Context Paper Three
Modus Operandi for Participatory Land Suitability Activities - PALSA: A New Approach

Background to Land Suitability and Land Capability

The present methods of classifying land in terms of its suitability for a particular land use or crop have been in existence for many years and have been to a very large extent used by land use planners who have been part of a formal government structure such as a ministry or department, or who have been employed on a donor-funded project.

The purpose of these systems is to identify areas that are more or less suited to either a land use type (LUT) or a particular crop. First, a classification system is formulated. Work is then carried out in both the office and the field to identify the characteristics that affect the land use in the area. Finally, a map is drawn – to show distinct areas – marked by colours or particular symbols, each area being more or less suited to a different LUT.

The objectives of the suitability or capability classification systems have been:

- to achieve a higher sustainable agricultural or horticultural productivity,
- to choose the best use for a particular area of land, and
- to protect and conserve those areas where long-term production is not possible.

In very simple terms, land capability classification systems have been generalised in terms of what type of land use a particular area is suited for – e.g., irrigated or rainfed agriculture, forestry, pasture, recreation. Land suitability can also be much more focussed on the specific crop that has potential in any given area of land.

Traditionally, the work on the simple land capability or the more complex land suitability has been the mid-way point between land resource surveys and land-use plans. All the data collected from land resource and soil surveys are documented and analysed using the capability/ suitability classification, from which a land use plan can be drawn up and presented to the donor, the ministry, or the local authority.

You may have noticed that one very important element is missing from this profile of what is largely an academic exercise - the missing link upon which the success of the resulting land use plan is based is the community which owns or has user rights on the surveyed land.

This session, therefore, presents a method of investigation that attempts to put people first in land resource surveys.

PALSA

What is PALSA?

What is presented here is a form of land suitability activity that includes the traditionally missing link - the farmers and communities. It is a form of land suitability (not land capability) in that it is carried out at the watershed or village level and specifically targets the needs of the communities and the individual farmers - their needs from the environment in which they live. Among many others, these needs can include:

- food, fodder, fuelwood from the forests and areas of scrub and shrub,
- staple food and cash crops from the fields,
- water from the hill or valley streams,
- grazing areas, and
- urban centres and recreational areas.

The most renowned and well-used system for classifying land in terms of its suitability is the FAO Land Suitability Classification developed introduced in the 1970s. This can be used as a highly complex or a relatively simple system. In its simple form, it is described in Table 1. In Participatory Land Suitability Activities (PALSA), there is a strong possibility that it can become very complicated, depending on the needs of the community or farmer, but this is a reality of life in agrarian communities from which we should not shy away.

Ideally, PALSA is a meeting of minds from the inside and from the outside.

The Insiders are those that live, work, and make their living in the target area; these are the people who know

the history of the land, the capabilities of each area in terms of production, from where the fuelwood and fodder is collected, and which source of water is good for the livestock. But, in many areas of the HKH, these are also the people who are under great pressure in terms of land resources and sustainability, whose aspirations are increasing, and who run into trouble as these pressures build at the household and farm levels.

The Outsiders are a group of trained specialists, ideally with experience of the survey area or type of environment and knowledgeable of village life in rural communities.

The Outsider group would ideally consist of four persons, with specialist knowledge in the following fields:

- 1 x soil scientist (also with a good knowledge of geology),
- 1 x agroforester (also with a good knowledge of forestry),
- 1 x irrigation engineer (also with knowledge of ground water), and
- 1 x agronomist (also with knowledge of horticulture and fodder species).

PALSA - The Modus Operandi

It is essential that the Outsiders do not go blind into an area. It is important that both RRAs or PRAs are undertaken beforehand and that community leaders in the area have already been met. The Outsiders must be furnished with basic information, both social and geographic.

This is also true of the Insiders. It is therefore necessary for a number of meetings to be held between the Insiders and Outsiders, so that they know what to expect from each other.

Meeting the People

These formal and informal meetings between the Insiders and Outsiders are important as they will set the tone and collaborative spirit for the survey work to come. It is necessary in most HKH societies to start at the hierarchical top by meeting the sub-district or village leaders first. Once the leaders, preferably both male and female, understand the modus operandi, and the Outsiders have confirmed what are the major concerns of the community, larger groups can gather for the main presentation of the survey objectives and procedures.

Presenting the Case

When the larger village or sub-district/watershed groups is gathered, the Outsiders must explain what they can provide in terms of advice and options. Photos, slides, and even videos are useful at this stage to show cash crops, crop options, A-frame use, SALT and other agroforestry systems, fodder farms, polythene technology, EM composting, etc., in other words the possibilities of what the Outsiders can provide if farmers are interested.

A simple presentation of the FAO Land Suitability classification must also be presented at the meetings so that, when the surveys begin, the end product is understood.

Raising Awareness

A number of these meetings will be required if the task is to produce a land use plan for the watershed as a whole. Preparation for each meeting is essential as the interest of different groups will differ. For example, high-altitude yak herders, farmers upland rainfed lands and lowland paddy farmers will have some similar interests,

Table 1: Structure of the FAO Land Suitability Classification

S	Suitable	The land can support the land use indefinitely and benefits justify inputs.
S1	Most suitable	Land without limitations that will significantly reduce productivity or require extra inputs. It is useful to include the best 20-30 per cent of suitable land as S1. This land is not perfect but is the best that can be hoped for.
S2	Moderately	Land that is clearly suitable but which has limitations that either reduce productivity or increase the inputs needed to sustain productivity compared to S1 land.
S3	Marginally	Land with limitations so severe that benefits are reduced or inputs needed to sustain production are increased so that this cost is only marginally justified.
N	Not suitable	Land that cannot support the land use on a sustained basis or on which benefits do not justify necessary inputs.
N1	Currently not suitable	Land with limitations to sustained use that cannot be overcome at currently acceptable costs.
N2	Permanently not suitable	Land with limitations to sustained use that cannot be overcome.

but they will also face particular problems and challenges with which they may require assistance.

It is also a good idea to target the schools in the area or watershed in which the PALSA is to take place. Children in school are a captive audience, and a lively presentation will inspire their interest. First, they define the problems their families face; then the Outsiders provide a description of the objectives of the survey, following which they, as a group, air some possible solutions and options. Again photos, slides, and videos can provide an added dimension.

Survey - Village Resources' Mapping Method (Including Problem-Solution Charts)

Brief Explanation

This method consists of two steps. The first entails requesting the villagers to draw a map showing the important resources they use. These may include land, water, fodder, timber, firewood, trees, land use and land types, soil types and productivity, cropping patterns, and erosion and degradation. Other resources and infrastructures may also be indicated.

The main task of the 'facilitator' is to copy the map on paper (if done on the ground/floor), listen to the explanations, and ask questions afterwards. The facilitator should not intervene in the mapping exercise.

The second step requires making a problem-solution chart. After completion of the map, the villagers should be asked to explain how the village resources are managed. Problem areas, management and control measures, tried-out solutions, and planned or possible interventions could be indicated or discussed.

Considerations

Instructions should be very general, leaving as much as possible to the initiative of the villagers. The group could appoint one person to draw. The map could be drawn either by starting the drawing at the point where the group is located, or by first drawing the boundaries of the village and/or the position of adjoining villages, roads, ridges or rivers.

One can either involve a group of 6 to 10 villagers in drawing the map or involve many more villagers.
In the latter case, one could start with a first group of some 8-10 villagers and request them to draw a map showing the important village resources. Others can join the group later and additional resources can be added and/or modifications can be made. Villagers continue to modify the map and add features until they are satisfied with the map. Alternatively, especially if many villagers are present at the start of the exercise, one could split the villagers into two or more groups, each making their own map. In this case it may be useful if each group is composed of one type of resource user, e.g., a group of women and one of men, or one of land owners and one of share-croppers. The latter approach may give a better indication of the importance of certain resources for each user group.

Villagers may join the group on their own initiative. As long as this does not disturb the process, no intervention from the facilitators is required. If needed, the facilitator may intervene in order to help find solutions in case of major disagreement.

If one works with one group of villagers only, the group should include representatives of all major resource user groups. Care should be taken so that all user groups participate in the exercise. The views of landless share-croppers are as important as those of big land owners.

When the villagers consider the map to be complete, the facilitator may use his checklist and ask the villagers if the specific checklist topics that are not indicated on the map are not very important for them or if they were overlooked.

After completion of the map, the villagers should be asked (by using a stick) to indicate the different resources and explain how these are managed. Persons selected for this step should include representatives of the different resource user groups who can or will speak freely. The facilitator could ask open-ended questions to make sure all resources have been considered.

For each resource, the management practices, constraints, tried-out solutions, and planned or possible interventions could be indicated or discussed. The group can select one member or one can ask the first person to indicate a constraint to make a sketch or draw a symbol for that particular constraint on a separate sheet of paper (this will speed up the problem identification step).

Materials

Local materials may be used to draw the map. The villagers may use their imagination in choosing the materials. Drawing on the ground with a stick or knife may be the starting point, followed by the use of sticks, stones, flour, leaves, etc, to indicate different resources/ land uses.

Sheets of paper, pencils, felt-tipped pens, etc should be taken along and provided if the villagers feel comfortable using them. However, these materials may make it more difficult and time-consuming to make modifications to the map.

The final choice of the materials should be left to the villagers.

Sheets of paper, pencils, and coloured markers should be provided to make the sketches or draw the symbols for each constraint.

Time

The required time is 1 to 2 hours for the mapping exercise, 1 to 2 hours for the constraints-solutions diagram.

Products

- A village resource map
- A diagram indicating the important resources of the village, their management, their constraints, the solutions tried and other possible solutions (Table 2)
- Papers with symbols or sketches of the constraints encountered

Different Steps To Be Taken

- Briefly explain the purpose of the exercise
- Request the villagers to select 6 to 10 representatives of different user groups to participate in the exercise, or some groups of 6 to 10 villages who will make their own maps. In the latter case, each group should consist of one type of resource user.
- Select a suitable place to make the drawing.
- Explain to the selected group that you would like them to draw a map showing all the important village resources, and request them to use their full imagination.
- Ask the group which materials they would like to use to draw the map.
- When the group has finished the map, request another group (if more groups of villagers have been

Table 2: Example of Constraints-Solutions Diagram for Pungshi (Pakshipungshi), 'Mewang Gewog, Thimpu Dzongkhag

Resources	Constraints/ Problems	Solutions Tried/Tested	Solutions Suggested by Villagers
Wetland	Tshochum (potomogeton) weed problem, Lack of irrigation water	Hand weeding twice	Herbicide use
		Wait for rain, leave land fallow	Improve water distribution according to land holding (RGOB action)
Irrigation water	Irrigation channel broken by landslide	Hollow trunks used to pass the washed-out area, trunks need to be changed every three years	RGOB assistance
Wetland + Dryland	Crop damage by wild animals (boar, deer)	Dead brush fencing, 5 strand barbed wire fences reinforced with branches: ineffective; nighwatching, fires	Chemicals, RGOB to take action
Orchard	Insects and diseases	Use of chemicals, but insufficient knowledge; manual removal in insects	Village-level training on pest/disease control for farmers at the appropriate time of year
		Ashes on infested twigs and branches: ineffective	Chemicals
		Use water from drinking water supply	
Tseri	Fallow due to lack of manpower		
Livestock	Low milk yield from local cattle, no knowledge of Jersey-cross or other improved cows		Receive a Jersey-cross cow on trial to find out if it would be advantageous or provision of Jersey bull for cross-breeding
Forest	Forest policy/act too strict/cumbersome		Improve forest act: easier access to forest products for HH use by rural HH
	Insufficient firewood (50 loads/HH/year)		
Drinking water	Broken water pipes	Tried to join the pipes by heating the iron, tried to join the pipes with rubber strips: unsuccessful	Repair with RGOB assistance (train people on maintenance/repair, provide tools)
Houses	No electricity	Reported 6 times through Gup: no result	Send copy of our report to responsible dept. (Advised to put through GYT/DYT)
	No latrines	Temporary structures built	Latrine with cement, pipes (DWH support)
Infra-structure	Not enough good cattle tracks	Tracks improved by villagers, but many big rocks	Tools + materials required to blast the big rocks/stones (PWD assistance)

identified) to join them and suggest additional information or modification.
- When the map is finished, identify topics on the checklist which may have been overlooked and ask the villagers if these missing topics are important for them and if they should be indicated on the map
- Copy or photograph the map that is finally produced, if it is not done on sheet(s) of paper.
- Ask one representative to indicate the different resources on the map
- For each resource discuss

  - its management,
  - its constraints,
  - the solutions tried, and
  - other possible solutions and potentials.

- Request the group to choose one member to make a sketch or draw a symbol for each constraint identified.

Problems

- Hesitation or unwillingness to draw a map. This may happen especially if no group member knows how to write. When using pencils and paper, you can hand out pencils and paper to all group members and ask them to draw some rough figures/shapes on the paper to familiarise them with the material.
- The person drawing does the job without involving the other group members. Ask the person who draws to explain to the group everything that is put on paper and its position relative to other resources indicated on the map. Hopefully this will stimulate discussion.
- The mapping and resources' constraint diagrams are executed as two separate exercises. Request the person presenting the map to indicate one resource at a time and have the diagram filled in for this resource before the next resource is presented and discussed.
- Villagers may want to draw their own individual maps rather than one communal map. This should be allowed for a while, though it does not lead to discussion on the village resources. So, after a while, see if the villagers can appoint one or two drawers and start drawing a group map of the village, having everyone provide inputs from their own maps.

The Transect Walk Method

Brief Explanation

This method serves to explore the village territory in detail together with the villagers. It should take the group through most of the different land use types distinguished by the villagers in their village territory.

Observed or indicated land uses, soil, slopes, vegetation, crops, cultural practices, infrastructure, water availability, erosion, special sites, etc, are noted down. The constraints/problems related to the different land use systems and related solutions are to be discussed.

Considerations

Transects can be chosen, based on the village resources' map. Using the local soil classification as a basis for the selection of the transects is often very useful. Transects may be loops or a trail leading up and down the forest area above the village.

Teams consists of a multidisciplinary team and a number of villagers representing the different major resource user groups. It is most feasible to limit the group size to about 5 to 8 people. If the group becomes too large, communication may become more difficult. Splitting up into two or more groups should be considered if all want to participate.

DO's and DON'T's

- **Make the group feel relaxed and comfortable**
- **Explain the purpose of the exercise**
- **Explain that the input of all group members is important**
- **Let the group decide where to do the mapping exercise**
- **Let the group decide which materials to use for the mapping**
- **Ask if any important resources are missing before going through the checklist**
- **Ask the participating villagers if they want to write their names on the map**
- **Let the group select someone to present the map**
- **If possible, have the group select a member to fill in the resources-management-constraints-solutions diagram**
- **Make sure all group members participate in the problem-solution identification (Ask open-ended questions to specific group members if necessary)**
- **Do not help the villagers with the drawing**
- **Do not ask any leading questions**
- **Do not interfere in the exercise, unless major problems arise**
- **Do not ignore certain group members**

The time of the day chosen to walk the transect should be such that representatives of all resource user groups can participate.

Depending on the variation in the terrain and its user, one or several walks may be undertaken. Each walk should cover as many different land-use types as possible. The villagers could indicate which transect(s)/trails/looops may be the best choice.

The group could produce a diagram indicating different resources, characteristics, management, constraints, and solutions. However, it may be necessary that literate group members take on this task. Symbols should be used as much as possible in order to make the diagram as understandable as possible for all group members.

The sheets of paper could be divided into columns and rows, leaving space for a diagram on top. The topics to be addressed could be indicated in the first column, leaving room for other topics to be added by the group.

The team walks the predetermined transects. On the way the team writes down observed or indicated land uses, soils, slopes, vegetation, crops, cultural and local (indigenous) practices, infrastructure, water availability, erosion, special sites and any other characteristics they judge important.

Some characteristics such as slopes (flat, medium, steep), vegetation, etc, may be noted down without much discussion, but questions may be asked as to how the slope influences the farming methods used or for which purpose the vegetation in the area is used.

Along the transect, the constraints of the different land-use categories and natural resources should be discussed together with tried-out solutions, their results, and other possible solutions. A lot of emphasis should be put on this point.

The facilitator may need to ask questions to ensure that all necessary points are discussed. He/she should ask open-ended questions (e.g., which solutions were tried?, did they work? why? etc) and not leading questions (in which direction is given to the group concerning possible answers: e.g. "Did you have crops damaged by wild boars?" instead of "Which other factors caused damage to your crops?"). Make sure all participants give their input.

Materials

Sheets of paper and pens or pencils

Time

The time needed to complete one transect may range from one to 3 hours.

Products

- Transect walk diagram(s) of the village indicating resources, characteristics, constraints, and solutions. An example is given in Table 3.
- Sheets of paper with symbols or sketches representing the constraints encountered

Different steps to be taken during the transect walk include the following

- Asking the village to select a representative group of resource users
- Asking the group to select a good transect route
- Ask the group to select one group member to fill in the transect characteristics. If this proves to be difficult, one of the outsiders may take on this task.
- Request the group to obseve physical characteristics, such as slope, local soil names, soil characteristics (stoniness, depth, fertility), erosion, etc, and their effects on management practices and productivity and relationship with actual land use. Note this down in the diagram, together with crops and vegetation, yields, infrastructure, and livestock information.
- Problems related to each resource or its management should also be discussed. Problems, constraints, tried solutions and their results, possible alternative solutions, and potentials are noted down in the diagram.
- If needed, ask open-ended questions in order to ensure that all characteristics, problems, and potentials are discussed.
- The reporter notes the characteristics, observations, and remarks on the transect profile sheet.

DO's and DON'T's

- **Explain the purpose of the exercise**
- **Explain how the exercise should be done**
- **Ask the villagers to select a representative transect**
- **Take notes, especially if a group member fills in the diagram**
- **Promote discussion among group members**
- **Ask open-ended questions (what, when, where, why, how)**
- **Do take notes, especially if a group member fills in the diagram**
- **Do not advise**
- **Do not state opinions**

Table 3: Example of Transect Map: Darlung Kha Village, Mewang Gewog, Thimphu Dzongkhag (Source : LUPP, 1994)

Land Type	Forest	Sokshing	Kamzhing	Orchard	Creek	Village	Kitechen garden	Chhu-zhing	Pan-zhing
Soil name charact	Masa Red soil clayey	Masa Red soil loamy clay	Samape Red soil, loamy clay	Byesa Red soil, sandy loam, sandy	Byesa Sandy soil	Samape/ Byesa Red soil, sandy	Samape Red soil, sandy clay loam	Beysa Sandy loam	Samatay-Byesa
Slope	Steep	Medium	Medium	Medium (steep/flat)		Flat	Flat/medium	Medium	Medium
Aspect	W	W	W	W		NW/SW	W	W	W
Vegetation Crops	Blue pine, grasses, shrubs (wild berries), Medicinal plants (Sansa Kachu-incense, Kapisang: Berberis spp.-dye, local medic.	Blue pine, oak, grasses	Wheat, buckwheat, peas, apple, potato, vegetable, willows	Apple, walnut, pear, plum, peach, intercropped vegetables (Asp, Chl, Pot), grasses, young blue pine	Shrubs, bracken	Weeds, willow, vegetables	Fodder wheat, vegetables, weeds	Paddy nursery, wheat, fodder wheat, peas, grasses, weeds	Blue pine, wild berry shrubs, grasses, medicinal plants (Sansa Kachu incense)
Infrastr-uctures	Water tank, Irrigation channel	Irrigation channel	Irrigation channel, willows as wind breaks	Irrigation channel, drinking water, houses, watchman's house	Irrigation channel, drinking water	Houses, ruins, chortens	Irrigation channel, drinking water	Irrigation channel	
Livestock	Grazing cattle	Grazing	5 chickens, 2 cows, 1 pig	10 cattle, 3 chickens deer	Some grazing	1 pig, 3 chickens	1 calf	Grazing	Grazing
Products	Water, timber, firewood, leaf-litter, fodder	Leaf-litter, firewood, fodder, timer	Crops, fodder (crop residues, willow leaves).	Crops	Water	Shelter, eggs, crops	Crops (dried chillies for the whole year)	Crops	Incense plants, firewood, fencing poles, berries, fodder
Land owner-ship	Government, communal grazing rights	Private + communal	Privately owned	Privately owned	Communal	Houses + land priv. Owned	Privately owned	Privately owned	Privately owned
Others	Branches from thorny trees for temporary fencing, mapche: torchwood		Potatoes are the main source of income for non-orchard owners	Firewood (pruned branches), Track blocked by thorny shrub-fence (Taksay gang, Kapisang)		Windbreak (willows) traditional mustard oil press, drinking water	Cattle grazing after veg, harvest	Playing cattle herders, FYM-heaps in the fields	Land left fallow, I langdo converted to wetland - 5 yrs ago, not cultivated
Pro-blems	Forest law (against clearing near agr, land Erosion along irrigation channel in summer, Wild animal habitat	Wild boar habitat Afraid to collect leaf-litter due to wild animals	Crop damage by wild boar and cattle (some fields left fallow) Low fertility, Lack of manpower, Pests and diseases	Infertile soil (Baron deficiency observed); Powdery mildew; twig borer: Boar, deer: High weeds: hiding place for rodents, deer: Mule/cattle track blocked by fence: grazing area difficult to reach	Channel blocked by branches/weeds: Dirty drinking water	House destroyed after 3 deaths, new construction started, lack of manpower/funds	Lack of seeds for vegetables; Crop damage by cattle; Pests/diseases (possibly caused by FYM application); IHH has no cattle for FYM	Crop damage by boar/cattle Tshochum weed;	Wild boar: Difficult area to fence: Lack of manpower

Table 3: Example of Transect Map: Darlung Kha Village, Mewang Gewog, Thimphu Dzongkhag (Source : LUPP, 1994) (Cont'd)

Land Type	Forest	Sokshing	Kamzhing	Orchard	Creek	Village	Kitechen garden	Chhu-zhing	Pan-zhing
Solutions		Shouting before entering the forest	Temporary fencing, night watching esp. at crop maturity FYM application	NPK application; Night watching; Temporary fencing; Cow dung pasted on apple trees; Informal disucssion with Gup/ Chimmi/tshokpa: owner made a very small trail	Annual maintenance; Let water stand to let dust/soil settle in drum`	Work as casual labour, construction on labour exchange basis	Annual fencing;	Thorny branch fences, night watching; Weeding	Land kept fallow
Poten-tials		DOF to take action	Barbed wire fencing	Apple orchard management; Barbed wire fencing, electricity; Discuss again with Gup	Rural Water Supply scheme	Help from RGOB as "Kidu"	Supply of vegetables seeds; (composting suggested)	Barb. Wire fending, killing wild animals; electricity	Fencing; Converting land to apple orchard

- One of the participating villagers, upon returning to the village or in the evening, could present the result to other villagers who can then give their comments and observations.

Problems

Bad weather: Do another exercise, postpone the exercise if possible, or use umbrellas.

The village territory is very large and the time available does not allow walking through all resource areas of the village. Try to select a mark from where the resources which are far away (forest, grazing areas) can be seen, and discuss them. Some resources, which can neither be visited nor seen, such as a land in another Dzongkhag, can be discussed towards the end of the exercise.

Evaluation of Collected Information

The study findings must be reviewed with all the participants, including both the Outsiders and Insiders, to reveal gaps, to clear misunderstandings, and to correct misconceptions. Villagers are the experts and understanding their views will greatly increase the researcher's perceptions. These reviews may redirect plans for gathering new sources of information. People who live in the area should be consulted to check whether the researchers (Outsiders) have understood the situation. Then Outsiders and Insiders can be merged to become Bothsiders for preparing participatory land suitability activities that will have long-term implications for sustainable resource allocation and management.

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Suggested Further Reading

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