8 Evaluation of methods

The evaluation of the different qualitative methods has been divided into various parts. First the sampling techniques are evaluated followed by an evaluation of the topic-focussed interviews and the PRA approach. Then certain biases which were common for the semi-structured and the topic focussed interviews, as well as for the PRA approach, are discussed. Finally the quantitative methods are evaluated.

8.1 Selection of respondents and sampling locations

All groups wanted to choose their respondents randomly. The agriculture- and water group were aiming at covering as many kampongs as possible within the study area. However, it turned out that this sampling was heavily biased by varying factors. First of all the vehicles chosen for transportation determined the possible roads which could be used. This was not a problem for the water group who always had a four wheel driven Pick-up available. However, the agriculture group only had a pick-up truck when this could be arranged. The use of Pick-ups lead to a second bias being the fact that the drivers of the Pick-up trucks were from KPD and to some extent decided which kampongs to visit and who to interview. Another bias was the time of day the interviews were conducted; usually this was between 11 am and 5 pm. At that time of day farmers were usually in the fields and even though many interviews were conducted in the fields, some farmers were not reached because their fields were too far away. Even the selection of houses turned out to be a bias which was hard to avoid; some houses did not appear to be inhabitable and were purposely avoided, but when farmers were picked in their fields the interview often took place in such houses. Furthermore, the willingness of the interpreter to address certain houses was also a major bias which is discussed further in section 8.4.4.

A very important bias was the inability to reach absentee landowners. Their plans for utilisation of their land was very important information which was never revealed and therefore this bias limited the validity of the results.

The places selected, by the tourism group, for collection of the questionnaires have turned out to be biased. Since many Asian tourists arrived by busses which did not stop at the Park Information they were not included in the survey. In addition it has turned out that the respondents at the Park restaurant were mainly foreign tourists and therefore over represented in the study. The questionnaires were mostly collected at noon which was the check in time for Park accommodation. The tourists seeking accommodation in the park were mainly foreign

tourists which contributes to the over representation of this category in the survey. The time of the day when the questionnaires were gathered should have varied more and the time span should also have been longer. Regarding the hotels there does not seem to be any bias since nearly all hotels have been interviewed.

The places chosen for water sampling were good enough to give an acceptable picture of the KPD systems water quality. However, the private intakes which make up quite a large part of the water system are not tested. These intakes would have a larger impact from agriculture and waste water because they are located further downstream.

8.2 Topic focussed interviews

This type of interview was used only in a small scale by the water group compared to the semi-structured interviews. The success in this kind of interview was determined by the respondents ability to speak and understand English because the use of an interpreter would have slowed down the discussion. Also it is necessary that the respondent possesses a certain level of knowledge concerning the topics addressed. It was the impression that this kind of interview represents a mutual learning process for the interviewer and the respondent.

Another issue is that it is important to have knowledge about the area because it is essential for the understanding of the respondent; without any background information it is hard to make this kind of interview. Therefore the interviews with some of the key informants were not conducted before the second half of the field stay.

8.3 Participatory Rural Appraisal

The participatory method of matrix-scoring proved to be an interesting way to "hand over the stick". By visualising some of the complex issues it helped to reveal information about the respondents opinions. The work of ranking demanded concentration and by moving the focus from the spoken words so that the respondents talked more freely about topics that might have been too sensitive to ask about directly. Some respondents found it quite amusing and were very serious about the matrix. The method attracted attention from people who were listening to the interview. Some respondents however reacted with reluctancy. One farmer found the method so offending that he refused to participate.

Questions about use of water, payment of water and the possibility to receive more water were possible to answer by the respondent with the use of matrix-scoring. The remaining questions

about pollution and supply alternatives to the KPD system seemed more difficult to answer. This was mainly due to the fact that the predefined questions were not of any concern or relevance to the respondents.

It was difficult to explain the procedure of matrix-scoring to the respondents in a way so that the perception of the scoring was not interpreted differently by the respondents. Some used an absolute ranking giving each object an individual score, while others used a relative scoring so that the objects were ranked against each other. This makes the scoring problematic when data has to be quantified.

To be able to use the matrix for ranking, a respondent has to know the groups that he is supposed to rank, in this case the groups of water users. It was decided to let the respondents define the users themselves to reveal some of the users own perceptions of the water management. This meant that dictation was avoided. To conduct the matrix the respondent had to define at least two groups of users. In the beginning the matrix was introduced before it was known if the respondent was able to define different groups. Later the respondent was asked to define the groups of users before the matrix was introduced. When the respondents defined their own groups of users, it was more difficult to compare and quantify the answers.

The agriculture group tried out the pairwise matrix ranking but the use of this method was discontinued after a few interviews because it was tedious and the respondents did not take it serious due to the many repetitions.

8.4 Biases for the semi-structured and topic-focussed interviews

In the following section the biases experienced when conducting the interviews are covered under the following headings; the influence of the interviewer, the influence of the type and formulation of questions, the influence of the interpreter, and the influence of the respondent.

8.4.1 The influence of the interviewer

The interviewer should be aware of his, or her, appearance when conducting the interviews. Differences in appearance between the interviewer and the respondent are impossible to avoid when two different cultures meet and there is a risk that these differences will affect the results of the interviews.

All the groups experienced that by paying attention to the way of dressing, general appearance and the way of formulating the questions, these cultural differences became less obvious. It was

also clear that by spending more informal time together with the respondent some of the biases stated above would disappear. Usually the interviews ended with an informal conversation in which the role of questioning was reversed. This often created a relaxed atmosphere and ease of talking which could have been useful in the beginning of the interview.

Misunderstandings, ambiguities and contradictions often appeared during the interview and were not always satisfactorily clarified. Clarification demands a view of the situation and an ability to improvise and rephrase questions within very limited time span and this is a difficult task. Furthermore, cross checking and insisting on clear explanations sometimes seemed too intrusive.

→ This was not the general impression from the Bau Team.

The groups experienced that three interviewers together with an interpreter was too many people which resulted in lack of concentration on behalf of the interviewer and also inhibited the respondent.

Some of the interview groups experienced that the optimal size was one interviewer together with an interpreter. A high level of concentration would then be a necessity and confusions, lack of information and misunderstandings could be corrected straightaway. The time needed for interpretation left time for taking notes, reflecting and preparation of additional questions. Other interview groups experienced that two interviewers were the best team size for interviewing, because one person was able to focus on the questions and answers while the second person was able to take notes. This was especially preferred when the interviews were conducted in English and there were no breaks for interpretation which allowed some time for taking notes.

8.4.2 The influence of the type and formulation of questions

Questions can be posed as both open-ended and closed questions as previously mentioned in section 4.2.1. The tourism group and the agriculture group started out with mostly open-ended questions in their interviews, chosen in order to avoid leading questions and to encourage the respondent to answer freely (see appendix 8). However, both groups shifted from using mainly open-ended questions to using primarily closed questions in the reviewed interview guide. It had turned out that the respondents had great difficulty in answering questions which were too open or too vaguely defined; rather than giving the respondents an opportunity to answer freely it provoked confusion and shrug of the shoulders.

Furthermore, the open-ended questions were sometimes very time consuming and often revealed irrelevant information. As a consequence, the questions of the reviewed interview

guide became more precise, however the sequence of the questions remained semi-structured and any new issues were further elaborated independent of the defined questions (see appendix 8).

The water group on the other hand, experienced a shift from asking closed questions to asking open-ended questions. This was due to the fact that the closed questions appeared to be too leading whereas by asking in a more general way, the respondents were able to answer more freely. One example was the question "Does KPD do a good work?". This question was always answered in a positive way, it was simply to easy for the respondent just to say "yes". Therefore the question had to be changed to "How is KPD doing their work?". Some questions were also changed because they were simply too difficult for the respondent to answer.

8.4.3 The influence of the respondent

The knowledge level varied extremely among the respondents. When the tourism group was interviewing at the hotels, it was important to get hold of the manager, because the staff could not provide any of the specific information needed. This was not always possible and did result in the fact that some of the data collected was not precise. The same was characteristic for the interview with the Assistant District Officer (ADO). The ADO was not well informed about the plans of the District Officer and could not explain the district policies without an approval from the District Officer.

The respondents' different perceptions of the issues addressed were also a constraint when the water group was using the PRA method of matrix-ranking. The interviewers and respondents had different understanding of who the water users were.

During some interviews it was experienced that the respondents appeared to be seeking answers that would please the interviewer. This was very hard to avoid and some of the results became unreliable. When the interviewers found out that this was happening reformulated questions were asked.

8.4.4 The influence of the interpreter

The quality of the interview is very dependent on the capability of the interpreter to perform his job. This was indeed experienced by the agriculture group. A thorough discussion and clarification of the interview guide between interviewer and interpreter, before initiating the interview, turned out to be very important. Likewise, a discussion of the results and unavoidable misunderstandings after each interview would have been optimal, however time

consuming an therefore not conducted. The ability of the interpreter to understand English was crucial during the interviews where information had to be translated. One interpreter, who spoke English well, tended to select the information that seemed relevant for him. The groups experienced cases where the interpreter appeared to be reluctant to contact a potential respondent. It was difficult to understand the reason why and even harder to draw the line between respecting the feelings of the interpreter and asking him against his will.

8.5 Quantitative methods

Two of the groups used quantitative methods. The tourism group used questionnaires to collect information; the water group collected water samples. These methods will be evaluated in the following.

8.5.1 Questionnaire with closed questions

When analysing the questionnaires it became clear for the tourism group, that the results of the survey did not correspond to previous findings of Sabah Parks. Some of the deviations could be justified by several conditions as mentioned in section 7.7. However there are some biases that have to be considered. The respondents could have acted with reluctance when given a questionnaire written in English, if they believed, that their English abilities were not sufficient. This was especially the case with Malaysian and other Asian tourists. Sometimes these respondents were not willing to show that they did not understand the way the questions were posed. This could result in the fact that the respondents more or less chose the categories arbitrarily.

Another limitation in our experience, was that the questionnaires were not conducted face to face, which left doubt about whether the respondents actually understood the questions. By choosing questionnaires it was possible to get a large amount of data in a short period of time. This data was used to describe a behaviour, in this case the tourist expenditure but it was not possible to get an in depth understanding of the topics addressed which would have been possible through qualitative interviews.

8.5.2 Water sampling

The quantitative methods were used by the water group for measuring the water quality and quantity. The methods used were simple and this had a big advantage because they were very easy to use in the field. Besides this it is also worth mentioning that it would be difficult to

transport heavy equipment from Denmark to Malaysia. As it turned out, the sensitivity of the tests were not good enough to measure the actual concentrations of the different compounds in the water. However the accuracy was good enough to detect whether the concentrations were above the maximum allowances set by the Malaysian Food and Food Regulations in 1985. Since this was the main interest of the water group, the methods were considered to be good enough.

Some of the compounds were measured with a higher level of accuracy. An example is the turbidity which was measured quite accurately because of a good nephelometer. This was also the case with pH and salinity measurements.

Using an oxygen electrode is not the most precise way of measuring BOD. A more accurate method which was meant to be used was the *Winkler Titration Method.* This could not be used because it had been damaged during transport to the study area. However since the concentrations were far below the allowances the accuracy at that level were acceptable. In one of the BOD_5 results the value was negative. This can be a result of an error in the sampling or a leak in the bottle containing the sample.

The estimation of the river profile was indeed a rough estimate. Because of big rocks and a very uneven river bed, the profile was very difficult to measure. Furthermore the flow-meter used to measure the water flow in the rivers caused quite a lot of problems, and the measurements were very unstable in places were the water speed was low. Because of the above mentioned biases the results from this approach were not very useful and is therefore not mentioned in the discussion. However the method provided some experience and understanding of the problems connected to this method.

8.6 Lessons learned

The outcome of the project has besides the results and the new knowledge on the subject of sustainable land use and natural resource management been a lesson in field work and in group work with participants of different backgrounds.

8.6.1 Field work

As this report is based primarily on fieldwork it is appropriate to summarise the experiences learned in the field. Much experience has been gained concerning logistics of field work. When the field work is limited to a short period of ten days the practical planning is very essential to

the outcome. The planning was very time consuming as it included arranging for interpreters, transportation, meetings with respondents and others. Some practical priorities had to be made concerning how to use the limited time in the field. It could seem convenient to type the interviews immediately, but that would take time from conducting new interviews. It could also be fruitful to evaluate the interviews together with the interpreter by the end of the day, but this would also take time from some of the activities only possible in the field. The priorities might change from day to day.

A practical advantage was the housing in the chalets of the National Park, which had good working facilities for reading and writing on computers. In addition the temperate climate was comfortable and did not hinder the concentration of the Nordic students as the tropical climate could have done.

Anywhere in the world it is a challenge to find relevant information in an unfamiliar area. This is especially true for a country as culturally different from Denmark as Malaysia and it demanded as mentioned an appropriate behaviour and appearance. By being accompanied by fellow Malaysian students the confrontations between the two different cultures were eased as the Malaysian students were able to comprehend the respondents as well as the Danish students.

Living in the National Park, as opposed to in a village, daily life was not shared with the local people. This limited the possibility of getting inside information about the area from informal communication with the locals.

The information sought was influenced by presumptions based on the Danish culture. So was the way in which the information was gathered. For instance the before mentioned example of not searching for respondents in houses that seemed uninhabitable, might have left out information from certain farmers, as the houses were actually inhabited. Another example is the perception by the Danish students that water quality was poor if the consumer had to boil the water. This was not the opinion of the Malaysians. This shows that cultural pre-assumptions can affect the approach and the findings.

The experience was that questions will continuously arise during field work when new information is collected. Even though this can seem to create more confusion it might lead to a deeper understanding of the complexity.

8.6.2 Group work

The group work was an opportunity to work with other students having different backgrounds with regards to educational institutions, disciplines and culture. This gave new perspectives on working procedures that previously seemed indisputable. Challenge arising from the different working procedures was several discussions of the structure, the content and the purpose of each section of this report.

Differences in disciplines have influenced the working process in many ways. It can be difficult to point out exact occasions but these differences have helped focusing on issues that would normally not have been noticed. This has strengthened the integration of disciplines, but also some times created conflicts, when each group member was searching for what he or she considered important. Furthermore, the cultural differences led to challenges and diversification of ideas and approaches.

Summarising the lessons learned working interdisciplinarily and interculturally has broadened horizons. An important lesson is that it is important to express viewpoints very explicitly and clearly to make others understand them. The process has to a large extent been carried through by a good atmosphere within the Sabah team.

9 Discussion

The discussion reflects the common objective and has thus been divided into four sections concerning the resources tourism, water, land and labour. In each section the opportunities and constraints for further utilisation are discussed.

9.1 Land

In the Kundasang area most of the Native Title Land has been given away and therefore access to new land through the government is difficult. This is partly due to the fact that legislation regarding allocation of land, is not properly complied with. Bumiputra are allowed to apply once for two acres of Native Title Land, but because of a lack of control the applicants are not registered and it is possible for them to apply for land several times. Buying land from private owners is a possibility, but prices are high and the local landowners seem reluctant to sell, as land is considered a security. This restricts Bumiputra who want to buy and develop land. For already established Bumiputra farmers, however, lack of access to land does not seem to be a constraint for expansion of agriculture, since many of them are already in possession of uncultivated land

The land tenure law which restricts non-Bumiputra from owning land acts as a constraint for expansion, both for agriculture and in the tourism sector. The non-Bumiputra, who generally have the capital to expand and develop more land both for agricultural and tourism purposes, can only rent land.. The development of idle land for agricultural purposes can therefore partly be seen as limited by the existing land tenure.

In the Sabah Tourism Masterplan of 1996 cooperation and joint ventures between local landowners and people from outside wanting to develop land was encouraged. This would promote the expansion of tourism within the existing land tenure laws. According to the ADO, these joint ventures are often not to the advantage of the local landowners, due to the fact that the outsiders have greater experience in doing business. The land tenure laws are also circumvented by developing land designated for expansion of roads or other public works. This is practised by hotel owners within the area. The government can, however, claim the land at any time, but as this has not yet happened, the hotel owners do not see this as a threat. The District Office has actually considered legalising the hotels in order to be able to receive the permission fees, which all hotels have to pay in order to get a hotel license. The development of land for tourism purposes is therefore only limited to a certain extent by the land tenure.

Regarding opportunities for agricultural development, KPD and LFA could indirectly encourage increased utilisation of land by assisting the farmers in their production. This could either be through a widening of KPD's target group or by LFA assisting in developing a more profitable marketing for the farmers.

9.2 Labour

In the agricultural sector lack of labour is a major constraint for intensifying and expanding vegetable production as local labour is unavailable and access to cheap immigrant labour has been limited by the new immigration laws. The present farming practices are not mechanised and therefore very dependent on manual labour. This may be partly due to the fact that access to cheap immigrant labour, up to now, has been unlimited and the farmers have had no incentive to invest in mechanisation. The new immigration laws have therefore left them in a situation where lack of labour restricts their production. Only around 10% of the locals are employed in the tourism sector, which does not experience any lack of labour, so there is no obvious competition between these two employers. Therefore this can not explain why the local work force is not employed in farming when there is a need for labour. The unavailability of the local labour force seems to be caused by unwillingness to work in the agricultural sector or a preference to work in the family farms.

9.3 Tourism

The Ministry of Culture, Environment and Tourism states that:

"The State government recognises that the orderly development of tourism is an important source of diversification to the State economy".

The extent to which this statement can be justified, has to be examined in connection with the soundness of the Malaysian economy. The present composition of the tourist industry makes it more vulnerable to internal influences compared with other major industries in Sabah, which are export oriented. Therefore the economic crisis has had a major impact on the tourist sector by reducing the number of Malaysian tourists visiting Sabah. In order to secure a diversification of the state economy through tourism, it is proposed that an orderly development of tourism would imply a larger effort in trying to attract foreign tourists. The foreign tourists are expected to have a higher expenditure in all of Malaysia compared to the Malaysian tourists.

This is because many foreign tourists are flying with a Malaysian airline, renting a car in Malaysia and travelling for long periods. Besides this, the foreign tourists contribute with an amount of foreign currency to the state economy.

However, if the objective is rural development a substitution of Malaysian tourists for foreign tourists may not be preferable in the Kundasang area. This is because the Malaysian tourists have a higher average expenditure compared to foreign tourists and therefore a larger economic impact on tourist related businesses in the area.

Since the main tourist attraction in the study area is unique (Mt. Kinabalu), it could be expected that the National Park would utilise this attraction fully thereby generating the highest possible profit. This does not seem to be the case. Sabah Parks' main concern is to preserve the park since the main factor limiting the number of climbers allowed on the summit is determined by the level of wastewater that can be let out on the ground. In the dry season the number of climbers is further limited by the amount of drinking water. By trying to protect the park, Sabah Parks is not jeopardising the maintenance of a steady state, which is preferable when utilising a natural resource. This means that the present number of climbers can be maintained for a long time without degrading the environment.

9.4 Water

The water shortage experienced both within the agricultural and tourism sector in the dry season, is partly due to problems in the KPD distribution system. The distribution system is thus a constraint for an optimal utilisation of the water resource. The present system has reached its limit and cannot support the outer kampongs. Even though the majority of the hotels are supplied by KPD, one hotel was not able to obtain KPD as water distributor. Instead they were encouraged by the KPD to build their own pipeline. This inadequacy, and the high water prices in the KPD system, are reasons for the rather large number of private pipelines which bypass the official KPD-system. The users are able to circumvent the KPD-system because of two main reasons. The lack of communication between the involved institutions in the water management, together with the weak legislation concerning the water resource, results in the fact that there is an unclear definition of the authorities. This, in turn, causes a weakness in the KPD´s power to enforce the rules. This circumvention of the rules is, on the one hand, an opportunity for the individual user, but on the other hand, a constraint for an optimal common distribution system.

In order to achieve an optimal distribution of the water resource for all the users, an acceptance of and participation in the system by the users, is needed. Some rules are respected more than others, by the farmers. An example is the KPD timetable system for irrigation, which the farmers seem to respect. This set of rules is made by the KPD in co-operation with the kampong headmen. The participation of the headman may be essential in making the farmers comply with the rules because of their respect for him. These headmen are the only local representatives elected by the people.

Apart from the local level, the people have the opportunity to participate in electing representatives by voting at the state level. However, the District Officer who governs the district, is not elected by the people. Therefore the people do not have any influence on who is in office at the district level. Since the District Officer plays an important role in the decision making regarding water management, this lack of influence might be a constraint for people's acceptance of the water supply system.

The effect of agriculture upon the water quality is insignificant because the catchment area lies mainly within the boundaries of the Mt. Kinabalu National Park and is therefore protected against agricultural impact. This ensures an acceptable water quality and the water tests at the KPD intakes showed low concentrations of both fertilisers and pesticides.

It could be expected that the waste water from the huts situated on Mt.Kinabalu have an effect on the water quality in the catchment area for Kundasang. The coliform counts for the raw water before the treatment plant in Kundasang are below the maximum allowance for raw water, however not acceptable for drinking purpose. This could be a result of the untreated waste water from the park, but might as well be due to leakages in the pipes between the intake and the treatment plant. Because of this shortcoming of the distribution system, KPD is not able to supply an acceptable drinking water quality.

9.5 Future perspectives

Tourism and agriculture will still in the future create the largest economic impact in the Kundasang area because of the unique tourist attractions and the temperate climate. If the agricultural or the tourist industry experiences an expansion in the near future a reconstruction of the distribution system for water is necessary if the needs of both sectors are to be fulfilled.

An expansion will also lead to a higher demand for land and increasing prices, which in return could mean, that land to a larger extent would be considered an object of investment. It is most likely, that the tourist industry would purchase land that would not be profitable for agricultural production. This means, that the farmers would be unable to purchase a certain category of land.

According to the Sabah Tourism Masterplan one of the state's overall objectives is to obtain an average occupancy rate of 70% throughout Sabah. This would imply, that the number of tourists visiting the area per year should increase by approximately 120.000. In percent this means an increase of 50% which, given the existing tourist attractions and their capacity, is unlikely to be achieved. The expansion plans of the National Park are limited since Sabah Parks is neither interested in more climbers nor in establishing more trails. The only possibility in reaching the occupancy rate of 70%, given that the amount of beds remains the same, is if new tourist attractions are created in order to attract more tourists or if the tourists spend more time in the area. Tourist resorts with many attractions including horse riding, flower garden, butterfly farm etc., have already been planned, but are for the moment in a waiting position for better times to come. Non-local businessmen own most tourist resorts in and around the National Park, and the profits from a further expansion of the tourist industry will probably not benefit the local inhabitants considerably. However, an increased opportunity to be employed at these newly developed attractions will exist. This will be part time jobs, since the tourist industry is mainly seasonal.

There are many landowners, who for different reasons do not use all of their land but have no intention of selling it, while others, who are willing to buy and have the capital to cultivate the land or use it for tourism purposes, are constrained by the present land tenure laws. Given this present land tenure situation a further utilisation of the resources is unlikely; it is dependent on a redistribution of the land resources.

A number of farmers depend on immigrant labour in maintaining the present level of production. An increase in production will increase the demand for labour and if this labour is not available it will restrict the process of expansion. Conversely the availability of a cheap immigrant labour force would be a good incentive for expansion, but given the present immigration laws this is not bound to happen. At the moment the wages are about the same in both sectors. To avoid that the agricultural expansion is constrained by lack of labour and to avoid the dependency on an immigrant labour force it is necessary to insure wages that in the future can attract local workforce.

At present water is a limited resource during the dry season but is not regarded by the locals as a substantial problem. An expansion of the tourist and agricultural sector will lead to a greater demand of water. The present gravity fed system will probably not be capable of supplying all users with sufficient amounts of water. Without a restructure of the present water supply system it will not be possible to satisfy the demands. KPD is trying to reduce the use of water by installing water-meters for all users. This is not met by applause among the farmers who contrary to the KPD believe it will increase their expenses. Another possibility to reduce the use of water would be to adjust the farming practices. A further control of water will be the registration of all users according to the new law proposal.

A reduction of water quality might occur due to an increased use of pesticides, fertilisers and larger amounts of untreated wastewater from hotels and inhabitants. To maintain the present water quality it might require a more advanced filtration system in future. However a pollution of water will mainly affect people living downstream from Kundasang, but quality of water in Kundasang could also be affected by the development of the alienated areas above the intakes of KPD. These areas are still not utilised. KPD has tried to forth come future water problems by applying to the Water Resource Management Committee that the alienated areas should be reprocessed so that they will not be used or that funds should be granted to move the KPD intakes above the alienated areas which means that the new intakes should be placed inside the park. KPD has proposed that the park should be classified as an official catchment area to protect the future water resource. Further more KPD has applied to get a license to be the authorised supplier in the Kundasang area.

In the future there will be some changes in the institutional organisation due to the new law on water resource management. It might lead to a more restricted control of the use of water. How the improved legislation will be enforced at local level is yet to be seen.

10 Conclusion

For a further utilisation of the resources in the Kundasang area there are certain identified opportunities and constraints.

The agricultural sector can be expanded since there still is un-utilised land suitable for vegetable production. The tourist sector also has expansion potentials because the accommodation and attractions in the area can carry more tourists. Both sectors should not be limited by their need of water since the total amount is sufficient in the catchment area.

However, the distribution system limits the water supply and therefore it acts as a constraint for these sectors. At present the institutional arrangement and legislation regarding the water resource are limiting an optimal water distribution. The problems are a lack of governing, missing extensive legislation, unclear defined authorities and inadequate control of water use.

Besides the insufficient water supply, the local market conditions and the distribution of land are seen as minor constraints for an agricultural expansion. Furthermore, the land tenure disables non-Bumiputras in purchasing land thereby keeping potential capital strong business men from investing in the tourist industry, although they would contribute to a further expansion.

The farmers think that the main constraint is the availability of labour. The shortage of labour is partly due to the new immigration laws and the lack of interest in working in this sector. The labour shortage is not recognised in the tourist sector and does therefore not act as a problem. Rather the economic crisis in Malaysia is at the moment a major constraint since all development plans have been stalled and the number of Malaysian tourists visiting the area has declined. The economic crisis also has a limiting effect on the agricultural production by leading to the implementation of the new immigration laws.

Beside the economic crisis one of the main constraints for further development of the tourist sector can be identified as the conservation policy of Sabah Parks. This policy implies that the attraction of tourists is seen as a less important objective and this can inhibit the expansion of tourism. Furthermore by prioritising nature preservation profit maximization is made difficult. Also the scarce promotion of the hotels limits the potential number of tourists attracted to the area.

The present water supply system is not capable of coping with a further expansion of the

agricultural production and the attraction of more tourists. This regards both the quantitative as well as the qualitative aspect. The latter is due to an increase in the use of pesticides and fertilisers as well as the larger amount of waste water from the tourist industry.

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