19 Land evaluation and programme planning in sloping areas in North Western Tunisia

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The views expressed in this paper are entirely those of the author and not necessarily those of the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH.

19.1 Introduction

Negative effects of rural underdevelopment.
Many predominantly rural areas of continents (e.g. Sahel) or other smaller regions (e.g. provinces) remain undeveloped in comparison to their potential. These regions threaten development of other regions by rural exodus to already overcrowded cities, sedimentation of water reservoirs, etc., creating political turmoil or human misery in- and outside the region itself.

Higher population density requires more intensive land-use system
This process is relatively recent, reaching alarming proportions, caused by too high population densities. These densities have to be retained, because natural regulation of population densities through periodic starvation of people is not acceptable nowadays. Management of these (too) high densities on sustained basis in often more remote areas requires in long term appropriate, but often necessarily, high technology, intensive and sensitive land-use systems, accompanied by monitoring, evaluation and accountancy systems.

Planning and financing of more intensive land-use systems
Rural development projects execute Farming Systems Research. On-Farm Adaptation Research, Extension of Farmers- of Landless People-Groups, etc. to alleviate this situation. It is obvious that continuing subsidies will be necessary from central organizations to conserve sustaining land-use systems in these sparsely but often highly overpopulated regions, e.g. in the form of rural development projects.

Intensification of land-use systems by rural development projects
These rural development projects start with a nucleus project. This nucleus project, like a benign virus, affects the farmers of the area with groups of farmers discussing and implementing farming techniques, marketing possibilities, improvement of well being, mining or conservation of agricultural land resources, etc. These groups will in the long term form Cooperatives, Soil- and Water Boards and other special interest groups.

Comprehensive and data processing aspects of RDP's
Most Rural Development Projects have ‘Monitoring, Evaluation, Credit and Marketing’ to keep track of socio-cultural, ecological and economic operations and impact on these activities. Automatic data processing is thereby an inevitable component to
prevent project personnel and farmers to be tied down in tedious but essential administrative activities. The latter activities diminish the time for more important activities like planning and group-formation of farmer-opinion-leaders, sociologists, ecologists etc.

**Local rural development administration**

The profile for such a specialist is somebody formed and experienced in land resources survey, development economics, administration and EDP as applied in the working areas of these projects (often remote rural areas). These disciplines are required to monitor the physical, economic and socio-cultural effects of actions using models of verifiable indicators of land and human behaviour.

**Summary of this paper**

This paper gives an example of programming of a project and an individual farm within a rural development project.

It describes monitoring and evaluation of the level of satisfaction reached by the rural population in one generation (about 30 years)

**19.2 Two kinds of programme planning: one of the project and one of the farm**

Management Information System (M.I.S.)

Figures 19.1 and 19.2 display an example of the minimum required iterative Management Information System (M.I.S.) and Organization to coordinate the multiple actions of a Rural or Regional Development Project. Figure 19.3 describes the M.I.S. in greater detail.

**Agricultural services and rural population**

Especially important are the services to customers (= target groups of development actions e.g. small farmers): extension (3) and supply, credit and marketing (5) (Figures 19.1 and 19.2).

![Diagram of Management Information System (M.I.S.)](image-url)

Figure 19.1. S.I.G. systeme d'information de gestion des projects de developpement rural (quoi et comment)
These supply verifiable indicators of income composition, distribution and level and participation of target groups. Evaluation of these indicators and the rate of transformation of project-activities into selfhelp groups, cooperatives or soil/water boards enable internal and external project-monitoring.

Figure 19.2 Organigramme de la direction regionale d’un projet de development rural (qui et ou).

Vulgarisation

- form.inst.rur.
- prod.animale
- prod.vegetale
- activ.feminine
- Mise en valeur

- pistes
- pont et batiment
- inst.prairie
- petit hydraulique
- economique

Planif/eval 1
- pistes ponts
- suivi projet 2
- Inst.prairies

informatique 4
- appr/cred/comm 5

4) Le but de cette section est d'automatiser toutes les gestions de donnees.
N.B/ Pourquoi et quand: voir texte

Impatience of world opinion
This monitoring is necessary since world opinion and literature gets impatient with much intransparent not measurable planning and execution activities of rural development agencies.

Environmental aspects
Next important are environmental aspects as shown for instance in Table 19.1 for the development of primary production of 'macquis' in time for several alternative scenarios and analytical models (see Figure 19.3).

Major improvements
Another important aspect is the sub-division in Project Planning/Evaluation (1) (see Figures 19.1 and 19.2) and Execution activities (2) for the major improvements (Beek, 1978) using external Land Evaluation on one side.
Table 19.1 Model der entwicklung der futterwertpotential projahr von 4800 ha macquis in einige henchirs in sejnane vn 1949 bis 1983.

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<tr>
<td>Macquis HA</td>
<td>4800</td>
<td>4557</td>
<td>3685</td>
<td>0</td>
<td>0</td>
<td>635</td>
<td>635</td>
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<tr>
<td>Geroddet seit 1949 HA</td>
<td>-</td>
<td>243</td>
<td>1115</td>
<td>4800</td>
<td>4800</td>
<td>4165</td>
<td>4165</td>
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<tr>
<td>DTO% von 4800 HA</td>
<td>-</td>
<td>5</td>
<td>23</td>
<td>100</td>
<td>100</td>
<td>87</td>
<td>87</td>
</tr>
<tr>
<td>Gerodet/periode HA</td>
<td>-</td>
<td>243</td>
<td>872</td>
<td>3685</td>
<td>3685</td>
<td>3050</td>
<td>3050</td>
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<tr>
<td>DTO% von 4800 HA</td>
<td>-</td>
<td>5</td>
<td>18</td>
<td>77</td>
<td>77</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Gerodet/periode/jahr HA</td>
<td>-</td>
<td>19</td>
<td>79</td>
<td>368</td>
<td>368</td>
<td>305</td>
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<tr>
<td>DTO% von 4800 HA</td>
<td>-</td>
<td>0,4</td>
<td>1,6</td>
<td>7,7</td>
<td>7,7</td>
<td>6,4</td>
<td>6,4</td>
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<tr>
<td>Installierte prairie HA</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2000</td>
<td>2000</td>
<td>2000</td>
</tr>
<tr>
<td>DTO% VON 4800 HA</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>42</td>
<td>42</td>
<td>42</td>
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<tr>
<td>Garique oder stoppel HA</td>
<td>-</td>
<td>243</td>
<td>1115</td>
<td>4800</td>
<td>2800</td>
<td>2165</td>
<td>2165</td>
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<tr>
<td>DTO% von 3800 HA</td>
<td>-</td>
<td>5</td>
<td>23</td>
<td>100</td>
<td>58</td>
<td>45</td>
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<table>
<thead>
<tr>
<th>Futterwert Macquis (400UF/HA)UF</th>
<th>1920</th>
<th>1823</th>
<th>1474</th>
<th>0</th>
<th>0</th>
<th>254</th>
<th>254</th>
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</thead>
<tbody>
<tr>
<td>DTO Gar./Stopp. (200UF/HA)UF</td>
<td>-</td>
<td>49</td>
<td>223</td>
<td>960</td>
<td>560</td>
<td>433</td>
<td>433</td>
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<td>X1000</td>
<td></td>
<td></td>
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<tr>
<td>DTO Dauerweide (1600UF/HA)UF</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3200</td>
<td>3200</td>
<td>-</td>
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<tr>
<td>X1000</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>DTO naturweide (400UF/HA)UF</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>800</td>
<td>-</td>
</tr>
<tr>
<td>X1000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DTO total 4800 HA UFx1000</td>
<td>1920</td>
<td>1872</td>
<td>1697</td>
<td>960</td>
<td>3760</td>
<td>3887</td>
<td>1487</td>
</tr>
</tbody>
</table>

A) Situation ohne project mit in der zeit logaritmisch extrapolierte degradation der vegetation.
B) Situation mit project mit in der ze logaritmischit extrapolierte degradation der vegetation.
C) DTO mit lineaer extrapolation D) DTO mit lineaire extrapolation und verbesserte naturel weide.

**Minor improvements**

On the other side extension (3) and on-farm production aspects (5) for the minor improvements (Beek, 1978) using internal land evaluation. The latter can generally be executed and financed by the farmer alone or in groups with or without credit.

**Programming**

In both cases the Programme Planning phase is of crucial importance and can only be done with thorough knowledge of the local situation by local technicians (initially governmental, later paid by farmer groups) and farmers together, be it for major improvement, e.g. different watershed protection plans of enterprises or LUT's on the farm.

**Project analysis without effect analysis**

Standard economic project analyses methods are available and well known (Gittinger, 1982) for these analyses, but do not account for effects on different groups (farmers, traders, etc.)

**Farm programming**

The latter form of programme planning is the one used by farm economists and extension specialists to find the best farmplan. It is only mentioned here to emphasize the preference of its use in rural development projects over linear programming. The latter
Figure 19.3. Planification, programmation et budgetting; comptabilités, suivi et évaluation des projets régionaux de développement rural.
being too rigid, too difficult and too intransparent for the variable conditions of family-farmers in rural remote areas with often degrading environments and lack of reliable data.

*Agro-ecological modelling*

Quality of data in land evaluation, their presentation as estimates or in precise terms, their analytic or holistic analysis and degree of accuracy in modelling, somewhere in the continuum of the black box to accurate functional models, are shortly discussed by Van Diepen (1983). In FAO (1984) Radcliffe gives some examples of agro-ecological modelling used for programme planning in a district of Mozambique, while the Agro-ecological Zones project of the FAO is presently engaged in refining its analyses to country-level.

*Land utilization modelling*

Functional agro-ecological modelling is therefore relatively advanced and not treated in this paper. Missing is often its link with the L.U.T. description in:

a. one production function with;

b. more accurate differentiation of the family farm L.U.T.'s by their differentiated product composition;

c. definition of the needs for the farmer in his area to hold him back from the rural exodus;

d. accurate monitoring of this exodus;

e. inclusion of the production trend of his L.U.T. and f) inclusion of major and minor improvements a capital (needs) in this production function.

*Project programme planning*

This needs not to be done exhaustively. Van Mourik (1984) has described the framework of studies with participation of the population, needed to collect the necessary data. Below some very rough functions of points a. to f. are described, forming a rough monitoring model.

19.3 **Functional models of regional rural development, some simplified functions**

Functions of a regional development model.

A model consisting of the above described links (points a. to f.) of agro-ecological functions with agro-economic functions is simplified described below for agricultural development including animal husbandry.

a. the production function:

\[ Y_t = L \times T \times C \]

\[ Y_t = \text{products}; L = \text{labour}; T = \text{land}; C = \text{capital}. \]

b. the objective function:

\[ Y_t = Y_1 - I + Y_b + Y_c + Y_a + Y_e \]

\[ Y_t = \text{total products}; Y_1 = \text{milkproducts}; I = \text{non factor inputs}; Y_b = \text{‘meat’ products}; Y_c = \text{cash crops}; Y_a = \text{other agricultural products and}; Y_e = \text{external products (salaries, etc.)} \]
c. the needs function:
\[ N = \text{SMAG} + \text{CHRF - AUTOC} \]
with
\[ \text{SMAG} = \text{minimum agricultural salary; CHRF = overhead costs and} \]
\[ \text{AUTOC = autoconsumption.} \]
d. the population function:
\[ \Delta \text{LA} = \frac{(100 \Delta \text{LT} - (\%\text{LE}/\text{LT})\Delta \text{LE})}{(100 - \%\text{LE}/\text{LT})} \]
with
\[ \text{LA = agricultural population; LT = total population; LE = population active} \]
\[ \text{outside agriculture, } \Delta = \% \text{ change.} \]
e. the land function:
\[ T = \text{present value of } 15 \text{(-30) years of production, as for instance could be calculated} \]
in Table 19.1, based on data from El Amami (1976).
f. the capital function:
\[ C = \text{Ca} + \text{Ci} \]
with
\[ \text{Ca = major improvements (artificial landqualities like roads, etc.) and Ci = minor} \]
\[ \text{improvements (on farm).} \]

19.4 A simplified and imaginary application of a model to the Sejnane Area

Modelling of satisfaction of the population within one generation.
The model of Sejnane is determined by its verifiable indicator: the sold daily milkproduct of some 2,000 farmers as obtained from their electronically processed revolving fund- and milk customer-accounts at the project: (all data are imaginary!)
a. \[ Y_t = Y_1 - 0.8Y_1 + 0.7Y_1 + 0.1Y_1 + 0Y_a + 0Y_e \]
b. \[ N = 830 + 270 - 200 = 900 \text{ DT} \]
\[ \text{(DT = Tunisian Dinar)} \]
c. \[ L = (150 - (20\times0.5)) / 100 - 20 = -2\% \]
d. \[ \Delta \text{LA} = (150 - (20\times0.5)) / (100 - 20) = -2\% \]
From a. and c. can be derived that today, e.g. 45% of the population has satisfied its needs. From d. can be derived: an additional 2% per year of the 55% unsatisfied, satisfies itself by finding employment outside agriculture or by migration. The region will thus have satisfied its needs in one generation (55%/2%/year = 28 years).

19.5 Conclusions and recommendations

Rural development project organization.
An M.I.S. and Project organization as presented in Figures 19.1, 19.2 and 19.3, with emphasis on compact, on the site, programme planning for the project and the farm, using external and internal LE, is needed to monitor the L.U.T.'s (e.g. their farm size and - number, influencing the land flight) simultaneously with the L.U.T.'s (degradation and gap between potential and realized production).

Electronic data processed land utilization modelling
This systematic programme planning should use an international multidisciplinary land development-systems-terminology. Simple electronic data processing is necessary to narrow the gap between incomplete planning goals and necessary achievements
of projects and its inaccurate monitoring. This programme planning should be done with simple functional models, based on analytical and holistic analysis, as demonstrated in the paper to simulate more accurately the development based on verifiable indicators.

References