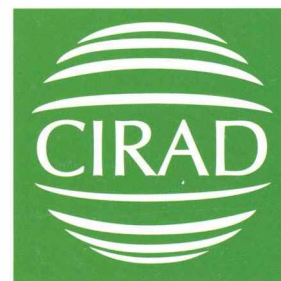




University of Pretoria



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**PARTICIPATORY ZONING TECHNIQUES  
AS SUPPORT TO RURAL DEVELOPMENT PLANNING  
AND MANAGEMENT**

**Principles and procedures  
A User's Guide**

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## 1- ZONING AS A WAY TO SUPPORT RURAL DEVELOPMENT PLANNING

Building up policies and strategies for rural development entails choices and arbitration from decision-makers. This process has often a spatial basis, as a specific area is targeted. It requires information that should take account of diversity and dynamics of spatial features of this area; its relationships with other areas ... Zoning techniques have been developed to ease decision-making process, providing information on diversity and dynamics, on a spatial basis.

An understanding of such diversity and dynamics is an essential prerequisite to any planning operation. How often have planning operations failed because they did not take into account the different situations existing in the planning area? Applying a uniform recipe to a diverse environment is bound to result in failure and a great waste of money.

Furthermore, the Development Facilitation Act (1995) aim is to involve the local level at all stages of the development process. The latest discussion document from the National Department of Agriculture on Agricultural Policy in South Africa (1998) also stresses the need to accommodate the diversity of production in policy making.

## 2- BACKGROUND AND PRINCIPLES OF ZONING TECHNIQUE

Zoning is a geographical delineation (mapping) of spatial units presenting an acceptable degree of homogeneity, according to some relevant criteria and to the scale of the analysis. The key notions are therefore :

- the identification of the diversity through homogeneous spatial units (HSU) : an area where available resources, their use and the constraints related to productive activities form an homogeneous problematic at the chosen scale,
- the use of relevant criteria to identify the diversity : synthetic variables chosen for they best reflects the diversity one wants to highlight in a given area.

It implies the existence of spatial information (statistics, local knowledge, and mental representations...) that can be collected through a survey for instance. But zoning goes beyond data collection and representation, it also leads to data management and modelling. It relies on the principle that it is possible to commit all spatial phenomena, their states, their dynamics and their functioning,

to a smaller number of elementary models. These models have an explanatory potential that goes beyond the simple graphic representation.

### *Origin of participatory zoning techniques : milestones*

The peculiar method presented here has been developed in Brazil, within a project supporting the development of small-scale agriculture in the *Nordeste* area (Caron, 1997). It was then applied in various regions (Tunisia, Palestine, South Africa...) to support rural development planning and management projects (Caron, 1998 ; Clouet, 1998).

This socio-economic and participatory zoning technique basically derives from the Francophone approach to rural development support. This approach often merged geography with socio-economics and agricultural sciences during the last 30 years, notably in Sub-Saharan Africa. This combination generated the concept of agrarian system (Jouve, 1992).

Also, one might find many similarities between this technique and some anglophone RRA/PRA procedures that aim at demarcating upon maps the modes of exploitation of the space by local communities (Mettrick, 1993).

An agrarian system can be defined as "*the historically constituted, sustainable mode of organisation used by a rural society to use its area and manage its resources. It results in interactions between the bio-physical, socio-economic and technical factors*" (Jouve, 1992). It appears to be the encompassing and highly determining level in the operation of small-scale farming systems. Thus, much systems research performed by Francophone teams goes beyond the scale of the holding to focus on villages and regions. Analysis of agrarian conditions in many developing countries and especially in sub-saharan Africa shows that the individual is closely integrated in family and lineage units that considerably reduce his/her degree of liberty and scope for initiative. Technical and social behaviour is relatively homogeneous and codified within a village community.

Under these conditions, it appears more relevant and effective to begin by studying the mode of use of the environment by these communities before addressing differences in operation between farms. These considerations bridge zoning procedures to local studies.

Recently, geography has helped to improve modelling, dynamic and the heuristic aspects of zoning as a representation and as a tool for decision-making. Particularly, it showed that "*it is possible to commit all spatial phenomena, their states, their dynamics and their functioning, to a smaller number of elementary models ... These models, with the help of a system of graphic symbols (choremes), have a heuristic dimension which goes well beyond simple graphic illustration*". (Deffontaines et al., 1992).

Thus, zoning techniques differ from mapping techniques, since they entail the combination of several variables and initial hypothesis, and they overpass a simple demarcation process. Although some mapping techniques rely on

hypothesis and variable selection, zoning goes a step further in its attempt to classify and order information and in the wealth of collected information that is not available on the map itself.

This manual is dotted with examples (italic boxes and illustrations) from a case study conducted in the Amatola District of the Eastern Cape (Lhopitallier & Perret, 1999). Such examples should assist the reader in understanding the procedures through concrete examples.

### 3- OBJECTIVES AND PRINCIPLES OF A ZONING BASED ON VERBAL REPRESENTATIONS

The information is generally fragmented (soil, climate, demography, production volumes, health, transport networks...) and rarely up to date. Furthermore, where censuses exist, they often deal with the description of an object in relation to administrative boundaries, which are not always relevant to understand the diversity, evolution and prospects of the rural population and agriculture.

Therefore, the choice is here to take advantage of the knowledge of local stakeholders who live and work in the area. The produced knowledge is structured from the verbal representations of stakeholders who have already unconsciously completed the essential part of the analysis of the complex situation.

The objective is to organise all available knowledge in order to produce and map all operational elements needed for rural development planning. It relies on the understanding of the social processes that determine the organisation and management of rural areas. Zoning also attempts to stimulate the participation of all rural stakeholders to the planning process by creating a dialogue around development prospects and issues.

Experience has confirmed the interest of the verbal representations of local participants, whose expert capacities prove to be very productive. It is the comparative analysis of their representations, the search for consistencies and inconsistencies between them that will enable one to generate new representations.

The first option relies on the choice of variables that account for the diversity and the dynamics of the situation. They are not determined *a priori*, but become the object of the study. Conversely to most of the agro-ecological

surveys and GIS, the variables that are not chosen *ex ante*, according to the abilities and skills of the expert in charge of the analysis.

The second option consists in using cartographic support as the basis for dialogue and the portrayal of knowledge. It allows the persons interviewed to express themselves while referring to specific locations, material objects, geographic boundaries, etc.

The third option is to focus on dynamics. Diversity is the focus one can easily start with. One has then to further explain diversity by taking into account forms of territorial and social organisation. Such a process is the basis for modelling rural space evolutions. Space is looked upon in its entirety and the exercise integrates the influence of different stakeholders and of exogenous phenomena and events.

It is then a matter of defining the links that exist between different HSUs: financial and demographic flows, products and labour force flows, complementarity and synergy, competition and even conflicts around the appropriation of production means, resources or markets.

#### **4- METHODOLOGICAL STEPS**

The zoning operation can be subdivided in various phases. Each of them has to be strictly followed. Yet, in order to get the necessary consistency in the research, one must understand that zoning is an iterative process.

Phases can be defined in the following manner

- Preparation phase,
- Interview phase,
- Analysis phase,
- Feedback phase,
- Synthesis phase.

##### ***A- The preparation phase***

The preparation is an essential step towards a proper implementation of a zoning operation. Reckless preparation will lead to poor final results. An essential aspect of the preparation, as with most research undertakings, is to prepare questions and hypothesis, that will hopefully be at least partially answered by the zoning.



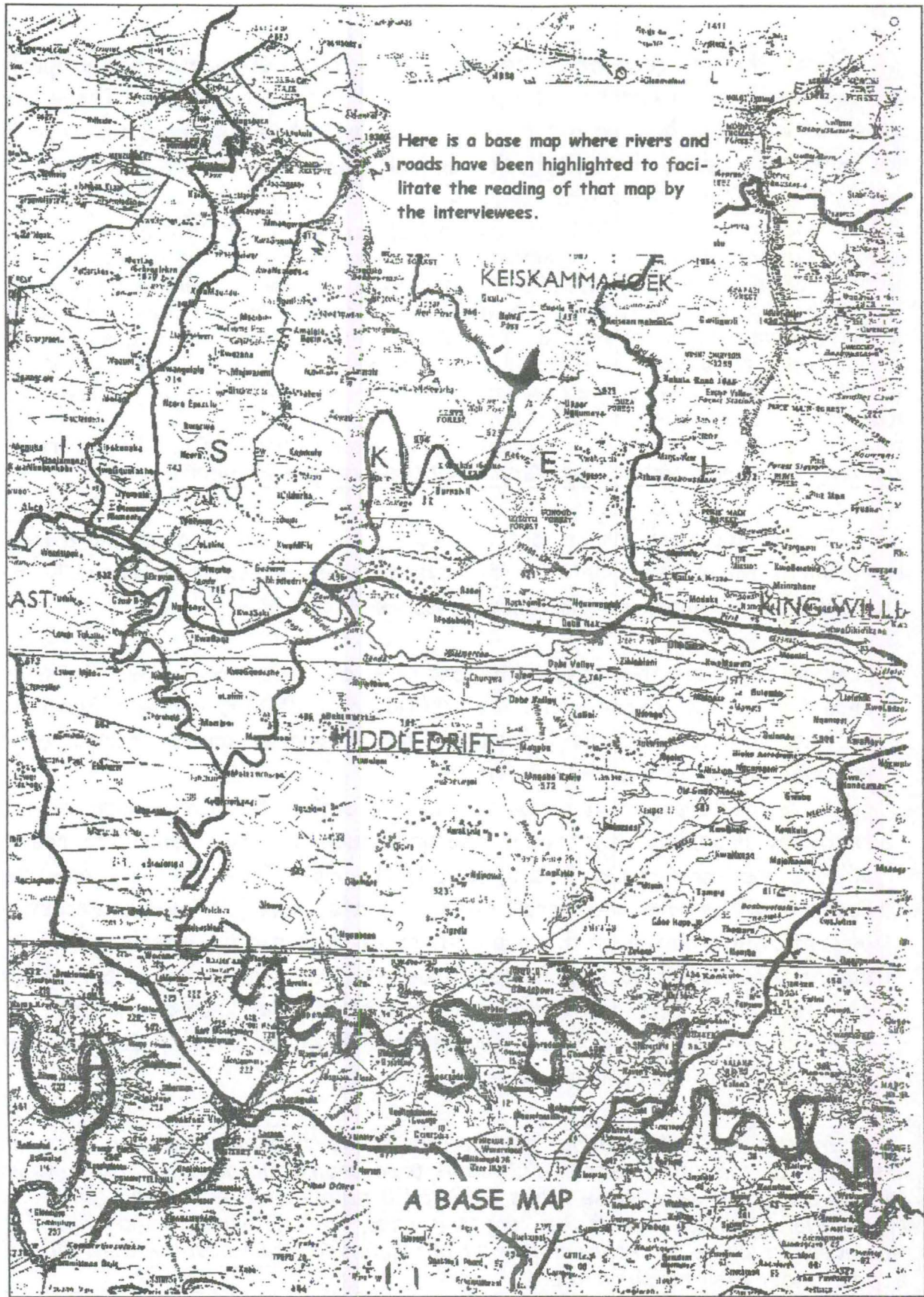
Once the key question to be answered and the objectives are properly defined one has to choose a target area and define it properly. There are numerous ways of choosing a target area but one should be able to properly define its boundaries, whether physical or political.

*The aim of the Amatola zoning project was to complete a zoning of the rural diversity, with a triple objective. On the one hand, the zoning is to allow a better interpretation of the results obtained by the research team in the area of Kambashe, by situating Kambashe in its environment, by identifying the main basis of organisation of the regional layout and financial, demographic and products flows. On the other hand, highlighting the diversity of the situations allows one to envisage the validation or the adaptation of the knowledge acquired in Kambashe, in particular the elaboration of a regional typology of households. Finally, the zoning process would explore ways of improving access to information, negotiation and planning at the local government level.*

One should then also select a proper base document, generally a map, which will be the main support of interviews, analysis and synthesis. Basically the choice will be based around the following issues :

- scale of the map : the scale will depend on size of the target area. The scale should probably remain within the 1:50000 to 1:250000 range in order to provide sufficient details to conduct the interviews and to remain of a manageable size during the interviews ;
- features depicted on the map : it is preferable to have a map with a relatively important number of features such as : main and side roads, villages and their names, rivers, forest. The more features there are, the easier it will be to locate oneself during the interviews (although an excessive amount of information on the map could create a bias in the interviews) ;
- age of the map : obviously, one has to look for the most recent map available on the area. One must however be careful of name changes for administrative or political reasons that are shown on the map but have not gone into the minds of local people.

*In the Amatola zoning project, the base document chosen was an assembly of the most recent 1:250000 topo-cadastral maps from the Chief Directorate of Survey. These maps depicted a number of very useful features : Magisterial District boundaries, contour lines, rivers, roads, and villages... However, we came to realise that a lot of villages identified on the map did not appear under their proper names.*



One must then prepare the questionnaire framework or matrix that will be used during the interviews. The preparation of the questionnaire is basically choosing a set of variables that are relevant for the area and the questions one should answer. One must also define the key variables that represent best the diversity one wants to represent. The remaining variables will be there to provide additional information and to help in cross-checking the answers. One must therefore look for inter-dependant variables.

Here are the main variables that were used for the Amatola zoning project : productive activities, sources and level of income, types of farming, land tenure, land use, natural resources, demographic patterns, main employers (local and non-local), rural-urban linkages, local services, infrastructure, marketing system, political system, external interventions, main problems, perspectives, projects. The main variables (i.e.: the variables we deemed relevant to highlight the diversity) were productive activities and sources of income.

The whole preparation relies on a preliminary knowledge and understanding of the area that has to be tackled. That knowledge does not have to be extensive, however one must have some idea of what is happening in the area. The collection of secondary data is crucial and could prove very useful at a later stage. Flicking to available reports and informal discussions with people conducting research or living and working in the area can be of valuable help.

One must eventually tackle the practicalities of the operation (i.e. organising the interviews. Ideally, one should try and test out the selected base map and designed questionnaire beforehand to see whether they will be suitable thereafter and then modify them if needed.

### ***B- The interview phase***

Zoning based on verbal representations is supposed to be a «lightweight» operation. One has therefore to carefully plan interviews in order not to waste time and energy in conducting the interviews. These considerations obviously depend on the size of the area one has to cover and the type of questions that have to be answered.

Ideally, one should try to work through some form of organisation when setting up the interviews. The choice must be made according to the objectives

of the research. A degree of legitimacy should also be sought. Such organisation could be :

- local authority,
- farmers association,
- community organisation.

Such organisation will be able to motivate the community around the research and to centralise everything, especially in areas where means of communications are poor or non-existent.

One must then concentrate on the sampling of interviewees. Key aspects are as follow :

- a wide socio-economic diversity,
- a wide gender and age diversity,
- a selection of key people (i.e. : people that have a good knowledge of the area one is covering through their activities).

#### ***Role of the informants, further quotations***

*" The key informant is an individual who is accessible, willing to talk, and has great depth of knowledge about an area, certain crops, credit, marketing and other agricultural or rural problems. Do not believe everything key informant say but do not pass up the old timer who enjoys talking. In any community it won't take long to construct a chain of key informants : banker or money-lender, landlord, farmer, merchant, middleman... Each person in the chain may see the problems differently" (Rhoades, 1982)*

*"It is important to realise that every informant has his/her own interest and that what someone tells a researcher does not have to be inaccurate to be misleading. It is necessary to challenge unsatisfactory responses... One develops an attitude of "suspended disbelief" whereby one accepts what one told only in a provisional way until it is confirmed by other key informants. "Mirror-image interviewing" is recommended, which involves asking informants the same set of questions in order to cross-check easily."(Mettrick, 1993)*

The size of the sample obviously depends on the means in terms of manpower one has. However, one should not go below five interviews per area for the sake of diversity and to enable the subsequent comparative analysis.

## Group interviews vs. Individual interviews

Regarding this matter there is no miracle recipe. Individual interviews should be favoured but group interviews can be interesting and challenging as it offers scope for community debate. Should one opt for group interviews, one has to be careful about the following aspects :

- make sure that no one within the group will be inhibited by other members of the group (i.e. young vs. elderly, chief vs. subjects, rich vs. poor) ;
- encourage debate whenever possible and gather as many different points of views as possible ;
- make sure to reach a consensus before consigning the information in the interview matrix.

*During the Amatola zoning project, it was decided to organise the interviews through the Transitional Representative Councils (local government structures at the Magisterial district level). They would mobilise the communities and organise people to come for a meeting with us for interviews. Depending on the number of people present, we would either conduct individual interviews or group interviews.*

Before starting with the interviews, one should present the objectives of interview to the interviewees and be willing to answer all arising questions. Confidence building is the key to successful interviews.

Practically, the interviewee will be placed in front of the base map, a sheet of tracing paper will then be placed over that base map in order to draw with a lead pencil the spatial units identified by the interviewee.

An essential aspect of the interview is the initial step of getting people acquainted with the support map. One has to make sure that the interviewee has understood the map and is able to locate his environment and other features on the map before carrying on. A good way of doing so is showing :

- the main roads,
- the rivers,
- the towns and villages,
- main relief features.

and then asking the interviewee to locate his village on the map. It is also important to define with him his «area of knowledge» (i.e. : the area, he is confident with and not necessarily the whole study area).

The following step is the interview itself. One must rely on the key variable to get the interviewee to draw on the tracing paper the different spatial units within the chosen area. One must then gather from the interviewee the main elements that differentiate one unit from the other.

One must then gather information from each defined unit and place it in the matrix. It is a tedious operation and, with a bit of skill and experience, one can conduct the drawing of the map and the filling of the matrix in a simultaneous manner. An interview should not last more than two and half-hours as the interviewee interest and concentration drop. Before concluding the interview, one must also get the interviewee to conduct a self-criticism of its draft map. Are the units truly different or homogeneous? Could some units be merged or other units be sub-divided? The information gathered in the matrix will be very helpful for assisting the interviewee in his self-criticism. Each interview will provide one map and one matrix.

At the end of the interviews, we come up with numerous maps giving a diversified picture of the target area.

### ***C- The diversity analysis phase : comparative analysis of the different interview maps***

The maps must then be combined in order to obtain a synthetic map, based on the comparative analysis of the different interview maps and giving a clue to the questions raised before the start of the exercise and bringing us closer to the objectives set by the zoning. This synthetic map is therefore based :

- on the comparative analysis of the interviewees verbal representations of their environment.
- but also on the researchers' hypothesis and analysis of that area, bringing in the analysis of secondary information available on the area.

Practically, each interviewer should present his interview map to the other interviewers, briefly describing all the spatial units that were identified during the interview. Once everyone has a clear picture of everybody else's map, it is possible to start overlapping the maps and look for consistencies between the different maps.

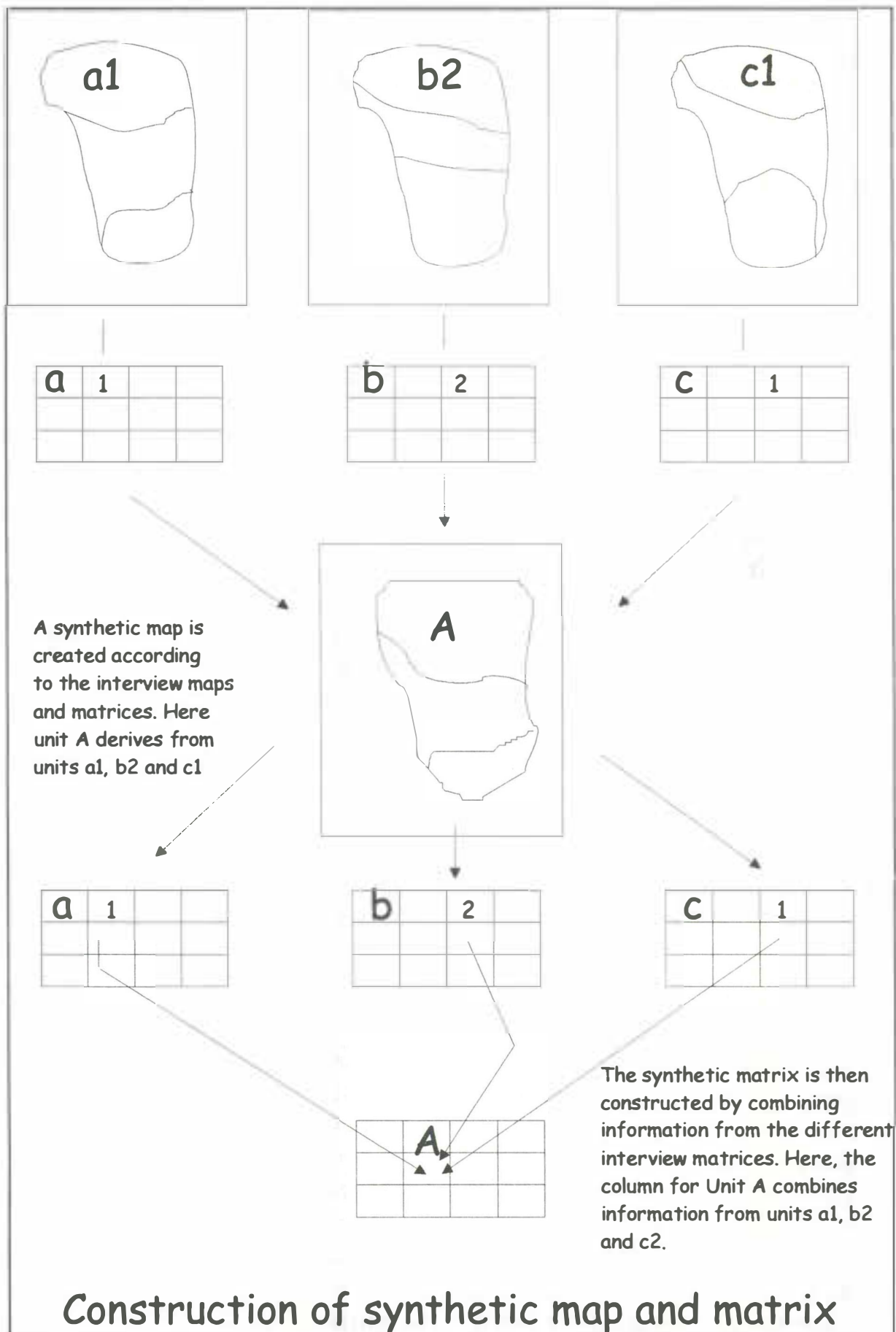
The idea is to start with units that match across different maps. A basic rule is to put more trust in a map that contains more information than the others (possibly more units) did. A constant reference to the accompanying matrices will also be of precious help.

The main problems likely to arise during this phase are the following :

1. some areas have not been covered by interviews.
  2. maps contradict each other
  3. units are similar from one map to the other but the boundaries do not overlap
1. In that case, the only solution is to resort to further interviews
  2. As it has been said before, one should always rely more heavily on the maps that offer more information. Otherwise, some contradictions can easily be solved through the use of the matrix, the checking of inconsistencies and the reliance on secondary data (field observations, reports, land use maps...). Further interviews could also prove useful.
  3. The main idea around the construction of the synthetic map is to look for a set of explanatory variables that define each area and differentiate it from neighbouring ones. These variables can often be used to redraw the boundaries from maps, matrices and secondary data.

*For instance, in Centani magisterial district, two interview maps showed different boundaries between a cattle farming area and a goat farming area. We therefore looked for an explanatory variable that would explain the spatial distribution of those two types of stock. That variable was vegetation (goats being browsers and enjoying «bushy» environments). However, we did not have a reliable vegetation map of the area. We then based ourselves on another variable that could account for vegetation patterns : relief. In the area around the possible boundary, we noted a sharp change in slope. We therefore redrew the boundary according to that change of slope : the goats would be on the bushy steep western slopes going down to the river whereas cattle would be distributed on the flat high lying areas to the East.*

Once a consensus has been reached over the synthetic map, it is time to prepare the corresponding synthetic matrix. The process is quite similar to the building of the synthetic map. The new units of the synthetic map correspond generally to a combination of units from the interview maps. One must therefore combine the information from within each interview matrix into the synthetic matrix. For instance, if synthetic unit A refers to the interview units a1, b2, c2, d4 and e1a (i.e. : HSU 1 from interview a, HSU 2 from interview b...), then the information from those various columns of the respective matrices must be combined into the column of unit A in the synthetic matrix.



## Construction of synthetic map and matrix



One will soon find out that information is lacking for some variables or that information is contradictory between interviews. A lot of it can be solved by applying further hypothesis (to be validated during the feedback phase), checking for consistencies and exploiting the available secondary data.

The phase ends up with a synthetic map and its corresponding matrix. The product is often very different from the initial interview maps as researchers have done a lot of interpretation. Furthermore, information might still be missing and some contradictions cannot be resolved during that phase. A validation phase is therefore necessary in order to get the community's approval of the product, to correct inconsistencies and to gather any missing information.

*D- The validation phase : feedback, field observations, random interviews and secondary data*

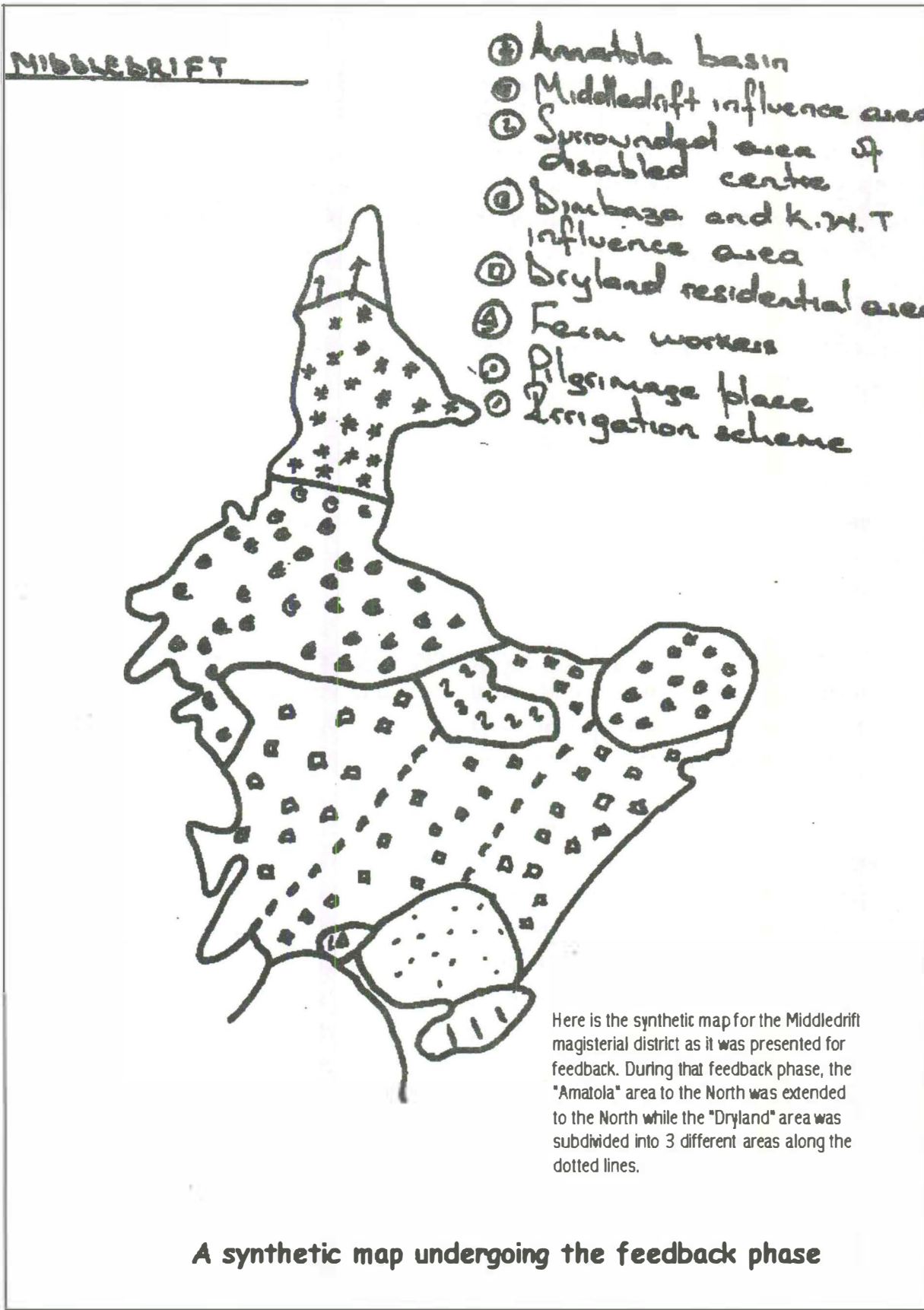
The feedback aspect of this phase is very similar to a participatory workshop. It is very important to stress to the respondents that this not «their» map but a combination of maps analysed through a researcher eye. Their full criticism must be encouraged. Any missing information must be obtained during that phase and any inconsistencies removed.

Practically, it involves organising a further workshop with the communities. Ideally, one should be able to gather once again the people that were already interviewed and also other people that were not able to join the interview session but could give a different insight into the study area.

Confronting the collected and analysed verbal representations with other sources of information (landscape, reports, statistics, and aerial photographs) is crucial. Such sources can provide further information, especially quantitative information that is often lacking from the interviews. They can also solve the problem of conflicting statements. However secondary information is often lacking or outdated in areas where zoning exercises are supposed to be held. The most reliable external sources often remain landscape reading and on-the-spot interviews which enables us to verify a lot of sayings.

One must understand that one has dealt mainly with subjective information. That subjectivity has to be taken into account and dealt with. It cannot be ignored. However, those subjective views have to be confronted with each other and with other sources of information. Confronting those collected

and analysed verbal representations with secondary information (landscape, reports, statistics, and aerial photographs) can further reduce subjectivity.



This confrontation will enable us to identify general characteristics that are common to the various subjective views. Some characteristics or statements cannot be reconciled in any way. These contradictions are also a source of information in itself. One then has to understand why stakeholders are offering contradictory views (what are their objectives, their strategies ?...). Further interviews, dealing more specifically with those unreconcilable points can assist us in dealing with such issues.

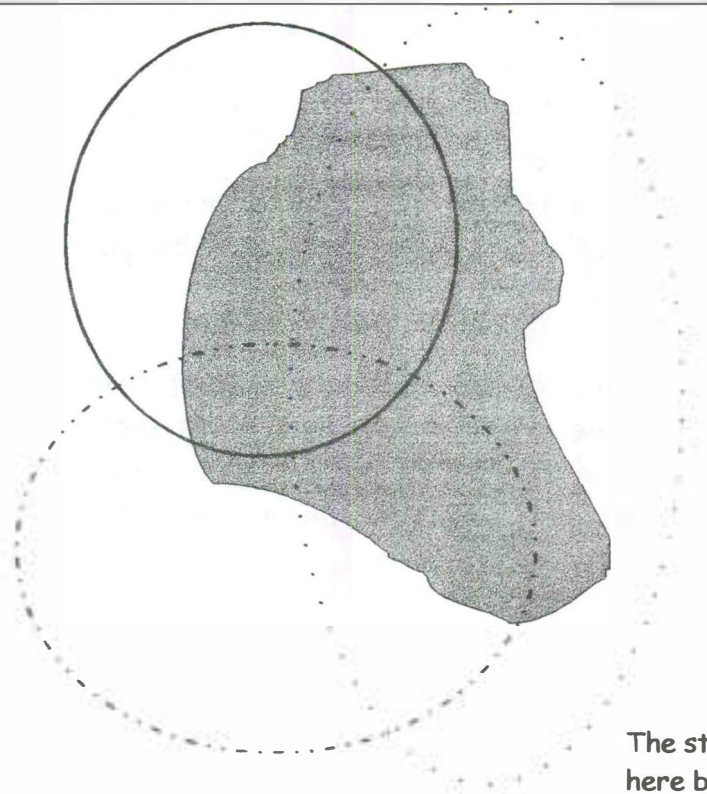
The analysis of the historical construction of such a reality and its dynamics is made possible by the picture of diversity the zoning provides us with. One should then try to build a model of spatial organisation by identifying the basic elements of the diversity and the main relationship between HSU (flows) and putting them into perspective.

## 5- COVERING A LARGE AREA : AN EXTENSION OF THE ZONING OPERATION

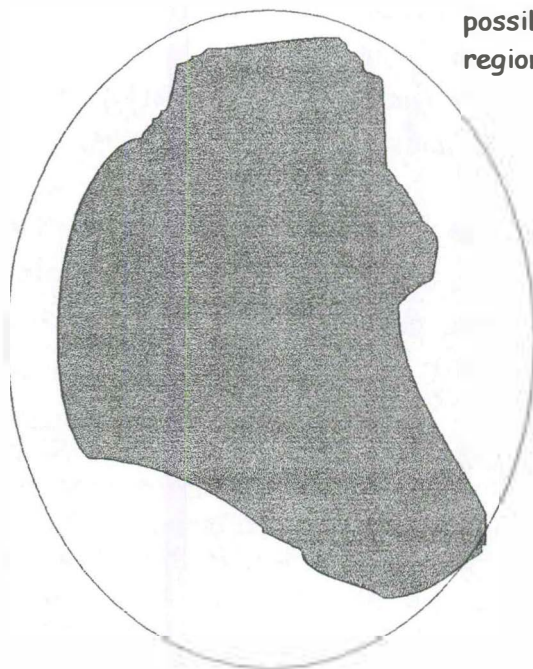
The zoning operation can be applied, time and resources permitting, to large areas. The idea is to subdivide that target area into smaller areas where the steps mentioned above can be implemented into each of those sub-areas. However, one has to make sure that sub-areas overlap, albeit marginally. It will enable one to look for consistencies between interviews.

Once one gets a number of maps for each area, one must then overlap them and combine them into a big map covering the whole of the target area. Problems very similar to those arising during the analysis phase are likely to surface. They must be dealt with in a similar way.

*A problem arose during that phase. Maps from Stutterheim and Komga districts overlapped but did not give similar information on an area along the banks of the Kei river. Stutterheim map considered this area as a perishable production area (vegetables and milk) whereas the Komga map delimited within that perishable product area a goat area. Our initial hypothesis was that we should rely on the Komga map since that map provided more detailed information on that area. In order to verify this hypothesis, we were going to try and prove that this area was not suitable for perishable production (although we could not prove for sure that goats would be there, we could easily prove that it was unsuitable for perishable production). We used a 1:50 000 topographical map of that area in order to gather evidence. We then realised that both the northern and southern banks of the Kei river were not similar in that particular area : whereas the northern bank was flat, the southern bank showed to be very steep and therefore unsuitable for irrigated vegetable production. We were then able to redraw the boundaries according to that secondary evidence.*

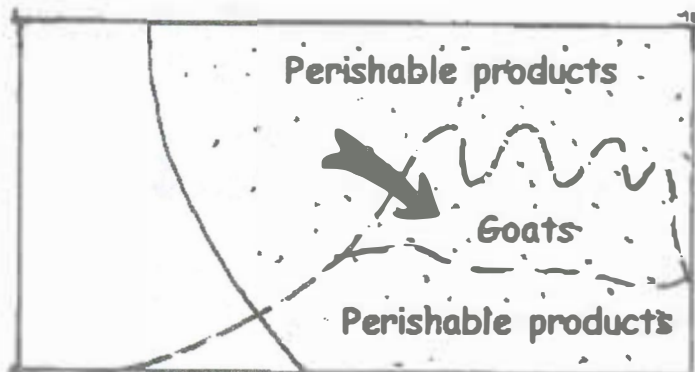


The study region is represented here by the filled area. 3 synthetic maps (the ellipses) overlap to cover the whole region. It is therefore possible to combine them into a regional synthetic map (see below).



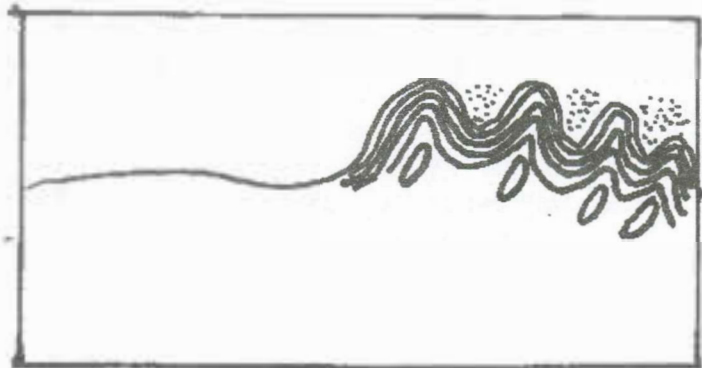
From Local knowledge to regional understanding

**Problem: a goat production area overlaps a perishable production area**

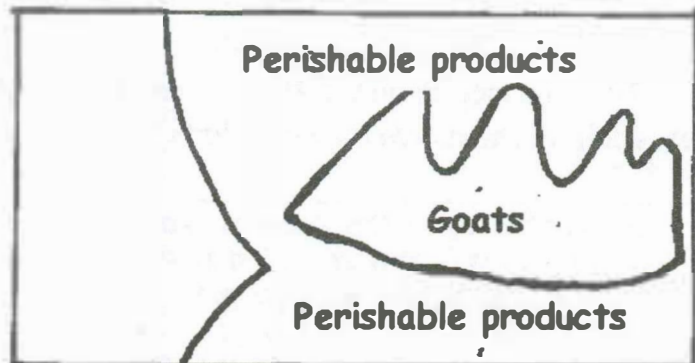


*The limits of the Stutterheim synthetic map are filled whereas the limits of the Kanga map are dotted.*

**Use of the 1:50000 topographical map as secondary evidence (topography and crop production symbols)**



**Proper combination of the two maps according to the secondary evidence**



The initial large map should hold as much information as possible (synthesis should not lead to the loss of information). It is the raw product of the zoning operation.

## 6- THE USE AND LIMITS OF ZONING RESULTS

### *A- Possible uses*

One must understand the inherent instability of the final map. As the map tries to record ongoing development processes and dynamics, it is likely to be outdated by the time it is completed. The situation on the ground is very likely to evolve very quickly. Furthermore, the map relies heavily on subjective and qualitative data.

The map must be seen above all as a tool to stimulate discussion and debate around development issues. It is not a direct tool for planning and should not be used as such. The map is more like a toolbox for raising and answering questions. One asks a question and lets the map provide elements to answer it. If one wants to stress a particular point, the map can present it nicely. The possibility of producing numerous different maps picturing the same studied reality is there to stimulate debate and avoid a technocratic style of planning.

The raw map is only a tool. It can then be used to design dozens of other maps, each of them giving a new, different picture of the area one has covered.

*For instance, in the Amatola zoning operation, a map was produced with the following idea : how to cut across the former boundaries of apartheid that are still so present ? Drawing a map with land tenure as the main feature that would have basically shown us the historical boundaries between the former Republic and the former bantustans. On the contrary, the idea was to be able to think of development opportunities with an holistic vision of the Amatola district. We therefore decided to concentrate on the main productive activities within the district (bearing in mind the fact that in most communal areas, these activities are not the main source of income as most of the income is being drawn from external sources). We then came across new areas that would include both communal and commercial farming land but shared similar activities, albeit on a different scale. Such a map can assist in thinking of how to integrate small-scale farmers into, for instance, the wool industry by extending the wool collection area.*

In order to try and keep the dynamic aspect of the map, it is a sound idea to look for indicators of change throughout the operation. Such indicators will

prevent one from conducting the whole operation again in order to update the map.

Identifying such indicators turns the map into a very powerful tool. It can then be used for prospective purposes and modelling. By using those indicators, one can follow-up changes and dynamics within the area and start feeding ongoing planning processes with a scenario approach.

- what impact will a new road have on the area ?
- what impact will a new crop introduction have on the rural economy ?
- is it wise to undertake a new administrative demarcation ?

Linking up zoning within common « mainstream » tools such as Geographic Information Systems can then give a forecasting aspect to the whole planning process. Taking into account current dynamics will enable the anticipation of change on the ground.

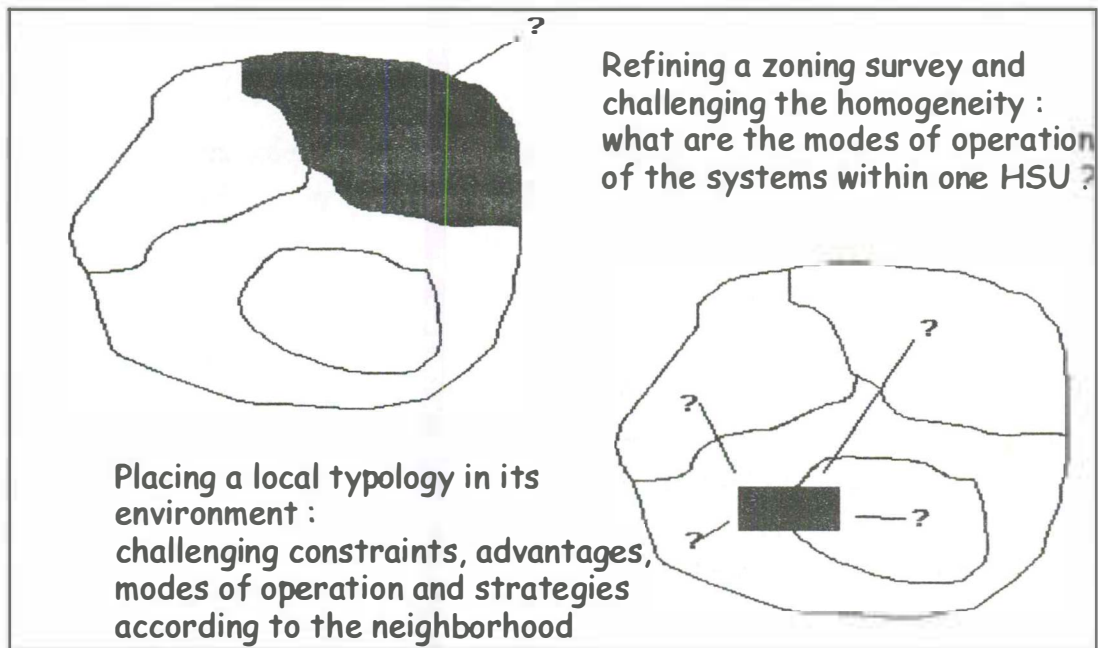
### *B- Connection between zoning and other survey techniques*

One can put forward that most of the objectives and outcomes of zoning studies are also expected from farm / household typologies, for instance (Perret, 1999). However, the procedures and the scales are different. Even though zoning procedures often cover larger areas than typological studies, the size of the studied area is not the main and only criteria to differentiate them. Typological studies try to find out consistencies in farms' operation and attempt to group them as reasonably homogeneous groups, mostly according to strategic, technical and economic criteria. Whereas, socio-economic zoning attempt to find out consistencies in land use patterns and activities. It usually relies on the agrarian system level.

In some areas, the short distance variability can be more important than the long distance variability. For instance, the differences in farms' operation and peasants' strategies within an agrarian system can be more marked than the differences and transitions between agrarian systems at region level. It can be then wise to rely on typologies.

It can be interesting for instance to carry out a typological study within a HSU, previously defined through a zoning process. Conversely, a zoning procedure may include an area previously studied through a typology, in order to locate this area in its environment, by identifying the agrarian systems' patterns and the flows of people, money, products at the region level.

These techniques appear to be complementary to each other.



### *C- Inherent limits*

The main limit is linked to the nature of the whole exercise : its inherent subjectivity. The zoning offers one's perceptions of interviewees' perceptions and nothing else. It is therefore very important to carefully select the interviewees and to be able to gauge each interviewee position and background when confronting it to others.

Another aspect is the nature of information that is collected. We are only identifying surfaces whereas space is also composed of lines (roads, rivers...) and points (clinics, shops, villages...). Furthermore, such surfaces or areas are not always defined according to a similar criterion. For instance, in the Amatola zoning, some areas were delimited according to the prevalence of a given stock type (i.e. cattle) while other areas were delimited according to a functional aspect, the accessibility of urban centres (although there might well be cattle in those urban biased areas).

Regarding the limits between spatial units, one must understand that they are not precise and should not be relied on. Obtaining accurate limits is close to impossible and is not the objective of the exercise.

The term "homogeneous" refers to the specific criterion selected to demarcate one spatial unit from the others. However, it still conceals the social differentiation with that unit and the spatial heterogeneity at a bigger scale



(built-up areas, grazing areas, arable plots...). In the Amatola zoning, areas referred as irrigation schemes are wider than the scheme itself. They encompass all villages that benefit in one way or the other from the scheme, some villages might benefit more from the schemes than others and, very probably, part of the population within those villages is not involved at all on the scheme.

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