Indigenous Soil Classification by Different Ethnic Groups in Phonexay District, Luanprabang Province

Socio-economic Component

Lao Swedish Upland Agriculture and Forestry Research Programme
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Abstract

Local agricultural practices based on indigenous knowledge have been practiced for a long time and they are often very sustainable technologies for development programs. Study of indigenous knowledge of soil classification has not been substantially undertaken and is a new topic of research in the Lao PDR. The objectives of this research are to demonstrate ethno-scientific elicitation techniques for indigenous knowledge on soil classification, and to identify indigenous classification systems for soils as a first step in understanding how different ethnic groups (Hmong, Khumu and Lao Loum) in the research area perceive and manage soils, and to develop a knowledge base on indigenous soil classification. The research area was located in the target village (Nambor, Thapo and Huaymaha villages in Phonexay district, Luangprabang province) of the Lao-Swedish Upland Agriculture and Forestry Research Programme (LSUAFRP) of the National Agriculture and Forestry Research Institute (NAFRI). The focus group interview was done separately with each ethnic group with adjustments to fit the dynamics of the situation in each case. The result of this research indicates that all three ethnic groups used soil color as one of the features which distinguished the second or third level in indigenous taxonomies of soil (the first level being the ‘domain’ name of soil in each ethnic group). One interesting point, even though being from the same ethnic group, the soil classification is different in different villages as in the case of the Hmong ethnic group in Huaymaha and Nambor village. The most significant feature for the Lao Loum ethnic group is that they classified the types of soil according to the water content and holding capacity. They did not classify many types of soil as ‘with rock’ or as ‘pure rock’ in the way the Khumu and Hmong ethnic groups did.

Key words: Lao P.D.R.; indigenous knowledge; indigenous soil classification; ethno-scientific; LSUAFRP; NAFRI; Lao Loum; Hmong; Khumu; Nambor, Thapo, Huaymaha village.
1. Introduction

Local agricultural practices based on indigenous knowledge have been practiced for a long time and they are often very sustainable technologies suitable for development programs.

Studies of indigenous knowledge in general (and of soil types in particular) have not been substantially undertaken and are new topics of research in the Lao PDR. This indigenous knowledge has existed in communities of local people for many generations and is an important aspect of sustainable development. However, the indigenous knowledge of soil types has not been investigated, developed or adapted in developing new technologies in order to increase the productivity and to improve the livelihood of rural people (LSUAFRP, 2001).

The objectives of this research were to demonstrate ethno scientific elicitation techniques for indigenous knowledge on soil classification, and to identify indigenous classification systems for soils as a first step in understanding how different ethnic groups (Hmong, Khumu and Lao Loum) in the research area perceive and manage soils (LSUAFRP, 2003), and to develop a knowledge base on indigenous soil classification.

2. Materials and Methods

2.1 Research team and site
The research team included staff from NAFRI and District Agriculture and Forestry Office (DAFO) of Phonexay district working with the local people in the villages.

The research area was located in the target village (Nambor, Thapo and Huaymaha villages in Phonexay district, Luangprabang province) of the Lao-Swedish Upland Agriculture and Forestry Research Programme (LSUAFRP) of the National Agriculture and Forestry Research Institute (NAFRI).

We conducted focus group interview of Khumu ethnic group in Nambor village, Lao Loum in Thapo village, and Hmong in Huaymaha village. We also conducted the group interview of Hmong in Nambor village to compare the differences of the same ethnic group in different villages. The approximate time of focus group discussion was two hours per group session and this was done separately for each language group.

2.2 Interview guidelines
The following methodological guidelines were used as a basis for the group interviews with adjustments to fit the dynamics of the situation in each case:

Step 1. Explanation of survey objective to the village headman
We explained what we want to do to the village headman and asked for his help in organizing a focus group of people within each ethnic group who are knowledgeable about soils and their names in the local language. This exercise was done separately with each ethnic group.
Step 2. First level of the soil taxonomy
We explained to the group what we wanted to do and figured out the term for “soil” in the local language. This term would be the starting point, the first and most inclusive level in the local taxonomy of soils; and it was also the name of the “domain”.

Step 3. Local terms for different types of soil
All other local terms for different “types of soil” were elicited. For example: one of the informants was asked, “What different kinds of soil are there on your land?” We tried to probe, “Any others?” We continued asking another informant, “How about you, what types of soil do you have on your land?”, and we asked others for contributions in turn. Then we asked the group as a whole, “Are there any other kinds of soil?” or “Are there any other terms that relate to soil?” We invited someone from the local group to write down all of these terms on separate cards, one term on each card.

Step 4. Classification of soil types
When we had got all the local names for soils, we then asked the group to sort the cards into piles. We let the informants discuss among themselves how they wanted to sort them. We gave them enough time and did not interfere. (We were careful not to assume that the ethnic classification system was the same as the Lao Loum system or one of the existing scientific social classification systems, and not to suggest terms or descriptions to them as this would “contaminate” the data.) When they had finished sorting the piles, we wrote the numbers of the piles (1, 2, 3 . . .) on each of the cards in each pile.

Step 5. Second level of the soil taxonomy
After the cards were sorted into different piles, we asked them why they sorted them this way, what the cards in each pile had in common and how they were different from the other piles of cards. This information revealed the “contrast sets” by which the local people differentiated soils. It was the second level of the taxonomy. We tried not to assume anything and did not contribute our own ideas to the discussion. We let the local groups tell us what features they used to distinguish and classify soils.

Step 6. Third level of the soil taxonomy
Then we gave the first pile back and asked them to sort them again into sub-piles according to whatever criteria they wanted to use. We did this with each pile. After they had finished sorting, we numbered the cards again (1.1, 1.2 . . . 2.1, 2.2 . . . and so on). Then we repeated step 5, and asked them what criteria they used to subdivide the cards this time. Then we added the new descriptive information to the cards. These criteria and descriptions defined the third level of the soil taxonomy.

Step 7. Repetition
If anything else was needed, we repeated this procedure again for each of the piles. We asked the group if it was possible to subdivide the piles further. Perhaps some could be subdivided while others couldn’t. We took note of any new contrast sets and levels and added the new information to the cards. We continued in this way until subdivision was no longer possible.

Step 8. Review
We reviewed the results with the group to be sure the list of soil types was completed. Then we picked up each card, and read out the name of the soil type and asked: “What can you grow in this soil?” or “What is this soil good for?” We wrote his information on the card and asked “What can you NOT grow on this soil?” and added this information to the card. We went on to the next card and continued until we had recorded all of this “suitability” information on all of the cards.
Step 9. Soil type abundance
Finally, we took all the cards and shuffled them together and mixed all the groups (We were careful to ensure that the classification information was recorded on every card before we did this.) Then we asked the group to sort the cards again into 3 piles from “most abundant” to “least abundant” with a “medium” category in between. This information indicated the local people’s perception of the relative abundance of each soil type in the area.

3. Results
The result of group interview of three different ethnic groups: Khumu in Nambor village, Lao Loum in Thapo village, and Hmong in Huaymaha and Nambor village are presented in the charts and tables.

For the Khumu ethnic group (Chart 1 and Table 1), they classified the types of soil according to the characteristics of soil (pure soil, soil mixed with other and rock) and soil color was one of the features they used for soil taxonomies.

Regarding the Lao Loum ethnic group in Thapo village (Chart 2 and Table 2), the significant feature is that they classified the types of soil according to the consideration of the water content and holding capacity and also soil color was used for soil taxonomies.

In the case of the Hmong ethnic group in Huaymaha and Nambor village (Chart 3.1, Table 3.1 and Chart 3.2), we can see that the way they classified the soil is different. There are also differences in the terms of the words they wrote for us, although the pronunciation is the same. For example, Hmong in Huaymaha village wrote the word of ‘Soil’ is ‘Aa’, but ‘Av’ for Hmong in Nambor village. Hmong in Huaymaha village classified more types of soil than Hmong in Nambor village. One common feature like other two ethnic groups, Hmong classified types of soil by soil color.

More information on local terms of types of soil are shown in Tables (Table 1, 2, 3.1) with the name of soil and their descriptions, their abundance and their crop suitability.

4. Discussion and Conclusion
We can see the similarity of all three ethnic groups is that soil color was one of the features which distinguished the second or third level in indigenous taxonomies of soil.

The most significant feature for Lao Loum ethnic group in Thapo village is that they classified the types of soil according to the consideration of the water content and holding capacity. They did not classify many types of soil as with rock or as pure rock as Khumu and Hmong ethnic groups did. It is likely they cared only whether the land can be cultivated. It is a well-known fact that Lao Loum people in general prefer to make a living near a stream or river and practice rainfed lowland cultivation.

One interesting point, even though they belong to the same ethnic group, the soil classification is different in different villages like in the case of the Hmong ethnic group in Huaymaha and Nambor village.

The charts and tables are given for the purpose of recording and preserving the basic data. The analysis of this data is not yet complete. This is a new topic that we are opening up and it is
hoped that it will become the focus of interdisciplinary discussion. This might be a suitable topic for an in-depth study by a Masters or PhD student.

Other possible analyses and follow-up in collaboration with others might include:

- replication of the taxonomy elicitation exercise in other communities in order to assess the degree of similarity and variation within the taxonomy for each ethnic group
- direct physical documentation (e.g. with photos, samples) of the soils corresponding to each of the soil names (hopefully this will be taken up by the soils researchers in the Soil Survey and Land Classification Center)
- comparison of the soil classes between different ethnic taxonomies and with the main international scientific soil classification system, with a view toward developing a “soils key” that combines the strengths of the indigenous and scientific classification systems and provides a tool for translating between the different classification systems
- use of the indigenous categories to construct a participatory soils map and GIS representation of the research area
- use of both indigenous (ethno-scientific) and international scientific classifications for land use planning and forest zoning, research planning and extension communication

The main contribution of this research has introduced the anthropological method for elicitation of indigenous soil taxonomies and opened the subject up for further investigation by NAFRI scientists.

Acknowledgements

Our sincere thanks go to Dr. John Raintree, socioeconomics research advisor of the Lao-Swedish Upland Agriculture and Forestry Research Programme (LSUAFRP), who helped us in giving the methodology for collecting data in the field and valuable advice. In additional thanks are to DAFO staff and the villagers in Phonexay district, who gave us well-cooperation. We would like to thank LSUAFRP for providing the financial support. We would also like to thank the Lao-IRRI Research and Training Project who supported our attending this Scientific Writing Course. Thanks are due to Philip Gibson, Dr. Renate Braun for assistance with English correction and valuable discussion, and to Dr. Thiphavong for computer technical assistance.

References

Annexes

Chart 1: Indigenous soil classification of Khumu ethnic group in Nambor village

- **Pate** (Soil)
  - **Pate** (pure soil)
  - **Pate** (soil mixed with other)
    - **Pate** (mixed with rock)
      - **Pate** jakwar (yellow soil)
      - **Pate** hiang (black soil)
      - **Pate** yim (red soil)
      - **Pate** iakwak (worm soil)
    - **Pate** sarakwaktang (soil mixed with rock)
      - **Pate** sarakwak (silt?)
      - **Pate** sarakwak sri (sandy soil)
  - **Glang** (rock)
    - **Glang** (melt in water)
      - **Glang** lai (like limestone)
      - **Glang** bu bu (sticky in water)
      - **Glang** saa (glass rock) 50%
      - **Glang** kora (sliding rock) 90%
    - **Glang** hiang (black rock) 90%
Table 1. Characteristics and uses of the soils according to the perceptions of Khumu in Nambor village.

<table>
<thead>
<tr>
<th>SOIL NAME</th>
<th>DESCRIPTION</th>
<th>ABUNDANCE</th>
<th>GOOD FOR</th>
<th>NOT GOOD FOR</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>pate</em></td>
<td>Soil (domain name)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>pate yim</em></td>
<td>not so fertile, good for trees</td>
<td>3</td>
<td>teak, ‘posa’, ‘khem’</td>
<td>annual crops</td>
</tr>
<tr>
<td><em>pate hiang</em></td>
<td>black soil, salty soil (‘din khem’, ‘acid) found at bottom of valley</td>
<td>3</td>
<td>can grow every crop but maybe not good yield</td>
<td></td>
</tr>
<tr>
<td><em>pate jaknar</em></td>
<td>yellow soil, pure soil, hard slippery in heavy rain</td>
<td>2</td>
<td>pineapple, making bricks, rice if after bamboo-fallow (bamboo opens up the soil)</td>
<td>corn, ‘mak duay’</td>
</tr>
<tr>
<td><em>pate iakwak</em></td>
<td>worm dung soil</td>
<td>1</td>
<td>every crop can grow</td>
<td></td>
</tr>
<tr>
<td><em>glang saa</em></td>
<td>glass rock, 90% rock, mountain soil</td>
<td>3</td>
<td>no use except furniture (beautiful)</td>
<td></td>
</tr>
<tr>
<td><em>glang kora</em></td>
<td>sliding rock, eroded soil on slope, often near stream, if much rain rice will become yellow and die or will develop bitter taste</td>
<td>1</td>
<td>rice, corn, chili, ‘makneng’, ‘posa’</td>
<td>rice, if much rain rice will become yellow and die or will develop bitter taste</td>
</tr>
<tr>
<td><em>glang lai</em></td>
<td>limestone ‘hin poon’</td>
<td>2</td>
<td>break to make house, cement</td>
<td></td>
</tr>
<tr>
<td><em>glang bu bu</em></td>
<td>rock, top of steam, water from this soil sticks to everything, agglomerates in stream like limestone</td>
<td>3</td>
<td>nothing</td>
<td></td>
</tr>
<tr>
<td><em>glang hiang</em></td>
<td>black rock, high % of rock (90%)</td>
<td>3</td>
<td>nothing, road paving</td>
<td></td>
</tr>
<tr>
<td><em>pate samwakrangi</em></td>
<td>rock soil mix mountain, most abundant, soil near clearing, only good for 1 year</td>
<td>1</td>
<td>rice, ‘mak duay’, ‘nga’, ‘corn’</td>
<td></td>
</tr>
<tr>
<td><em>pate sarawak sre</em></td>
<td>sandy soil (2/3 sand), near stream or river (riverbed garden soil)</td>
<td>2</td>
<td>annual crops, chili, tomatoes, garlic, onion</td>
<td>rice grows but not well</td>
</tr>
<tr>
<td><em>patesarawak bung</em></td>
<td>in stream silt</td>
<td>2</td>
<td>everything grows well including rice</td>
<td></td>
</tr>
</tbody>
</table>
Chart 2: Indigenous soil classification of Lao Loum ethnic group in Thapo village

- **Din** (Soil)
  - Din gam sai
    - sandy soil, cannot hold water
  - Din hin gap
    - smooth soft rock soil with tendency for land slips when very wet
      - soft
        - Din hin gap (yellow)
      - harder
        - Din hin gap (black)
  - Din gam tom (near stream)
  - Din dak (not near stream)
  - Din ki mon (containing less stone)
  - Din gam hin ong (2/3 stone)
Table 2. Characteristics and uses of the soils according to the perceptions of Lao Loum in Thapho village.

<table>
<thead>
<tr>
<th>SOIL NAME</th>
<th>DESCRIPTION</th>
<th>ABUNDANCE</th>
<th>GOOD FOR</th>
<th>NOT GOOD FOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>din</td>
<td>Soil (domain name)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>din gam sai</td>
<td>sandy soil, near river, water can’t stay, extremely well drained, can’t hold water in rainy season, very dry &amp; hard in dry season, near river, flooded in rainy season</td>
<td>5</td>
<td>sweet potato, peanut, white yam, corn, rice</td>
<td></td>
</tr>
<tr>
<td>din hin gap1</td>
<td>flat smooth rock, soft rock, tendency for land slips on mountain slopes</td>
<td>3</td>
<td>corn, ‘dok khem’, ‘nga’</td>
<td>rice – not so good, ‘mak duay’ (falls down, roots not deep)</td>
</tr>
<tr>
<td>(soft)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>din hin gap2</td>
<td>flat smooth rock, soft rock, tendency for land slips on mountain slopes</td>
<td>3</td>
<td>corn, cassava, never plan others</td>
<td></td>
</tr>
<tr>
<td>(harder)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>din dak</td>
<td>pure soil (no mix), holds water, not near streams, black white yellow or red, all good, different in color only</td>
<td>4</td>
<td>good for everything, can grow chili 3 years consecutively</td>
<td></td>
</tr>
<tr>
<td>din gam tom</td>
<td>pure soil (no mix), along streams, wetland soil (mud), river bank soil</td>
<td>6</td>
<td>good for everything, onion, lettuce, corn, rice, vegetable</td>
<td></td>
</tr>
<tr>
<td>din gam hin ong</td>
<td>doesn’t hold water, loose, gravelly soil, soil 1/3, small stones 2/3, hard wet, can walk on it</td>
<td>2</td>
<td>only good for pineapple</td>
<td>corn not so good (too dry)</td>
</tr>
<tr>
<td>din hi moh</td>
<td>doesn’t hold water in hard rain, gravelly soil, soil 2/3, stones 1/3, less stones than din gam hin ong, softer when wet, can’t walk easily (feet go in), crops will die, not slippery or sticky</td>
<td>1</td>
<td>If much rain good for rice, corn and banana</td>
<td>If not much rain can’t grow rice, corn and banana</td>
</tr>
</tbody>
</table>
Chart 3.1: Indigenous soil classification of Hmong ethnic group in Huaymaha village

Aa (Soil)

(SOFT)

Pohzeb taub tsuah (lime-stone)
Pohzeb xob (like glass)
Pohzeb daub (white rock)
Aa liap (red soil)
Aa txua (fruity black soil)
Aa dub (black soil)

(HARD)

Aa dai (yellow sticky soil)
Aa dawb (white soil)
Aa xiaa (blue soil)
Aa Pohzeb txhais dai (mixed rock & soil)
Pohzeb tooj (yellow rock)
Pohzeb quaa tshis (goat dung rock)
Phozeb quaa hlau (black rock)
Table 3.1: Characteristics and uses of the soils according to the perceptions of Hmong in Huaymaha village.

<table>
<thead>
<tr>
<th>SOIL NAME</th>
<th>DESCRIPTION</th>
<th>ABUNDANCE</th>
<th>GOOD FOR</th>
<th>NOT GOOD FOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>aa</td>
<td>soil (the domain name)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>aa dai</td>
<td>yellow sticky brick and pottery soil</td>
<td>3</td>
<td>bricks, pottery</td>
<td>crops</td>
</tr>
<tr>
<td>aa dawb</td>
<td>white hard cliff soil</td>
<td>3</td>
<td>corn, rice but not high yield</td>
<td></td>
</tr>
<tr>
<td>aa xiaa</td>
<td>river garden soil, wet soil, blue soil</td>
<td>3</td>
<td>corn, rice, sugarcane, vegetables (rice if enough water)</td>
<td>jackfruit (tree but no fruit)</td>
</tr>
<tr>
<td>aa pobzeb txhais daj</td>
<td>rock and soil mixed together, found on eroded land, usually on steep slopes, often on steep slopes near streams</td>
<td>3</td>
<td>job’s tears, ‘makduay’, ‘posa’, corn</td>
<td>rice</td>
</tr>
<tr>
<td>pobzeb tooj</td>
<td>yellow rock soil, underwater in streams, scarce</td>
<td>2</td>
<td>nothing</td>
<td>crops</td>
</tr>
<tr>
<td>pobzeb taub tsuah</td>
<td>limestone</td>
<td>2</td>
<td>nothing, medicine?</td>
<td>crops</td>
</tr>
<tr>
<td>pobzeb xob</td>
<td>looks like glass</td>
<td>2</td>
<td>nothing</td>
<td>crops</td>
</tr>
<tr>
<td>pobzeb daub</td>
<td>white rock</td>
<td>1</td>
<td>house construction, cement, brick</td>
<td>crops</td>
</tr>
<tr>
<td>aa liap</td>
<td>red soil, the best soil, can grow everything</td>
<td>1</td>
<td>everything including mango, jackfruit</td>
<td></td>
</tr>
<tr>
<td>pobzeb quaa tshis</td>
<td>soil mixed with rock, goat dung rock, round black rock</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pobzeb quaa hlau</td>
<td>black rock, hard mountain soil, iron?</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>aa txua</td>
<td>fertile black soil, too beautiful, volcanic oil?</td>
<td>1</td>
<td>everything can grow except mango &amp; jackfruit</td>
<td>mango jackfruit</td>
</tr>
<tr>
<td>aa dub</td>
<td>black soil</td>
<td>1</td>
<td>everything can grow except mango &amp; jackfruit, opium, lettuce, banana, onion, sugarcane</td>
<td>mango jackfruit pineapple</td>
</tr>
</tbody>
</table>
Chart 3.2: Indigenous soil classification of Hmong ethnic group in Nambor village

- **Av (pron Aa)**
  - **(Soil)**
    - (fertile soils in uplands)
    - (fertile soils near streams)
    - (shallow soils)
    - (shallow, rocky hill soils)

   - **Av duh** (black soil)
   - **Av liab** (red soil)
   - **Av nplaum** (mauve sticky soil)
   - **Av suab puam** (sandy soil)
   - **Av khaah xih** (blue)
   - **Av luaj ntsha** (yellow red layers)
   - **Av zeh txhais daj** (yellow melting)
   - **Av zeh xauh** (black, hard)
   - **Av rooh zeh** (50% rock, red or black)
   - **Av rooh tsuas** (2/3 rock)

   (can grow anything)
   (can grow anything except opium)