

The Collection of Associated Knowledge During Short Germplasm Collections: Field Experiences in Java and Irian Jaya

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Introduction

The collection of plant specimens has a long tradition in botany and genetic resource research. In some of these collections, detailed notes were taken with local information on the specimens collected; in other instances, almost no information of this type was recorded. Admittedly, however, documentation of local knowledge has been rather poor in most collections undertaken for the preservation of genetic resources. Such documentation may be undertaken at different levels of intensity: from incidental note taking whenever information is provided, to a structured search for information assisted by questionnaires or checklists.

However, a few basic considerations as well as practicalities are important, irrespective of the depth of the intended documentation. In this paper, I present a few points to be kept in mind during the collection of associated knowledge, based on my experience in sweetpotato collection in Java (1992) and Irian Jaya (1993, 1994)). After a short discussion of the rationale for collection of associated knowledge, I will discuss the approach used in fieldwork with farmers in the main section, as well as the constraints faced during short term collection trips. The process and tools of germplasm and data collection are shown schematically in Figure 1.

Why collect associated knowledge?

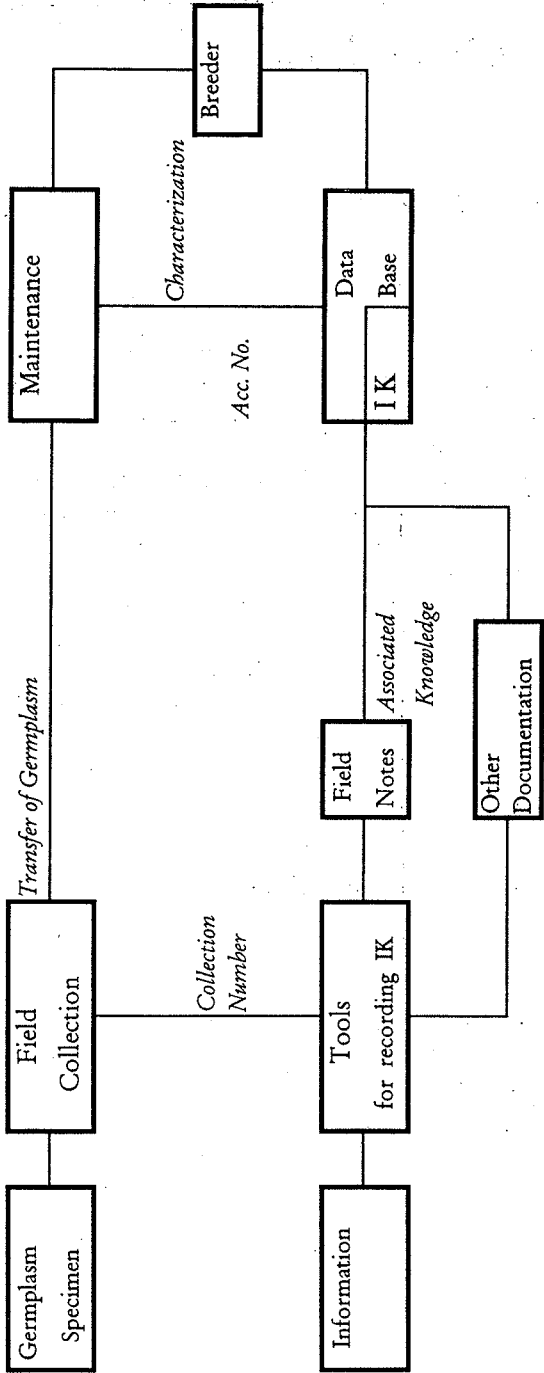
The collection of associated knowledge can help us:

To assess the level of diversity occurring locally

It is a relatively easy task to compile an inventory of cultivars known to farmers in a relatively limited area, say a cluster of hamlets, a village, or a small valley. Usually, this information is obtained from people with a "gatekeeper" function in the village, e.g. officials, or village elders. This list is very likely to include both rare (or even lost) and frequent cultivars, and should be seen as a list of cultivar names, or an identification of local names, with some additional information on individual cultivars, a tool which assists us in the collection of both specimens and more detailed information. It is also a first indicator to assess the diversity of sweetpotato in a particular area.

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Figure 1 Process and tools of germplasm and data collection.



Even though the information obtained from gatekeepers may be comprehensive and detailed, it has to be cross-checked in the field, if possible with other informants. The bigger the area contained in our list, the more likely we will find different names for the same cultivar, or the same name for different cultivars. There may also be considerable over- or under-estimation of the diversity to be found in gardens.

To get to know the preferences of local farmers

Associated knowledge can give us information about the preferences of local farmers and the criteria for identification of these cultivars. In Irian Jaya, farmers distinguish their cultivars based on use, for example :

- sweetpotato preferred by children, such as cv. *Untuhuk* (Anggruk, Kurima district). These cultivars commonly have yellow flesh color or red skin color.
- sweetpotato used as a pig feed which are characterized by big, fibrous tubers with a bland or non-sweet taste, and allegedly high yield.

These preferences may of course vary from region to region. In the Baliem Valley, people tend to prefer sweetpotatoes with soft texture or rather high water content, unlike people from the adjacent mountainous areas who like slightly dry sweetpotato which tastes sweeter compared to cultivars from the valley area. These different preferences correspond to the environment or the cultivation system of sweetpotato in their respective areas. In the Baliem Valley, despite deep drainage and cultivation on raised beds, roots tend to be more watery than those produced on upland areas.

Preference is also a key to why certain low-yielding varieties are being maintained. In Garut, a mountainous area of West Java, people prefer and still maintain an old cultivar (cv. *Jas perak*) because the taste of this variety is delicious. The variety is cultivated for home consumption, but also sold within the village. Yet, in more intensively cultivated lowland areas, this variety is not found anymore, as people prefer to plant sweetpotatoes for commercial purposes.

In areas with commercial sweetpotato production, preference is also linked to market acceptance, with taste as an important second criterion, because home consumption is also common. In Wonosobo (Central Java), people currently prefer to plant cv. *Klantheng* because both taste and price of this variety are good. In this area people plant sweetpotato all year round.

To gather information on distinctive (variety-specific) properties

Associated knowledge contains information about distinctive (variety-specific) properties. The cultivar *Welayuk*, for example, easily rots, and has to be harvested as soon as it reaches maturity. Another example is the cultivar named *Umarikbingga* well known as vegetable. Another type of cultivar-specific information is the preferred environment in which it is cultivated: adaptation to slope or valley planting conditions is one of the criteria associated with a large number of cultivars from the Baliem valley (Table 1).

To provide information for breeding activities

Associated knowledge can feed back into breeding activities using the germplasm that has been collected. Information, such as cultivar resistance to drought, early maturation and resistance to shade can be used to support breeding activities. For example, a cultivar called *Lirti* (standing for *lilir bentian*, which means after waking up in the morning) produces early maturing roots. *Tanjung kait* is known as a cultivar with resistance to shade and drought.

Cultivars from Irian Jaya which are known as pig feed (*bulok*) have the criteria of good vigor, high yield, and early maturation, but on the negative side, cracking. Another cultivar

Table 1 Specific information on sweetpotatoes of Irian Jaya.

No.	Children's Food	Pig Forage	Original	Early Maturing	Valley	Slope
1	Arugulek	Musan	Kila	Hoboak (90)	Arugulek	Abokul
2	Kentang	Tabogolek	Abelia	Musan (90)	Mikmak	Ukutuk
3	Ubi merah	Hulok	Pelale	Womin (90)	Yeleti	Suembul
4	Kila	Saporengeken	Sengerengke	Pipombi (90)	Musaneken	Iloka wiwid
5	Mikmak	Lokobasok	Ponai	Umokmbi (90)	Hoboak	Gelakwe
6	Wortel	Hitilom	Inin	Kentang (90)	Helalekue baru	Lirugue
7	Helalekue	Huwakeh	Hompuk	Pusemangken (120)	Saworok	Yibalanggan
8	Felalekue kurae	Nikiyawut	Mingka	Arugulek (150)	Espalek	Abunggun
9	Felalekue molae	Koboak	Dirake	Gelakue (150)	Siate	Nanorom
10	Yobere	Mingka	Felaleke	Kilombi (150)	Musan	Yoban
11	Abonggul	Tinta kuning		Tabambi (150)	Tabogolek	Elagambi
12	Humpuk	Tinta putih		Kaboak (150)	Abelia	Yiloli
13	Huminarue	Towenggon		Abelia (180)	Kentang	Abanggit
14	Nabokum	Tabambi		Umakwe (180)	Hulok/top	Bimilanake
15	Senggol	Apeh		Moluge (240)	Wenawae	Yinggelakwe
16	Aluage	Liduge		Malugurum (240)	Wortel	Manis
17	Kilombi				Mogob	Sebunggun
18	Kumangga				Tinta	Bon
19	Malugurum				Kila	Malugurum
20	Pipombi				Werene	Kumangga
21	Muluge				Nikiyawut	Kilombi
22	Umakwe				Koba	Bogoranggan
23	Elakmbi				Ekenpalek	Moluge
24	Linggoara				Suwekul	Tuwenakara
25	Kurongge				Wenaboge	Linggoara
26					Pelale	Apeh
27					Sengerengke	
28					Somporengken	
29					Pusemangken	
30					Aluage	
31					Womin	
32					Paniai	
33					Gelong-gelongken	

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Nabokum
Giniagalo
Sengol
Abunggul
Humpuk
Inin
Tabimbi
Pipombi
Umokmba
Umakwe
Lenekuwara
Towenggon
Kuminambi
Mailongge
Amiambi
Korwambi
Elakmbi
Kurongge
Siknimb

practice; learning is not singled out and organized as an activity separated from other socially and economically relevant undertakings.

In the case of sweetpotato agriculture, people have gained knowledge through practice and learning from the older generation and peers. From their childhood, they have already known about sweetpotato. They know how to cultivate it, after how many months they can harvest, which plant type can be used for special purpose, and other information.

The level of formal education of the respondent will influence the ease with which we can communicate with him. With respondents without formal education, we will be faced with more difficulties. Many concepts very familiar to us may need careful explanation to be understood. For example, the concept of growth period - after how many months the crop can be harvested - can cause confusion in Irian Jaya, as many people are not used to counting the months or to seeing their crops in an absolute time continuum. Lack of formal education, however, does not imply the lack of relevant information on the topic of maturation in relation to their germplasm.

In Java where most people go through formal school education, we can ask many of our question more directly.

Social differentiation

Social differentiation of people who will be chosen as respondents is another contextual variable influencing our data, because people are different in age and status, wealth and gender, and accordingly, their knowledge will vary.

In general, practical knowledge of sweetpotato cultivation is with the practitioners and does not differ much with age. However, elder males with high status, such as lineage chiefs, often possess "secret" knowledge which the other people don't have. Such was the case with the garden magician (or the "chief of fertility" as his designation may also be translated) of Kimbim and other tribal heads in Irian Jaya whose special knowledge was, for example, related to the history of sweetpotato in that area, the meaning of sweetpotato names, and where sweetpotato comes from.

Gender

In the Irian Jaya case, the women who are the working class do have sweetpotato knowledge which is rarely owned by men, such as a sense for distinction and specific uses of individual varieties. In order to cross-check the information which we get, we have to interview both women and men, and be supported with information from the old people or key informants (head of village, teacher, chief of tribe, etc.).

Wealth

The rich not only have different views from the poor, but their knowledge and conceptualization of the world around them also differs in many respects. We don't see this as a very relevant variable in the knowledge of sweetpotato cultivation, particularly in Irian Jaya where local societies are relatively egalitarian. Everybody has access to the land and the technical knowledge needed to grow the crop. This case is different, if we talk about crops which need high cost inputs, such as rice or horticultural crops, and the case of new agricultural technologies with potential benefits for the grower in a competitive, market-oriented setting.

Language

In the context of Indonesia with its rich linguistic diversity, it often happens that nobody in the research team speaks the local language. The use of translators during the collection of associated knowledge becomes necessary. The best solution would be to have a team member

used for baby food (*wortel*) is usually watery, not fibrous, and very sweet with yellow flesh color.

Collection of information from farmers

The choice of informants is often predetermined by the fact that we enter the village as a group of important outsiders. Automatically, people having the function of "gatekeepers" will take care of the researchers' concerns first. People like the lineage head, the garden magician or the village head, however, through their experience and public position may be excellent informants. As the example of local agricultural extensionists (PPL) shows, gatekeepers need not be locals with a "life experience" in indigenous knowledge. It is important to ask first for potential informants, and keep in mind the background of these people while working with them.

Factors such as age or gender will also influence both our approach and the kind of information we will obtain. In collecting associated knowledge, we have to consider who has been chosen as an informant. Is it a male or a female person? Is it a young or an elderly person?

The group interview is a spontaneous mode of interaction during fieldwork. A walk to a garden where people are working will almost inevitably lead to the situation of group interview. However, women should as a rule not be interviewed in the presence of men, because men always tend to answer the questions due to their dominance in the public sphere, and in contacts with outsiders in particular. Our experience both in Java and in Irian Jaya showed us that women did not speak a lot when we interviewed them in mixed groups with men. Especially in Irian Jaya, women were responsive when they were interviewed in their own group and became silent when we interviewed them in groups with men. To elicit adequate information from women, interviews should be conducted separately.

The elder people tend to have a lot of information about IK. However, their language is more difficult to understand and to put into context because they retain vernacular modes of communication. In Irian Jaya - but sometimes also in Java - the language problem is more difficult to overcome with elder people compared to interviews with the younger generation which has reached some fluency in Indonesian. Patience, and the use of a translator, are needed to get the information.

To make things smoother during interviews, it is an advantage to bring small gifts such as tobacco, cigarettes, candies or salt (in Irian Jaya where this is still a rare article in the more remote villages). This will reduce uneasiness in the relationship with the informants.

Limitations in the researcher-informant relation

The category of informant or respondent is a general one which glosses over the fact that knowledge, and thus, possible responses, vary widely among a village population. Data obtained from informant interviews have to be used and analyzed in the context of factors determining the position of the informant in his society, such as education, social stratification, language and culture. Moreover, each researcher is limited in his search for adequate information by limitations of time, communication language, and aspects of personal attitude, such as patience, etc.

Education

There are two kinds of education, formal and informal. Formal education is organized in institutions such as schools which have the specific purpose of providing training and information. Informal education can be obtained from parents, old people or by everyday

with both academic background and competence in the local language. In the case of Dani, such persons are very rare, and we used local people with some formal schooling and reasonable fluency in Indonesian. In Java, the difficulties are usually less pronounced, because Javanese is spoken by a majority of the Indonesian population, as well as many researchers.

Culture

Wherever we encounter sweetpotato, it is not only part of agricultural production, but also embedded in a wider social and cultural context. It is important to get some idea on the wider culture previous to the research through reading available reference literature on the area to be visited. Our special focus will of course be the links between the crop and the people, and links to other cultural domains. From such an exercise, we will for example note that sweetpotato is the staple food in the Irian Jaya highlands, with all its implications in a traditional cultural context. A crop which is the stuff and staff of life is likely to get a certain amount of ritual attention to secure its productivity which is the basis of the people's subsistence. Documenting cultural aspects will also facilitate fieldwork as it generates data about the "limiting factors" discussed above. Dani culture, for example, attributes a high position to men and a low position to women who nevertheless have a crucial role in family life. They are responsible for food supply (sweetpotato) and take care of the livestock (pigs). Sweetpotato and pigs have high status in their culture.

A second aspect of cultural learning concerns our very relation with the informants and the people we meet during fieldwork. Knowing a few basics of their culture can reflect our genuine interest in their way of living. A simple example is the use of local greetings. In the Dani area, people felt happy if we used *nayak* and *lauk* as a greeting when we met them. We can also reduce people's fear that their culture is not respected or dismissed by outsiders who represent the dominant segments of the society.

Farmer participation in germplasm collection

The farmer is the key informant and key resource for us because farmers know everything in relation to IK. Therefore, farmers should participate both as resource persons and as evaluators. Knowledgeable farmers usually serve as resource persons in the recording of IK, but their experience as evaluators of germplasm is not very often tapped.

Knowing farmer preferences for sweetpotato is very interesting. We can ask the farmer as an evaluator to rank cultivars using parameters such as yield, taste, texture (hard or wet), sweetness, and personal preference.

I have experience with organoleptic tests (sensory evaluation) by local farmers in Wamena, Irian Jaya. I asked eight local farmers to evaluate 20 cultivars which are known for different purposes, such as for baby food, pig feed and human food. The results indicate that farmers could determine certain cultivars by taste, although these were unlabelled (Table 2). They still know which cultivars are for baby food, pig feed and human food. In addition, people know which one is an original cultivar and where the cultivar comes from (valley or slope area). The cultivar called *wortel*, which is known as baby food, was chosen by almost all respondents because the texture is very soft, not fibrous, and very sweet. People from Baliem Valley prefer watery cultivars compared to hard ones. Another cultivar, *helalekue alepmeke* (old *helalekue*), has a high score for preference because the cultivar is known as an original cultivar.

Table 2 Farmer's sensory evaluation of sweetpotato.

Cultivar Name	Texture	Sweetness	Fibers	Preference
wortel	1.5	3.5	1.0	3.4
aluage	3.6	3.0	3.3	2.4
mikmak	2.4	2.0	1.1	1.9
yobere	4.3	2.6	1.8	2.6
kentang	4.9	2.5	1.3	2.5
mingka	3.8	2.4	1.5	1.9
musan	2.1	2.6	2.0	2.1
towenggon	1.9	2.6	1.6	2.3
kaboak	2.3	2.4	1.5	2.3
tinta	3.5	3.3	1.3	2.5
malugerom	3.5	2.3	2.5	2.9
abokul	2.3	2.4	2.6	2.3
helalekue alepmeke	2.6	3.0	1.3	3.3
tabimbi	2.6	1.6	2.1	2.9
dirake	3.0	2.8	3.5	2.6
helalekue ketmeke	4.5	3.1	1.0	2.1
yiloli	3.0	2.8	3.3	3.4
arugulek	2.1	2.0	2.9	2.4
gelakue	3.5	1.4	5.0	1.0
musaneken	2.3	1.5	4.3	1.1

Note: all components were evaluated over a range of 1 to 5. For texture 1 = very soft (watery), 5 = hard; for sweetness 1 = bland (no taste), 5 = very sweet; for fiber 1 = no fiber, 5 = very fibrous; and for overall preference 1 = dislike, 5 = like.

Tools for data collection

When collecting associated knowledge, tools such as field notes, tape recorder, photographs/slides, as well as specimens are needed.

Field notes

During germplasm collection, field notes help to keep all information before the report is prepared. If notes sometimes cannot be taken directly during the interview, they can be completed after the interview is finished.

Tape recorder

This tool is very useful during interviews, because the interviewer can concentrate on interviewing the farmer without stopping to write the information down. Especially in Java, the tape recorder can be used because people do not object. However, it is necessary to obtain permission first from the respondent. The negative side to tape recorder use is that people not freely give information, so care must be taken in using the tape recorder.

Photograph/slide

Photographs/slides can be used as a tool to document IK. Photographs/slides can be used as a check when required if notes were not taken. From our experience in the field, it is easier to take photographs in Java than in Irian Jaya. In Irian Jaya, it is advisable ask permission first before taking pictures, or people may request some money.

Specimen

Using specimens makes it easier for the farmer to explain something in relation to sweetpotato. They can easily give information by ranking, comparing with other cultivars and by mentioning other morphological characteristics. In addition, the specimen can be used as a check for farmer information. In our experience, a good respondent gives almost 90% correct responses.

For long term purposes and breeding activities, we still keep specimens as live plants in germplasm maintenance. All the information related to the specimen, is put in a database. These data can be used by anybody who needs it.

Conclusion

Collecting IK during sweetpotato germplasm collection helps establish the level of biodiversity of sweetpotato in that area, and provides other information (farmer preference, etc.) which is very useful for breeding activities and other purposes. Different places may require different methods and tools to cover the IK.

References

- Minantyorini, Nina Lisna Ningsih, Schneider, Jürg and Widyastuti, Caecilia Afra. 1992. *Collection of sweetpotato germplasm in the regency of Garut, West Java*. International Potato Center, Bogor.
- Minantyorini, Nina Lisna Ningsih, Schneider, Jürg and Widyastuti, Caecilia Afra. 1992. *Collection of sweetpotato germplasm in the regency of Wonosobo, Central Java*. International Potato Center. Bogor.
- Mok, Il Gin and Schneider, Jürg. 1992. Collection and documentation of sweetpotato germplasm in Indonesia. In: Prain, G.D and Bagalanon, C.P. (ed.), *Local knowledge global science and plant genetic resources: towards a partnership*, Los Banos, Laguna.
- Schneider, Jürg, Widyastuti, Caecilia A. and Djazuli, M. 1993. *Sweetpotato in the Baliem valley area, Irian Jaya*. International Potato Center, Bogor.