given in texts, tables, figures, photographs and maps.

The information should be readible (= understandable). It is reasonable to weigh the costs of printing and distributing the results against anticipated use. Also new means of data storage, presentation and distribution should be investigated (tapes, databanks etc.).

Working group B: Multistage production character of extensive grazing

4 It is absolutely necessary to consider primary production first (quantity and quality) to be able to determine the secondary production levels.

5 The concept of 'LUT' for extensive grazing is useful, but should be used with care, keeping in mind appropriate key attributes, land use alternatives, the level of improvements and the social and economic parameters.

6 A major constraint in improvements in extensive grazing is common land.

7 The application of the FAO Framework should follow the following sequence of activities:
a) current status of land use,
b) assessment of obtainable production,
c) identification of major constraints,
d) possible improvements and
e) determination of new sustainable production levels.

Working group C: Definition of land evaluation for extensive grazing

8 Grouping of land utilization types should be defined according to:
- specific climatic zones and regions,
- key attributes, which become more specific in relation to increasing degree of detail and decreasing area size,
- key attributes of LUTs should be listed but their relative importance depends on site/region and production systems,
- key attributes can be used for both description and classification of LUTs.

9 Five main key attributes for selection and classification of relevant LUTs are considered:
a) production method
b) produce
c) animal species
d) production aims and objectives
e) territoriality
Twelve key attributes were recognized.

10 The LUT concept is applicable to extensive grazing with minor modifications.

Working group D: Concepts and methods for determining carrying capacity.

11 Carrying capacity is defined as 'the maximum stocking rate possible, without inducing damage to vegetation or a related resource'.

12 The maximum stocking rate has to take the production system into account.

13 The possibility of 'fixing' carrying capacity is doubted. Once a safe (conservative) stocking rate is set, continuous monitoring of the vegetation and range conditions related to secondary production is necessary. Various methods may be used: terrestrial and remote sensing techniques, including aerial survey.

14 The traditional concept of climax spp. was of limited value outside the North American context. Additional useful criteria include measurement of changes in perennial species with time.

15 Not only forage attributes determine the carrying capacity, but also accessibility, availability of water, climatic factors, topography, etc.

Working group E: Land qualities for extensive grazing

16 The land qualities for extensive grazing should be grouped according to production levels.

17 No clear rules can be laid down with regard to the weighting (relative importance) of land qualities. This should be decided in the light of local circumstances.

18 A distinction is being made between the rating of individual qualities (factor rating) and the land suitability based on the consideration of all qualities together.

19 The comparison of land qualities with land use requirements is better carried out in terms of actual dimensions, quantities or other figures, and not as an ordinary scale (1 to 5).

20 The overall land suitability based on a combination of factor ratings, cannot be specified for all possible situations. A single factor rating of N2 must always result in an overall suitability of N2.

Working group F: Socio-economic aspects of LEEG

21 Sociological factors may be described as key attributes in the LUT description and not as a land quality.

22 The key attributes pertinent to animal- and land tenure and user attitude (towards change) should be given special attention.

23 Social and economic inputs are necessary to arrive at a sound selection of projects and/or project areas.

Opening address

by S. Sandford
ILCA, Addis-Ababa, Ethiopia.

It is a great pleasure for me to welcome you here today on behalf of the Director General of ILCA, at the start of this important Workshop on Land Evaluation for Extensive Grazing. Unfortunately, Dr Peter Brumby our Director General is away for the Annual Centres Week of the IARC and cannot be present. I hope Dr Lambourne our Director of Research may be able to join you later in the week.

It is a great pleasure for ILCA to jointly sponsor this workshop with a distinguished institute such as ITC.

The subject you are about to deal is of great importance. 35% of the world's land surface area lies in arid and semi-arid areas where extensive grazing is the pre-dominant form of land use. It is more difficult to quantify accurately the number of people depending for their livelihood on extensive grazing systems but probably there are between 30 or 40 million pastoralists in the world. That is a substantial number in absolute terms even if only a small proportion of the world's total population. Of these pastoralists, more than 50% are found in Africa where extensive grazing systems probably account for more than 60% of all livestock output.

It is a great temptation for someone like me, who is asked to open a conference but who will be unable to attend all its sessions, to act irresponsibly by raising questions and topics to whose solution I will not have to provide answers. It is a temptation that I am not going to resist. I, therefore, propose to leave you with three questions.

Firstly is any land evaluation system that you propose going to be able to cope adequately with changes in potential land use caused by changing factor proportions (e.g. labour/land or capital/land ration) or with changes in technology? Or is any system or evaluation technique which you discuss or recommend this week going to be rapidly rendered obsolete by such changes?

Secondly do your evaluations techniques adequately cope with inter-annual fluctuations in primary and secondary production in the range lands caused by fluctuations in the weather? Or are they excessively dominated by the concept of the 'average year'? For example, if you have two areas identical in almost all respects, including mean annual rain fall and mean annual primary production, but which differ only in that the co-efficient of variation of annual rain fall of one area is 20% and of the other area is 50%, will your evaluation technique adequately differentiate between the potential and usefulness of these two areas?

Thirdly for what purposes do we design range inventories and evaluation?

Who is going to use and who is going to benefit from them? How useful will they be for extending small scale decentralized forms of community management or range lands? Or are they simply a means for over centralized bureauracy to wrest control from the local community and place it in the hands of outsiders?

I am not sure whether you already have answers to these questions or will be able to devise answers to them during the course of this week. I am pretty sure that they are questions which need answers.

I wish you a useful and interesting workshop. I hope that you not only enjoy the proceedings inside the workshop and the intellectual facilities, e.g. in the documentation centre, that ILCA is able to provide you, but that you will also be able to enjoy recreational ILCA's facilities and generally to have a pleasant time.

Chairman's address

by I.S. Zonneveld,
ITC, Enschede, The Netherlands.

Thank you Mr. Sandford for your kind words of welcome and the wise guidelines you gave us to follow.
I will add some more welcoming words on behalf of the organizing committee and especially of ITC, our International Institute for Aerial Survey and Earth Sciences in Holland and of ISSS, the International Society of Soil Science. You may be aware of the fact that this workshop is organized under auspicies of the ISSS what does grazing have to do with such a specific soil organization? For those not familiar with this organization let me mention that ISSS is engaged in study and application of soil science in its widest sense. I am one of the 7000 members. And at least 1 per mille of that number is present here. This society has seven standing committees. Each of these has working groups for subjects that merit special attention. One of these working groups deals with land evaluation.

This working group belongs to, strangely enough, (but what does it matter?) the committee 'Soil technology'.

More important the chairman of this working group happens to be Prof. Klaas Jan Beek, who is at the same time Rector of ITC my institute and consequently my boss. His committee has in cooperation with FAO initiated several workshops, comparable with this one. These workshops dealt with land evaluation in general, or a specific topic such as irrigated agriculture, rainfed agriculture, of forestry, with the aim to compile, in cooperative effort, a manual of land evaluation.

A recommendation to the organisators of this particular workshop was in fact made by the secretary-general, my old friend and colleague, Wim Sombroek, with whom I spent, together with Peter de Leeuw of ILCA, some happy and fruitful years in West Africa. He did this in a speech he made 3 years ago to the participants of the workshop on Land Evaluation for Forestry. He recommended that a following workshop should be dedicated to Land Evaluation for Extensive Grazing. I am glad to note that at least one of the recommendations of that workshop is now being realized. In the meantime I hear some of you already muttering, but why should soil scientists dominate in this matter?

Do not worry, I am not a pure soil scientist anymore, who has a chair in vegetation science, other disciplines especially vegetation scientists, range ecologist, and zoologist, have become interested, and what is more, active in land evaluation.
Broadminded soil scientists from the physiographic school took the lead indeed, already about 10 years ago, at a seminar organized in Holland (Wageningen) by FAO, it was accepted that not soil but land in its totality

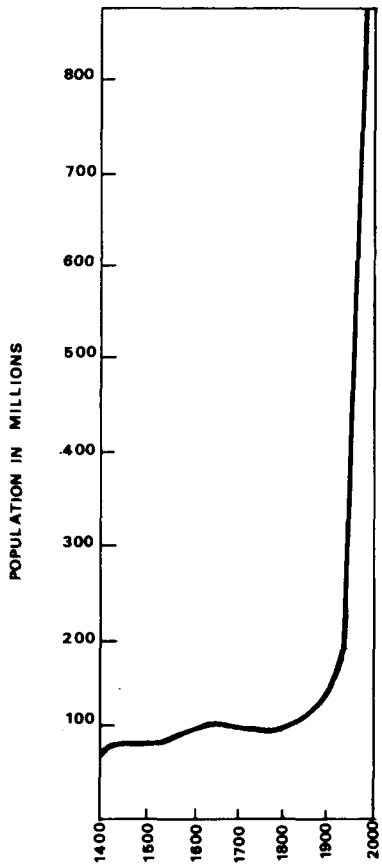

Fig. 1 Population of Africa from 1400-2000

(including water, vegetation, soil, landform, landuse and vegetation), is the base of land evaluation. The FAO Framework of land evaluation of 1976 is the direct result of that FAO/Wageningen consultation.

Why however, all this activity around land evaluation as a special discipline? And especially for land evaluation for extensive grazing? Does the herdsman not know already enough and has he not adapted himself already better to his harsh environment, than what could white collar scientists gathered around the swimming pool of the Zebu Club at the luxurious, lovely ILCA compound teach him? The reason is the curve of escalating population growth of the world population due to increased medical care and improved communication (Fig. 1.). That is the main reason.

Some of the first extensive land evaluators such as Moses on the Mount Nebo (in Palestine, Jordan) 3000 years ago, and Abraham and Lot and Jacob and Esau 700 years earlier, to mention some land evaluators from oldest

literature, already had problems with dividing the best rangeland of the near east among themselves.

The populations have boomed, especially in the last century. In Africa it has just started in the last decades, in countries of which the religious and even political leaders still do not seem to realize that populations can be too high. Especially in this satellite age in which we have gotten used to seeing our earth from a distance, it is not difficult to realize that there is a limited space on earth and that space has to be divided honestly, now and in the future, among the then living people. It has to be managed well, so that there will be a world left to live in for our children. Awareness should be created by all responsible people, because this world is limited in resources and that means it can only support a limited number of people. Too easily certain human cultural and political leaders seems to suppose that the solution to the problem of over population can be postponed to our children or even grandchildren. One of the further reaching results of land evaluation can show the cowardness of such an attitude.

The daily practice of land evaluation however, deals with coping with the problem of dividing honestly and righteously the still existing resources between all groups of land users, for their and all of our benefits and provides a mean for preventing deterioration of management practices, and the land itself, and even improvement of those. Therefore, land evaluation takes, as I said already more into account than soils. Figure 2 shows how the land ecosystem is composed of all attributes in mutal dependency.

All these land factors including man have to be taken into account. To find out how this has to be done for extensive grazing is the job of this workshop for which we have to work hard.

The outcome will not be a direct improvement of the world, neither an immediate better division of the earth resources among our fellowmen. Such a process is slow and demands much effort or oral communication, teaching, persuasion and the like.

We, however, can achieve a series of ideas and procedures in our proceedings that will serve as a first base for the mentioned manual of land evaluation to be written by a small group of us.
That manual can be a base for further dissemination. We will work together these days for that limited aim.

It is not without reason that we have brought you together in Africa! Extensive grazing is here a major land utilization type. ILCA is also here and that provides us not only hospitality but effective facilities, we are grateful for that.

We also thank FAO (son of UN) who contributed by sending people and by guiding the excursion of Thursday.

We are very encouraged by your presence, in the numbers and in the distances

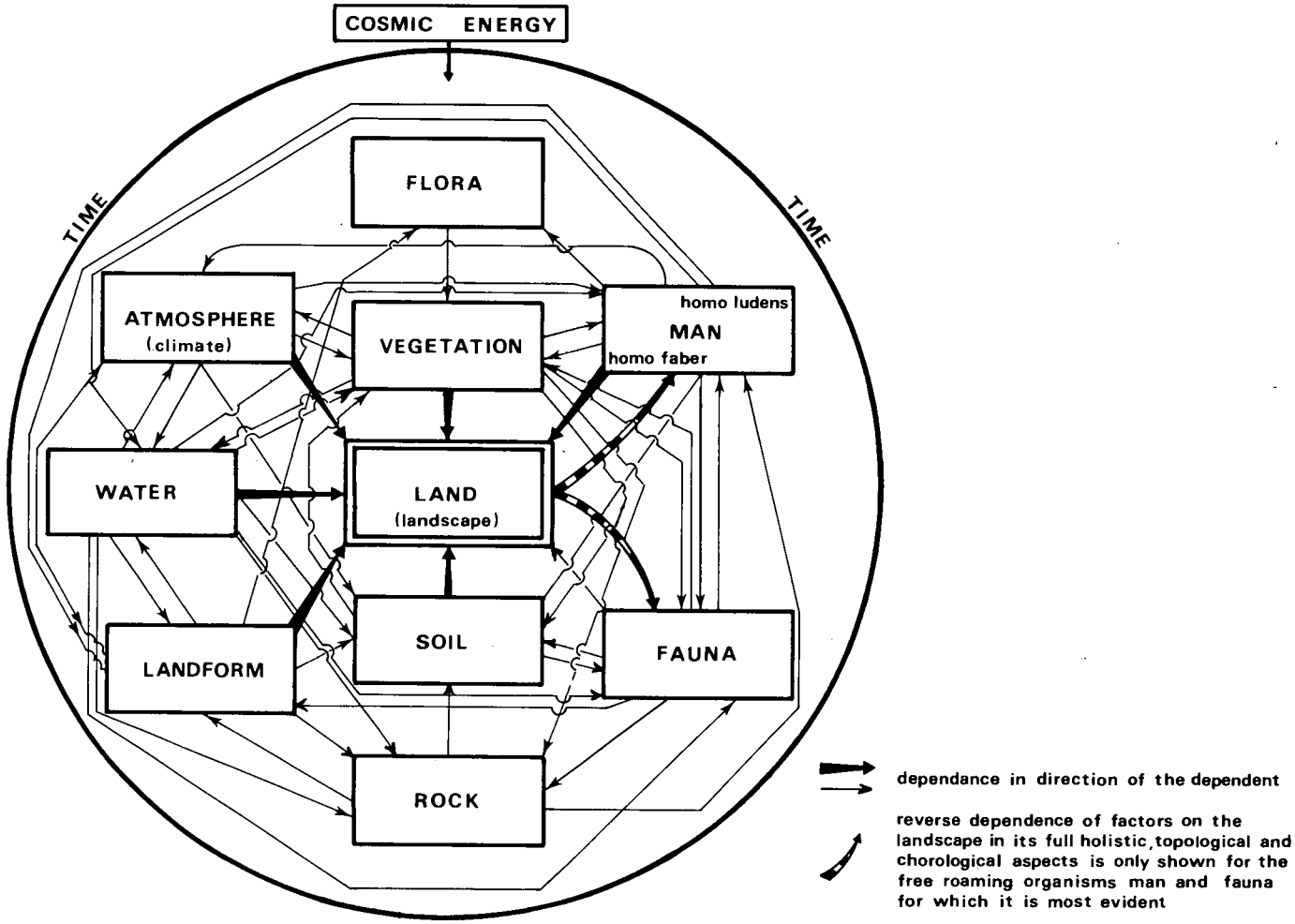

Fig. 2 Landforming factors and their interrelation

of travel involved, participants from the whole world from China to Argentina, from Northern Europe to Australia are present. A large part of the grazing community is here, your quality and even quantity guarantee success!

We hope to make this workshop, that is (by the way) now officially opened into a real working affair between colleagues in grazing (no doctors of science or professors of universities). Many of us know each other well enough from the field to say things straight forward as we do in a bush camp. We do not need to waste time on politeness and/or procedures. So we will work from now on in an informal way, although we will remain friends and that means we will be friendly of course. With this prospective, I can wish you on behalf of ITC and ISSS, and the organizing committee a pleasant and fruitful workshop.

Thank you!