

# TERMS FOR RICE AGRICULTURE AND TERRACE BUILDING IN SOME CORDILLERAN LANGUAGES OF THE PHILIPPINES

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## 1. INTRODUCTION

The purpose of this paper is to examine the reconstructable terms for wet rice agriculture in the Central Cordilleran languages of the Northern Philippines, in an attempt to throw light on problems relating to the antiquity and function of the rice terraces found throughout the area where these languages are spoken. The age of the rice terraces has been estimated by some to be in the range of thousands of years, but by others to be in the order of several hundreds of years. Their primary function today is to provide a suitable environment in the rugged terrain of the region for the production of wet rice. Whether this was the function for which the terraces were originally constructed has been questioned in recent anthropological studies which accept the relatively great antiquity of the terraces but view the introduction of wet rice in the region as a relatively recent result of agricultural intensification.

## 2. BACKGROUND

### 2.1 GEOGRAPHY

The northern half of the island of Luzon in the Philippines is characterised by a highly complex chain of mountains known as the Cordillera Central. Rising to nearly 3,000 metres they extend for some 300 kilometres in a north-south direction, effectively separating the dry, narrow, coastal strip of north-western Luzon (the Ilocos provinces) from the broad, fertile valley of the Cagayan River in the north-central part of the island (the provinces of Cagayan and Isabela). The Cagayan River has its headwaters in the southern reaches of the Cordillera Central and flows in a northerly direction along the western flanks of the range, picking up the outflow of a number of tributaries draining valleys which, in some cases, reach into the very heart of the range.

The largest of these tributaries is the Chico River, which flows through the centre of the Bontoc area and was possibly the route by which the ancestors of the mountain peoples first gained access into the central and southern sections of the Cordillera.

For many years the Cordillera Central constituted a single political entity known as Mountain Province. It consisted of five sub-provinces, Benguet, Ifugao, Bontoc, Apayao and Kalinga. Now, these entities have been reconstituted as separate provinces, Benguet, Ifugao, Mountain (formerly Bontoc) and Kalinga-Apayao.

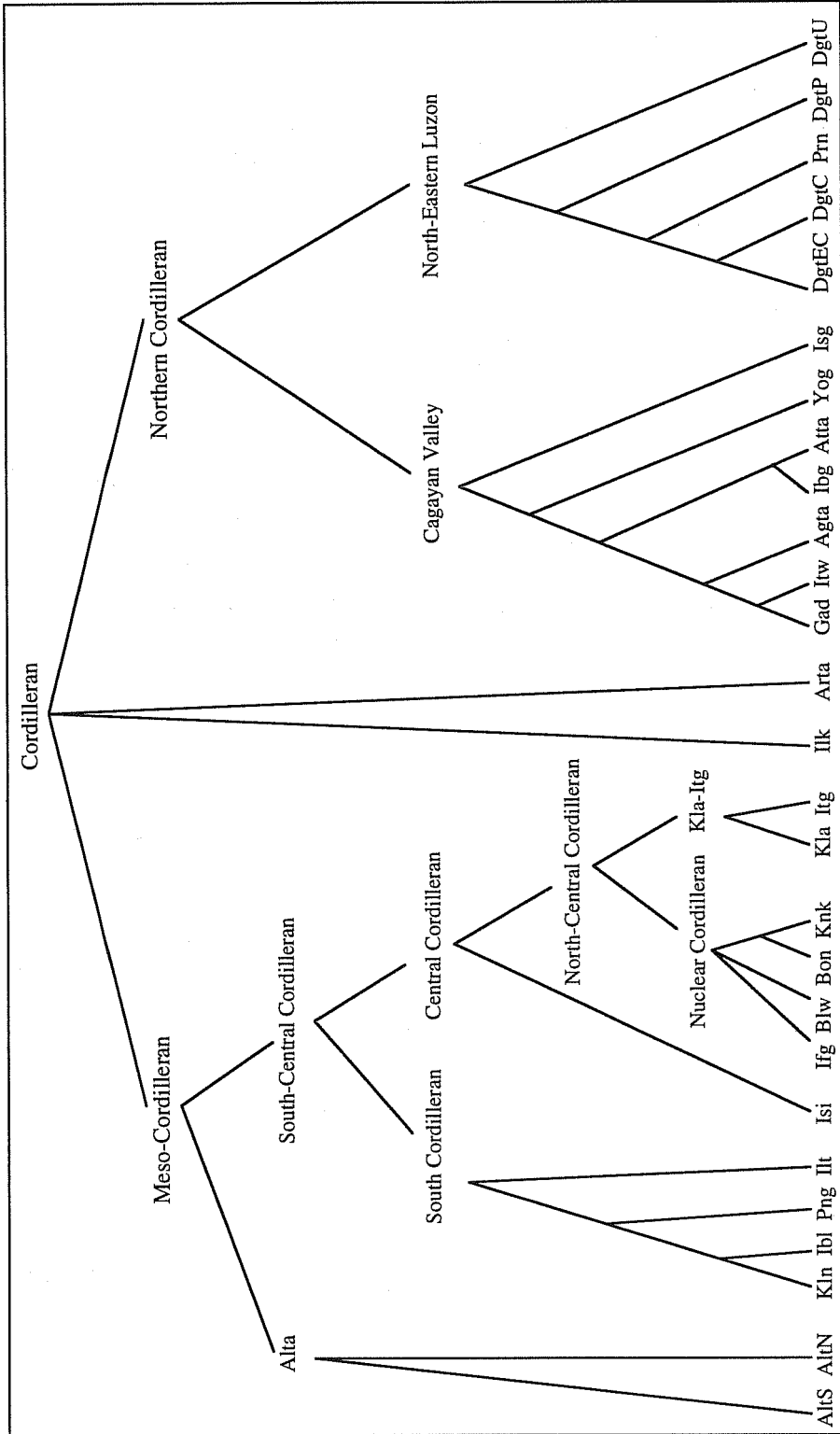


FIGURE: SUBGROUPING OF CORDILLERAN LANGUAGES

## 2.2 ETHNOLINGUISTIC GROUPS

Northern Luzon is populated by some six and a half million people, close to one million of whom actually live in the provinces of the Cordillera Central. All these people belong to a single, fairly clearly defined, linguistic subgroup. Generally called Cordilleran (or perhaps more appropriately Northern Philippines), it has two major branches, Northern Cordilleran and Meso-Cordilleran. Two languages (Ilokano with some four million speakers and the major trade language of the Cordilleran area, and Arta, a Negrito language with about a dozen remaining speakers) appear to be separate first order branches of this family.

Northern Cordilleran consists of two branches. One is comprised of the languages of the Cagayan River Valley, such as Ibanag, Itawis, Yogad and Gaddang; the other comprises the languages of the eastern coast of Northern Luzon and the Sierra Madre mountains, the great majority of which are spoken by small groups of Negritos commonly referred to as Dumagat. The Meso-Cordilleran branch consists of a small group of Negrito languages called Alta spoken in scattered areas of the southern Sierra Madre and the South-Central Cordilleran branch. South-Central Cordilleran in its turn consists of two branches, South Cordilleran and Central Cordilleran.

The Southern Cordilleran languages, Ilongot, Inibaloi, I'wak, Karaw and Kallahan are spoken throughout the southern reaches of the Cordillera and surrounding lowland areas. One other member of this family, Pangasinan, is spoken only in the lowlands in Pangasinan Province.

The Central Cordilleran languages with which this paper is primarily concerned are Isinai (now spoken only in two small lowland towns in the province of Nueva Vizcaya), Kalinga and Itneg, and the Nuclear Cordilleran group comprised of the Ifugao languages (Kiangan, Batad, Amganad, Bayninan, etc.), Balangaw and Bontok-Kankanay (Bontok, Tukukan, Sagada, Lepanto, etc.). It is the speakers of Nuclear Cordilleran languages who have developed rice terrace culture in the Philippines to its fullest extent.

Their internal relationships are demonstrated in the Figure.<sup>1</sup>

## 2.3 WET AND DRY RICE

As in most other areas of the Philippines the staple food in the Cordillera is rice. Various other crops supplement rice as the staple, especially in those areas where insufficient is grown to be able to meet the need. Principal additional crops include root crops, primarily sweet potato, as well as taro, yam and cassava and grains such as millet and sorghum, with corn also frequently grown.

Rice is grown with varying degrees of success in this area depending on the type grown and on various ecological and environmental factors. Two types of rice agriculture are found, dry rice, grown in shifting swiddens, and wet rice, grown in terraced pondfields. According to Scott (1958:93) only wet rice techniques are used by the Ifugao, Bontok, Kankanay and other groups of the high mountain regions of Benguet Province; and only dry rice techniques are used by the Isneg and Kalinga, that is in the lower elevation Kalinga and Apayao Provinces. Dry rice cannot be grown successfully at the higher altitudes where the Ifugao and Bontok people live. However, at least in the southern Kalinga municipalities of

<sup>1</sup> Abbreviations are listed in Appendix 1.

Tinglayan and Pinukpuk, wet rice is grown and is the main food source (SIL 1980:iv), and terminology associated with wet rice agriculture is found.

In Bontoc and Ifugao in particular, wet rice agriculture has resulted in extensive modification of the ecosystem with valley walls and sometimes precipitous mountainsides being carved into terraces whose walls, in Bontoc and in some areas of Ifugao, are built of rocks quarried from the mountainsides or in some cases carried up thousands of feet from the river bed below. Conklin (1980:38) states that in Ifugao alone there are 20,000 kilometres of pondfield walls, 7,000 of which are rock walled. Complex systems of irrigation canals have also been built to provide the constant flow of water necessary for the successful growth of wet rice.

The expenditure of labour necessary for the development of new rice fields and for their maintenance and repair is extremely high. Every heavy rainstorm results in some wall being eroded or collapsing onto the terrace below it and after a typhoon considerable effort must be expended to return damaged fields to a productive state again.

Activities associated with the growing of rice have therefore become central to both Ifugao and Bontok societies. Rituals must be performed at the beginning of the soil preparation season and at every distinct phase of activity, such as preparation of seed beds, transplanting of the seedlings, cleaning of the terrace walls, harvesting and so on. In Bontoc, the formation of the working groups (*ʔubbu*) which will do the soil preparation and related activities is a highly structured social activity and is hedged about with religious sanctions to ensure ultimately a good rice harvest and healthy children in the village (Reid 1972).

### 3. DATING THE TERRACES

#### 3.1 INTRODUCTION

Looking at the magnitude of the task that the Ifugaos and Bontoks have accomplished, one cannot help but wonder just how long they have been at it. Various hypotheses have appeared in the literature, ranging from Beyer's (1955) claim that the terraces were developed by an in-migration of "Late Indonesian Type B" terrace-building people some 2,000-3,000 years ago, to Keesing's (1962) claim that the Cordillera was probably almost completely unpopulated until settlers with a knowledge of wet rice cultivation fled to the mountains to avoid Spanish taxation and persecution within the last few hundred years and developed them. All these positions are carefully summarised and discussed in Bodner (1986).

Most researchers today (including Scott, Bodner and Conklin) have concluded on the basis of ethnographic and ecological studies that the introduction of wet rice agriculture into the Cordilleran area although apparently occurring at different periods in different areas must have postdated the actual settlement of the area, and that early settlers in the area were dependent, not on rice for their staple food, but on root crops such as yam and taro, as well as grains such as millet, sorghum and Job's-tears.

Although I do not believe that linguistic data can provide us with a measure of the actual time that two languages have been separated, the reconstruction of protoforms can provide us with some indication of the life and times of the speakers of that protolanguage. With this in mind I have attempted to compare lexical items associated with pondfield agriculture to

determine if possible whether terrace construction preceded or followed the dispersal of those languages whose speakers are today most closely associated with their development and use.

In the following section I discuss the terminology of terraced pondfield construction. It will be noted that the knowledge of this technology must have predated the dispersal of the Nuclear Cordilleran languages in that nearly all the relevant terminology is reconstructable to Proto Nuclear Cordilleran. It will also be noted that in many instances the terminology is either unique to this subgroup, or it is a specialisation of more general terminology reconstructable to a deeper time depth but without reference to terraced pondfield construction, the implication being that the technology was a local adaptation to local environmental conditions, rather than an imported technology. The complete data on which this paper is based is found in Appendix 2.

### 3.2 PONDFIELD CONSTRUCTION AND MAINTENANCE

(1) PCo, PNoCo *\*payaw* 'pondfield'; PS-CCo, PSCo, PCCo, PNuCo *\*payew* 'pondfield, terraced pondfield'.

(2) PCCo, PKI, PNuCo *\*?a:lak* 'irrigation canal'. The presence of a cognate in Isinai has yet to be confirmed. The term may only be reconstructable as far back as Proto North-Central Cordilleran.

(3) PS-CCo, PNuCo *\*?ugbu* 'an exchange labour working group'. The intense labour required for the construction of terraced pondfields was probably the reason for the formal development of cooperative working groups in which the members take turn about in receiving the labour of the group in their fields for the day. Although these working groups may be asked to do any kind of labour, the primary function of the group is to assist in the building, maintenance and cultivation of terraced pondfields. In Guinaang, Bontoc, working groups are reconstituted annually, just prior to the beginning of the soil preparation season, and their first ritual work is the turning of soil in a pondfield in Bagiw, probably the first area to be cultivated in the area (Reid 1972). The inclusion of an apparent cognate in Inibaloi pushes the antiquity of this term back to Proto South-Central Cordilleran. Whether or not its use at this period implies terraced pondfield construction is debatable, since the technology has apparently been introduced only relatively recently into Inibaloi.

Although there is nothing in the phonology of the Inibaloi term to imply a borrowing, it is possible that it was in fact borrowed from a neighbouring Central Cordilleran language along with other terminology relating specifically to pondfield construction, and therefore should only be reconstructed back to Proto Nuclear Cordilleran.

(4) PS-CCo, PSCo, PCCo, PNuCo, PKI *\*pa:nad* 'level area; to level' (< PCo *\*pa:naj* 'level area, plain'). The levelling of ground in the mountains for other than the preparation of a residential site generally implies the development of a pondfield terrace, since normal swiddening activity in mountainous areas is typically accomplished on natural hillsides. The development of the Proto Cordilleran term for 'level area, plain' in Proto Nuclear Cordilleran usually relates specifically to the development of a pondfield terrace. In Bontok, as in the Ifugao languages it also means the hard mud layer beneath the cultivated surface of a pondfield, and in Bontok is the name of a spirit that must be placated prior to any agricultural activity in the field.

(5) PNuCo *\*dubdub* ‘movement of soft mud’. Both Bontok and Ifugao have terms which relate to soft, running or oozing mud associated with pondfields. In Bontok it specifically refers to mud formed in the process of hydraulicizing, the method by which hillsides are scoured out with running water to develop a terrace.

(6) PNuCo *\*ʔa:deg* ‘to fill with stones and dirt, as the space behind a stone wall during the process of constructing a terrace’. This term, although having the general meaning of ‘dry fill’ typically applies to the fill used in terraced pondfield construction.

(7) PNuCo *\*li(:)sang* ‘clods of dried mud or dirt’. Specifically, in Bontok and Ifugao, this term applies to either the construction, maintenance or soil preparation activities of terraced pondfields.

(8) PS-CCo, PSCo, PCCo, PKI *\*tuping* ‘stone wall’; PNuCo 1. ‘stone retaining wall’, 2. ‘any orderly heap of objects’. In Nuclear Cordilleran languages this term applies generally to any retaining wall, although specifically to the rock retaining walls of terraced pondfields.

(9) PNuCo *\*pegnad* ‘foundation’. Specifically applied to the foundation layer of large rocks in the construction of terrace retaining walls.

(10) PNuCo *\*pangdew* ‘stepping stones built into the wall of a pondfield’. This term was probably morphologically complex, with *pang-* being an instrumental prefix, however, to my knowledge, none of the northern languages of the Philippines retains a lexical item such as *(ke)dew* or *(ge)dew* which could have been the source of the final syllable.

(11) PS-CCo *\*b(a,e)neŋ*; PSCo *\*beneŋ* ‘dike for retaining water’; PNuCo *\*baneŋ* 1. ‘top section of a pondfield terrace retaining wall’, 2. ‘pondfield’. A mud dike is built on top of a pondfield retaining wall to stop water from escaping from the field. In some Bontok dialects the term is used as a metaphor for the field itself.

(12) PNuCo *\*ʔetʔet* ‘to pack holes with mud’ (cf. Ilk *ʔetʔet* ‘tight; cause to become tight’). This term applies specifically to the packing of holes in the upper sections of a pondfield retaining wall to prevent water seepage. In Bontok the term is used as a noun and applies to the inner wall of the pondfield dike.

(13) PCo *\*pakpak* 1. ‘to slap, to beat with a flat surfaced instrument’, 2. ‘to fasten two flat surfaces together’; PNuCo 1. ‘to fasten two flat surfaces together’, 2. ‘to stick mud on something, as the top of a retaining wall to prevent leakage’. This is a general, onomatopoeic term in a number of Philippine languages to describe a slapping sound. In Nuclear Cordilleran languages the term has been narrowed to apply specifically to the action of slapping mud onto something, usually the top or sides of a terraced pondfield dike to prevent water seepage.

(14) PCo *\*gi:wəŋ/\*gu(:)wəŋ* ‘to make an opening or hole through; to make a breach in’; PNuCo *\*gu(:)wəŋ* ‘breach in a pondfield dike’. A breach is made in pondfield dikes to allow for controlled water drainage.

(15) PCo, PNoCo *\*teneŋ* ‘division in a field’; PNuCoX *\*batneŋ* ‘stone boundary marker in a field; mud dike in a pondfield’ (probably a fused form of *\*batu-n teneŋ* ‘stones which are boundary markers’).

(16) PCo *\*pideR* ‘be adjacent to’; PNuCo *\*pidel* ‘that part of a pondfield which is adjacent to the base of the retaining wall that supports the pondfield above it’.

(17) PNuCo *\*ta:ban* 'the cleared ground bordering a pondfield, either the mountain slope above or adjacent to it, or the area below its retaining wall'.

(18) PNuCo *\*samal* 'preparation of a pondfield prior to transplanting rice seedlings'. Although found with this meaning only in Bontok, it is probable that the term had this meaning also in Proto Ifugao. Present-day Ifugao languages have the term only in a derived form, *hinamal* 'cooked rice', apparently originally meaning 'food from prepared pondfields'.

(19) PNuCo *\*leweg* 'to dig deeply'. A way of soil preparation, specifically applied in Bontok to deep pondfield cultivation.

### 3.3 THE RICE PLANT AND ITS PARTS

In this section I examine the terms for rice in an attempt to determine whether the speakers of Proto Nuclear Cordilleran knew the plant. It will be seen that terms reconstructable to this level refer not only to the plant (probably pondfield, or wet rice) but also to various parts of the plant, and to stages of its growth. Furthermore, most of these terms can be shown to be reflexes of terms with similar meanings in earlier protolanguages. Some of these terms, such as (22) and (26-31) could apply to grain crops other than rice. However, (20) and (23-25) refer specifically to pondfield rice.

(20) PAn *\*pa:jey* 'rice plant'; PCo 'pondfield rice plant; unthreshed pondfield rice'; PNoCo, PS-CCo, PSCo, PCCo, PNuCo, PKI *\*pa:gey* 'pondfield rice plant; unthreshed pondfield rice'. Two terms for rice plant have been reconstructed for Proto Austronesian with reflexes in Philippine languages. Only reflexes of PCo *\*pa:jey* are found in Nuclear Cordilleran languages, that is those spoken in the area in which only wet rice can be grown. Reflexes of the other term, PCo *\*?emay* (see (21) below), are found only in Northern Cordilleran languages: Isneg, Malaweg, Itawis, Ibanag, Atta and Gaddang, where it typically refers to dry rice grown in swiddens. It is possible that the semantic distinctions noted here for Proto Cordilleran reflect distinctions at much earlier levels, and perhaps go back to Proto Austronesian, although there are both Formosan and Philippine languages which reflect the latter term with the meaning 'cooked rice' (Revel 1988). The Bontok and Balangaw borrowings of a Northern Cordilleran reflex *?ammay* meaning 'good', or 'tasty', and which can perhaps be associated with the meaning 'cooked rice', must be relatively recent (because of the phonological developments in the term), although the latter meaning does not appear in any available Northern Cordilleran dictionary or wordlist.

(21) PAn *\*Sem(e)y*; PPh *\*hemay* 'rice plant, cooked rice'; PCo, PNoCo *\*?emay* 'swidden rice plant; unthreshed swidden rice'.

(22) PCo *\*dayaket* 'general term for any variety of glutinous rice, cassava, or taro'. The distinction between glutinous and non-glutinous varieties of rice is found throughout the Cordilleran area. Only the general term for glutinous varieties however is reconstructable. Bontok *puddaw* 'non-glutinous rice' is apparently borrowed from Ilokano *pu daw* 'white, light-complexioned, light-coloured' (note also Lepanto Kankanay *pu dawan* 'white, light-coloured'), since the Bontok form does not have the expected reflex, *-ew*, of the final diphthong (PCo *\*-aw* > PS-CCo *\*-ew*).

(23) PCo *\*penar*; PNuCo *\*penal* 'rice grain used for seed'. This term is used specifically for rice seed that is sown in a seed bed from which seedlings will be transplanted into a pondfield. The verbal form means 'to plant a rice seed bed'. None of the Nuclear Cordilleran

languages reflects PPh *\*binhiq* ‘seed’, which in most Philippine languages refers to any seed for planting.

(24) PNuCo *\*padug* ‘rice seedling’.

(25) PS-CCo, PSCo, PNuCo *\*tu:ned* ‘to transplant rice seedlings’. Although there is nothing in the phonology of the Inibaloi term to imply a borrowing, it is possible that it was in fact borrowed from a neighbouring Central Cordilleran language along with other terminology relating specifically to pondfield construction, and therefore should only be reconstructed back to Proto Nuclear Cordilleran.

(26) PNuCo *\*seldiq* ‘stage of rice development when seed heads have appeared and are beginning to ripen’.

(27) PAn *\*ZeRami(h,O)* ‘stubble’; PCoX *\*daga:mi* ‘rice stubble’. This form reflects an irregular development of *\*R* as *g* in all the South-Central Cordilleran languages in which a reflex has been identified, as well as in Ilokano. It is similar in this respect to a large number of forms in which it seems PAn *\*R* irregularly changed into PCo *\*g*. On the other hand, it could have been borrowed from some Northern Cordilleran language at one or more times in the history of these languages.

(28) PNuCo *\*ʔu:gas* ‘a grain of unhusked rice which has fallen from a harvested rice stalk’.

(29) PNuCo *\*la(:)siq* ‘a branch of a rice panicle’.

(30) PCCo, PNuCo, PKI *\*dugi* ‘husk of rice’.

(31) PCCo *\*ʔu:pak* ‘bark of a tree, peeling’; PNuCoX *\*ʔu(:)pek* ‘rice bran; what remains after rice has been pounded and winnowed’.

#### 3.4 PREPARATION OF RICE FOR FOOD

Almost all of the following terms, from harvesting, bundling, storing and winnowing to cooking and serving are today primarily used with reference to rice. However, as Bodner (1986) makes clear, the terms may also be used with reference to other grain crops, such as millet, and in some cases also to taro.

(32) PAn *\*a(n,N)i*; PPh, PCo, PNuCo *ʔa:ni* ‘harvest’.

(33) PCo, PNoCo *\*rakem*; PCCo, PNuCo, PKI *\*lakem* ‘harvesting knife’.

(34) PCo, PNoCo *\*bejel* ‘to press or squeeze together’; PNuCo *\*bejel* 1. ‘bundle’, 2. ‘a bundle of harvested grain’.

(35) PCo, PNoCo, PSCo, PCCo, PKI, PNuCo *\*betek* ‘bundle, as rice; the tie used to bundle things together; the smallest unit of bundles of rice’.

(36) PCo *\*ʔi:tiq* ‘a unit of harvested rice bundles’; PNoCo *\*ʔi:tiq* ‘four bundles of harvested rice’; PNuCo *\*ʔi:tiq* ‘five bundles of harvested rice’. The Kalinga form is possibly an early borrowing from a Northern Cordilleran language, in that it refers to only four bundles.

(37) PCo *\*ʔu:yun* ‘a unit of harvested rice bundles’.



(38) PCo, PNoCo, PNuCo *\*ʔu(:)pu* ‘a unit of harvested rice bundles’. This term typically refers to a substantially large number of bundles of harvested rice, one *ʔu:pu* being either 400 or 500 bundles. The Gaddang reflex has an initial verbal prefix *m-*, and means ‘to transport or carry goods’. The widespread distribution of these terms suggests the presence of a rice trading network in very early times.

(39) PCo, PSCo, PCCo, PNuCo *\*ku(:)tim* ‘to remove the husk of freshly harvested grain with fingers or teeth in order to eat the grain raw’.

(40) PCo, PNoCo, PSCo, PCCo, PKI, PNuCo *\*ʔa:laŋ* ‘granary’.

(41) PCo *\*ʔaga:maŋ* ‘sleeping house for unmarried people’. Although glossed as ‘granary’ in Ilokano, Tukuran, Lepanto, and in some other Bontok dialects, the meaning given for the Ifugao cognates is probably the original meaning, since *ʔa:laŋ* has a much wider distribution with the meaning ‘granary’.

(42) PCCo, PKI, PNuCo *\*ʔu:lut* ‘to strip grain from rice panicles by pulling them through one’s hands; straw that is left after grains have been stripped off’.

(43) PPh *\*bayu* ‘to pound rice’; PCo, PNoCo, PSCo, PCCo, PKI, PNuCo *\*ba:yu* ‘to pound with pestle and mortar for the purpose of removing husk from grain’. One other term has been reconstructed with this meaning for Proto Philippines: *\*lebek* (Zorc 1971). In Cordilleran languages, definitions of the latter usually imply beating for the purpose of crushing, for example, Lpn *lebek* ‘to beat small, to grind, to pound’; Ilk *lebbek* ‘to pound, smash, crush in a mortar with a pestle’. In Bontok the term is used for a ceremonial rice pounding during a wedding ceremony. The rice is placed in an elongated trough-like mortar, the *lebkan*, which according to local tradition was originally used for pounding and crushing sugarcane, prior to the introduction of cane mills. I suggest that the term may have originally meant ‘to pound sugarcane’.

(44) PAn *\*lesuŋ* ‘mortar’; PCo, PCCo, PKI, PNuCo *\*lusuŋ* ‘mortar, for pounding grain’.

(45) PPh *\*qaSelu*; PCo, PNoCo, PSCo *\*ʔaʔlu*; PCCo, PKI, PNuCo *\*ʔalʔu* ‘pestle’.

(46) PNuCo *\*ʔasud* ‘method of pounding in which two or more persons pound by alternating their pestle strokes’.

(47) PCCo *\*bina:yu* ‘pounded rice’.

(48) PPh *\*(O,q)eta* ‘unhusked rice kernel; rice husk’; PCo, PNoCo, PSCo, PCCo, PKI, PNuCo *\*ʔeta* 1. ‘raw, uncooked’, 2. ‘an unhusked kernel of rice mixed with husked or cooked rice’.

(49) PPh *\*tahep* ‘winnow rice’; PCo, PNoCo, PSCo, PNuCo *\*taʔep* ‘to winnow; husk of grain’.

(50) PPh *\*bijawu*; PCo *\*biga:ʔu*; PS-CCoX *\*liga:ʔu* ‘winnowing basket’.

(51) PAn *\*lu(N)[t]juh* ‘cook’; PCo *\*lu:tu* ‘to cook by boiling; ripe’; PS-CCo *\*lu:tu* ‘to cook by boiling, especially to cook rice; ripe’.

(52) PNuCo *\*teleb* ‘to pour off excess water from cooking rice’.

(53) PCo, PNoCo, PCCo, PKI, PNuCo *\*ʔa(:)sug* ‘to place a pot on the fire, for the purpose of cooking rice’.

(54) PNuCo \**ba:new* 'to serve cooked food'.

An examination of the above sets of terms leads to the conclusion that the speakers of Proto Cordilleran not only knew about rice, but it was harvested, stored in granaries, pounded with a pestle and mortar to remove the husk, and cooked for food. Terms both in Cordilleran and non-Cordilleran languages for cooked rice simply translate as 'food', or 'that which is eaten' (Tag *kanin*, Bon *makan*), or 'that which is cooked' (Ilk *inapoy*, Ibl *nilutu*, Itg *?asug*) and imply that at least for these groups, rice has been the primary food source for a considerable period of time. However, the fact that no single term for cooked rice can be unambiguously reconstructed for Proto Cordilleran, might imply that at earlier times, other crops such as taro and millet may have formed a much more prominent part of the diet than they do today.

The speakers of the parent language of the South-Central Cordilleran subgroup appear to have been cultivators of wet rice in pondfields. Terms for the pondfield itself, for levelling fields, and the social groups formed for this purpose, for the mud dike used to retain water in the pondfield, and most significantly the term for the planting of rice seedlings are reconstructable to this time depth. There is no reason to believe from this though that these people were builders of walled pondfield terraces of the type which are ubiquitous today in much of the Cordillera. There is certainly no reason either to believe that they were living in the mountains.

At least some of the speakers of Proto Nuclear Cordilleran, however, were clearly masters of walled, pondfield terrace construction in a mountainous environment. They had mastered the art of building rock retaining walls, and had special terms for the foundation row of rocks in the terrace wall, and for protruding rocks built into the wall as a stairway. They also had a term for the mountainside abutting the inner edge of the terrace. They knew how to construct irrigation canals to bring water from higher elevations to the pondfields, and had a term for the breach in a pondfield dike to permit water to flow to terraces below. Terms for the bundling and counting of large amounts of rice were also used, and trading between groups probably occurred.

It is significant that the majority of the terms that are related to pondfield construction do not appear to have cognates outside the Nuclear Cordilleran languages. The few that do have external cognates do not apply specifically to rice terrace construction in the external languages, from which we may infer that the ability to shape the local terrain was a skill that was locally developed and mastered, not one that was brought into the area by some immigrant population with a knowledge of rice terrace construction.

It is important to note that pondfield construction had apparently developed prior to the dispersal of the Nuclear Cordilleran languages. There is no way linguistically to determine what that time frame was, but given the considerable internal differentiation of each of the languages in the family (each is a complex dialect chain with poor mutual intelligibility between the major population centres) and the syntactic and phonological differences between each of its members, I would think that at least fifteen hundred to two thousand years must have passed since Proto Nuclear Cordilleran began to split up.

Archaeological studies by Bodner in the village of Tukukan, Central Bontoc, lead her to a somewhat more conservative view of the role of rice in early Cordilleran populations than the one outlined above. Her analyses of excavated materials established (among others) the following; permanent villages were established in the Bontoc area by at least AD 570-680;

the inhabitants were spinning, weaving, using stone tools, earthenware ceramics and wooden products; they were able to acquire iron through a limited trading system; they possessed the technology for constructing stone walls; they practiced agriculture and augmented it with hunting and gathering; rice was not a major part, if present at all, of the subsistence base in AD 570-680 nor by AD 1410-1450; however grain, legumes, sorghum, millet, root crops and sugarcane probably were (Bodner 1986:422). She further states (p.226), "That rice was known is not questioned, but that it was grown by all groups which knew of it at the time of Proto Cordilleran or even Proto Nuclear Cordilleran is highly unlikely, particularly in light of the crop's uneven distribution throughout the Cordillera during historic times".

Bodner (p.210) further cautions that, "terracing must not be inextricably linked with irrigation, irrigation must not be considered synonymous with mountain stream diversion and pondfields must not be concatenated with wet rice cultivation. Harvesting and storing in bundles is a practice applied to rice and millet alike. Similarly, preparation by pounding in a mortar and winnowing is not necessarily associated with rice and only rice".

Bodner has assembled a substantial set of data in support of the above hypotheses. It is clear that the distribution of pondfield terraces was almost certainly far more restricted in prehistoric times than it is today. It is also clear that even within what is today a single language area, different ecological conditions demanded flexibility in the types of crops that are grown. She has furthermore made a convincing case for a far more extensive use of pondfield taro and of grains other than rice in prehistoric times than is common in most Cordilleran areas today.

Nevertheless she states (p.465) that, "Without securely dated rice remains in archaeological contexts throughout insular Southeast Asia, its presence, absence, and importance in the early Austronesian crop inventory remain matters for speculation...". She furthermore cautions "reservations are in order with regard to accepting the linguistic argument for its early dominance".

The linguistic evidence should, however, dispel any question of whether or not rice was present in the early Austronesian crop inventory. It will remain a matter for speculation only as long as the linguistic evidence is ignored. It was reconstructed for Proto Austronesian long before the recent discoveries of the great antiquity of rice in southern China, at least two thousand years prior to the estimated period during which Proto Austronesian developed in Formosa. Bodner recognises that rice must have been known by speakers of early languages in Northern Luzon. The major question that arises then is whether there is any linguistic evidence that early settlers in the high Cordillera (probably speakers of Proto Nuclear Cordilleran) were practicing rice cultivation, as their Proto Cordilleran ancestors undoubtedly were, or was the practice discontinued until comparatively more recent times when rice varieties which could prosper in the high mountain environments had evolved? The answer is a qualified yes. It is quite clear, as indicated above, that Proto Nuclear Cordilleran speakers were pondfield terrace builders. Whether or not they were used for rice cultivation at the time of the dispersal of the language groups that constitute the Nuclear Cordilleran subgroup depends on whether the terms that uniquely identify rice cultivation can be shown to be inherited from earlier protolanguages, or whether they can be shown to be borrowings from some non-Nuclear Cordilleran group, from whom they would presumably have brought in the seed, the plants or the technology associated with rice agriculture.

A number of terms, such as *ba:yu* ‘pound rice’, and *?a:laŋ* ‘granary’, could be either inherited or borrowed, since no diagnostic sound change occurred in these words which would enable us to make such a determination. There are, moreover, a few terms which do not have the expected reflexes, and may be borrowed. One of these is *daga:mi* ‘rice straw’ in which *g* appears as a reflex of *\*R*, rather than *l*, the expected reflex in Central and Southern Cordilleran languages. However this form shows irregular reflexes in a number of different languages, and its reconstruction is uncertain. There are a number of forms which are reconstructed with *\*R*, which reflect *g* in all of the Cordilleran languages, including Ilokano, where the expected reflex is *r*, and this form appears to be one of them.

Another such form is the widespread term reconstructed as PAN *\*beRas* ‘husked rice’. Isneg (Northern Cordilleran) has the correct reflex – *baŋgat*, as does Pangasinan *belas*, but Ilokano does not, having irregular reflexes both for *\*e* as well as for *\*R*, *bagas* (expected *berras*). Both Bontok *begas*, and Ifugao *bogah* show a medial *g* instead of *l*, and therefore appear to be borrowings. But, this form is also of interest because in the Nuclear Cordilleran languages its primary meaning is not ‘husked rice’ but ‘substance, kernel, contents’ and with appropriate affixes (*namgas*, *nabgas*, etc.), it means ‘to bear fruit’. It is no longer primarily associated with rice.

These extended meanings are also found in Isneg, and presumably in other Northern Cordilleran languages. The complete dictionary definition for Isneg *baŋgat* (Vanoverbergh 1972:109) is: “‘Rice (when pounded or unpounded); seed, kernel; fruit; tuber, rhizome, bulb, corn; substance, contents’; *maŋgbaŋgat* ‘To bear fruit’; *naŋgat* ‘Well-filled, full of grain’; *taŋgaŋgat* ‘One kernel’; *aŋgbaŋgatan* ‘A basket used for storing grain’; *baŋgat udan* (lit. ‘substance of rain’); ‘Hail’ *paŋgatan* ‘The female tutelary spirit of Sabangan’”. The form is interesting because it suggests that Nuclear Cordilleran could have borrowed the term (at a very early date) from Northern Cordilleran, prior in fact to the development of consonant gemination following *\*e*, a rule which is shared by many of the languages in this subgroup, as well as by Ilokano. But if it was borrowed, it was not borrowed with the meaning ‘husked rice’, so it does not throw any light on the issue at hand.

But the majority of terms given above are clearly not borrowed from any lowland language. The word for the rice plant itself, if borrowed after the sound changes that characterise the Southern and Central Cordilleran languages would have a final *-ay*, not *-ey*, as have scores of such words that have been recently borrowed. Similarly, PNuCo *tu:ned* ‘to transplant rice seedlings’ could not be a recent borrowing from any Northern Cordilleran language where *\*e* is generally reflected as *a*. Nor, for the same reason, could PNuCo *\*penal* ‘rice seed; to sow a rice seed bed’ be a borrowing from any lowland language. It is directly inherited from PCo *\*penar* ‘rice seed’.

#### 4. CONCLUSION

In summary, there seems to be conclusive linguistic evidence that pondfields were being constructed by the people who spoke the language ancestral to the Central and Southern Cordilleran languages, and that the Central Cordilleran speakers who migrated into the higher regions of the mountains developed the techniques of terraced pondfield construction, so that by the time of Proto Nuclear Cordilleran, they had become masters of the construction of rock walled terraces and of complex irrigation systems. What those terraces were used for is not quite so clear. That they were probably used for rice in at least some areas, is suggested by a number of terms which could also perhaps have applied to other, non-irrigated crops.

But the reconstruction at this level of terms for the rice plant itself, rice seed and rice seedling, could only apply to pondfield rice agriculture. That terraced pondfields may also have been used for taro cultivation in some areas is not contraindicated by any of the linguistic evidence, and seems to be supported by some of the ethnohistorical facts.

## APPENDIX 1: LIST OF SYMBOLS AND ABBREVIATIONS

<A>	Assimilation	Isg	Isneg
B	Borrowed form	Isi	Isinai
<BF>	Back formation	Itg	Itneg
<D>	Dissimilation	Itw	Itawis
<E>	Epenthesis	Kbn	Kabayan Inibaloi
<F>	Fused form	Kla	Kalinga
<G>	Gemination	Kln	Kallahan
<M>	Metathesis	Kng	Kiangan Ifugao
<P>	Prothesis	Knk	Kankanay (Botak)
X	Innovated form	Lpn	Lepanto Kankanay
Alt	Alta	PAn	Proto Austronesian
AltN	Northern Alta	PCCo	Proto Central Cordilleran
AltS	Southern Alta	PCo	Proto Cordilleran
Amg	Amganad Ifugao	PHF	Proto Hesperonesian- Formosan
Art	Arta	PIf	Proto Ifugao
Att	Atta	PKI	Proto Kalinga-Itneg
Blw	Balangaw	Png	Pangasinan
Bon	Bontok (Guinaang)	PNoCo	Proto Northern Cordilleran
Btd	Batad Ifugao	PNuCo	Proto Nuclear Cordilleran
Byn	Bayninan Ifugao	PPh	Proto Philippines
DgtC	Casiguran Dumagat (Agta)	Prn	Paranan
DgtEC	Eastern Cagayan Dumagat	PS-CCo	Proto South-Central Cordilleran
DgtP	Palanan Dumagat	PSCo	Proto Southern Cordilleran
DgtU	Umiray Dumagat	Sgd	Sagada Kankanay
Gad	Gaddang	Tag	Tagalog
Ibg	Ibanag	Tuk	Tukukan Bontok
Ibl	Inibaloi	Yog	Yogad
Ifg	Ifugao		
Ilk	Ilokano		
Ilt	Ilongot		

## APPENDIX 2: DATA

## I. TERMS RECONSTRUCTABLE TO PROTO CORDILLERAN

(1) PCo \**?aga:maŋ* 'sleeping house for unmarried people'

Ilk *?aga:maŋ* 'granary'

Kng *?aga:maŋ* 'a sleeping house for boys and girls'

Btd *?aga:maŋ* 'a sleeping house for unmarrieds'

Tuk *?agamaŋ* 'granary'

Lpn *?aga:maŋ* 'granary'

(2) PCo *\*ʔa:ni* ‘to harvest’ (< PHF *\*qániH* [Zorc 1971], PAn *\*a(Nn)i* ‘harvest’ [Blust 1971])

Ilk *ʔa:ni* ‘to harvest crops, to reap crops’

Isg *ʔa:ni* ‘to harvest, to reap rice’

Gad *ʔa:ni* ‘harvesting, said of rice’

Kla *ʔa:ni* ‘to harvest’

Bon *ʔa:ni* ‘to harvest rice or other grain-bearing plants; to gather seeds from certain weeds’

Lpn *ʔa:ni* ‘to harvest; to reap’

(3) PCo *\*ʔaʔlu* ‘pestle’ (< PHF *\*qaSelu* [Zorc 1973])

Isg *ʔallo* ‘pestle for pounding rice, etc.’

Gad *ʔa:lu* ‘pestle’

IlkX *ʔalʔu* <M> ‘pestle’

PSCo *\*ʔaʔlu*

Png *ʔalu* ‘pestle’

Ibl *daʔdu* ‘rice-pounding pestle’ (< *\*laʔlu*, cf. Ifg *lalu*)

PCCoX *\*ʔalʔu* <M>

Isi *ʔeʔu* ‘pestle’

Kla *ʔalʔo* ‘pestle’ (Limos Kalinga *ʔallu*)

ItgX *ʔalsuŋ* <F> (*ʔalʔu* + *lusuŋ*) ‘pestle’

PifX *\*lalu* <P> ‘pestle’ (possibly borrowing from Pre-Ibl *\*laʔlu*)

Blw *ʔalo* ‘pestle’

Bon *ʔalʔu* ‘pestle’

Tuk *ʔalʔu* ‘pestle’

Knk *ʔa:ʔu* ‘pestle’

Sgd *ʔa:ʔu* ‘pestle’; also *ʔalʔu*

LpnB *ʔalʔu* ‘pestle’

(4) PCo *\*ʔa:laŋ* ‘granary’

Isg *ʔʌ:laŋ* ‘granary’

Gad *ʔa:laŋ* ‘granary’

Ibl *ʔalaŋ* ‘a house of good construction – especially spoken of that which is not for daily living (as a house separate from the kitchen for sleeping); also, in some places, of well constructed houses in the fields as granaries’

Isi *ʔeaŋ* ‘granary’

Gad *ʔa:laŋ* ‘granary; front’

Kla *ʔa:laŋ* ‘rice house, granary’

Itg *ʔa:laŋ* ‘granary’

Kng *ʔa:laŋ* ‘rice granary’

Btd *ʔa:laŋ* ‘a granary, esp. for rice; to place rice sheaves in a rice granary’

Blw *ʔa:laŋ* ‘granary’

Bon *ʔa:laŋ* ‘rice granary’

(5) PCo *\*ʔasud* ‘to help one another in working’ (< PPh *\*ʔasud* [Zorc 1973])

Ilk *ʔasud* ‘to help one another, pounding rice, preparing timber, etc.’

IblX *ʔassud* <G> ‘to help one another thresh rice: usually by two or more standing at the mortar and pounding in alternate strokes’

PNUCo \**?asud* 'method of pounding in which two or more persons pound by alternating their pestle strokes'

Kng *?ahud* 'pound rice with two or three pestles in one trough, each pounder acting by turns'

BtdX *?ahhud* <G> 'to pound in pairs with pestle and mortar, as for two to pound rice, corn, coffee'

Bon *?asud* 'method of pounding rice, in which two persons, one on each side of the mortar, alternately strike their pestle into the mortar'

Tuk *?asud* 'method of pounding anything in which two or more persons pound by alternating their pestle strokes'

Sgd *?asud* 'to pound rice with another person, making alternative strokes'

(6) PCo \**?a(:)sug* 'to place a pot on the fire, for the purpose of cooking rice'

Isg *?atug* 'to place a pot on the fire'; *annatuxa:n* 'any kind of pot or jar, in which rice is being cooked'

Isi *?asux* 'cook rice'

Itg *?asug* 'rice as food'

Bon *?a.sug* 'to cook rice out of doors'

(7) PCo \**?emay* 'swidden rice plant; unthreshed swidden rice' (< PPh \**hemay* 'cooked rice' [Zorc 1971] < PAn \**Sem(e)y* - 'rice plant' [Charles 1973])

Isg *?ammay* 'rice on the stalk'

Att *ammay* 'rice on the stalk'

Ibg *ammay* 'unhusked rice; rice plant'

BlwB *?ammay* 'good'

BonB *?ammay* 'good, tasty, specifically to children when coaxing them to eat'

(8) PCo \**?eta* 1. 'raw, uncooked', 2. 'an unhusked kernel of rice mixed with husked or cooked rice' (< PHF \**qeCá* 'unhusked rice kernel; rice husk' [Zorc 1971]; PHF \**Hátaq* 'raw' [Zorc 1971])

Art (*ma-*)*ata* 'raw, uncooked'

Isg *?atta* 'an unhusked kernel of rice mixed with husked or cooked rice'

Gad *?atta* 'rice bran'

Alt (*ma-*)*ata* 'raw, uncooked'

Png *?eta* 'raw, uncooked, or undercooked'

Isi *?ota* 'grain of unhusked rice'

Kla *?ota* 'unhusked grains in pounded rice'

Kng *?ota* 'grains of unhusked rice left after pounding'

Btd *?ota* 'grains of unhusked rice remaining after pounding'

Bon *?eta* 'grains of unhusked rice left after pounding'

Tuk *?eta* 'one grain of rice, millet, sorghum, or Job's-tears, still unhusked after pounding'

Sgd *?eta* 'unpounded rice which remains mixed in with pounded rice'

Lpn *?eta* 'grains of unhusked rice left after pounding'

(9) PCo \**?i:tiŋ* 'a unit of harvested rice bundles'

Isg *?i:sij* 'a bundle of rice of the usual size; each consists of four *batta*'

KlaB *?i:tiŋ* 'four bundles of harvested rice'

Bon *?i:tiŋ* 'a unit of harvested rice consisting of five bundles'

Lpn *?i:tiŋ* 'five sheaves, of *palay*, etc.'

(10) PCo *\*?u(:)pu* 'a unit of harvested rice bundles'

Isg (*m*)*o:po* 'one hundred bundles of rice'; also *ŋo:po*

Gad (*m*)*u:fu* 'to transport or carry goods'

Kng *?u:pu* 'rice bundle unit of measurement'

Bon *?upu* 'measurement of harvested rice, consisting of ten *betek*, or five hundred bundles'

Tuk *?upu* 'measurement of harvested, bundled grain (i.e. five hundred bundles of millet or rice)'

(11) PCo *\*?u:yun* 'a unit of harvested rice bundles'

Isg *?u:yon* 'one hundred bundles of rice'

Kla *?u:yun* 'four hundred bundles of harvested rice'

Lpn *?u:yun* 'band; anything used to bind a load of wood; five hundred sheaves'

(12) PCo *\*ba:yu* 'to pound with pestle and mortar for the purpose of removing husk from grain' (< PPh *\*bayu*, PAn *\*bayuH* 'pound rice' [Zorc 1971])

Isg *ba:yo* 'to pound rice'

Gad *ba:yu* 'pounding of rice or corn'

Ilk *ba:yu* 'to pound rice, in a mortar; to husk it'

Png *ba:yu* 'to pound'

Ibl *bayu* 'threshing rice or such using mortar and pestle'

Kla (*mam-*)*ba:yu* 'pound rice'

Itg (*mam-*)*ba:yu* 'pound rice'

Kng *ba:yu* 'pound rice with a pestle'

Btd (*mum-*)*ba:yu* 'to pound anything'

Amg *bayu:(-won)* 'pound rice'

Byn (*mum-*)*ba:yu* 'pound rice'

Blw *ba:yu* 'pound rice'

Bon *ba:yu* 'pound with pestle and mortar'

Tuk *bayu* 'to pound anything'

Knk (*men-*)*ba:yu* 'pound rice'

Sgd *ba:yu* 'to pound rice'

Lpn *ba:yu* 'pound; husk'

(13) PCo *\*beŋel* 'to press or squeeze together' (> PNuCo *\*beŋel* 1. 'bundle', 2. 'a bundle of harvested grain')

Ilk *beŋl(-an)* 'to throng, press upon, crowd upon'

Isg *baŋŋal* 'a kind of squeezer used for extracting milk from coconut meat or honey from honeycombs'

GadX *baŋŋad* 'tether'

(14) PCo *\*betek* 'bundle, as rice; the tie used to bundle things together'

Isg *batta?* 'strip of bamboo or bark; a band for tying reaped rice into bundles; a small bundle of rice, one fourth of an *ísij*'

Gad *baŋtèk* 'a bundle of rice'

Ilk *bettek* 'band, tie, string; a strip of bamboo, vine, etc. used to bind reaped rice into bundles'; *saŋkabtek* 'one bundle of *palay*, in some districts, four, five, or six bundles'

Ibl *betek* 'bundle, as of rice or wood'



Kla *botok* 'bundle tied'

Kng *botok* 'rice bundle'

Btd *boto*? 'to harvest rice; material for binding rice into bundles; a bundle of rice'

Blw *b̄ita*? 'harvest', also: *bata*?

Bon *betek* 'anything used for binding; a measurement of bundled rice, ten ?i:tiŋ, i.e. fifty bundles'

Tuk *betek* 'a large bundle of wood, rice, sweet potato leaves, etc.; the vine, bamboo, rattan, string, etc. used to tie such a bundle together'

Sgd *betek* 'a number of bundles of rice'

Lpn *betek* 'bind into bundles; sheaves'

(15) PCo *\*biga:ʔu* 'winnowing basket' (< PPH *\*bijawu* [Charles 1973], PHF *\*bijau* [Zorc 1971] 'winnowing basket' > PS-CCoX *\*liga:ʔu*)

Ilk *biga:ʔu* 'winnow, winnowing basket'

(16) PCoX *\*daga:mi* 'rice stubble' (< PHF *\*ZaRami* [Zorc 1971], PAn *\*ZeRami(hO)* [Dyen 1951] 'stubble')

Isg *dΛΛΛ:mi* 'straw of rice'

Kbn *shagami* 'rice stalks left in the field after the grain has been harvested'

Kla *daga:mi* 'rice stubble, straw'

Kng *daga:mi* 'rice straw'

Btd *daga:mi* 'rice stalks remaining in a field after harvesting rice'

Bon *daga:mi* 'rice straw'

(17) PCo *\*dayaket* 'general term for any variety of glutinous rice, cassava, or taro'

Isg *de:kat* 'a general name for several varieties of soft and oily rice'

Gad *de:kat* 'cake; glutinous rice'

Ilk *di:ket* 'several varieties of soft, oily rice'

Kla *de:kot* 'sticky or glutinous rice'

Kng *dayakot* 'general term used for any variety of sticky rice'

BtdX *dayaʔʔot* <G> 'glutinous rice'

Bon *dayaket* 'general name for the various varieties of glutinous rice or cassava (*dayket*)'

TukX *dayyaket* <G> 'sticky manioc, rice, millet, avocado'

Lpn *dayket* 'variety of dark-coloured *palay*, or taro with red shoots'

(18) PCo *\*gi:waŋ/gu(:)waŋ* 'to make an opening or hole through; to make a breach in'

(> PNuCo *\*gu(:)waŋ* 'breach in a pondfield dike')

Ilk *gi:waŋ* 'to make an opening or hole through; to make a breach in'

(19) PCo *\*ku(:)tim* 'to remove the husk of freshly harvested grain with fingers or teeth in order to eat the grain raw'

Ilk *kutim* 'to peel with teeth, in the manner of squirrels feeding on nuts'

Ibl *kutim* 'to remove the hulls from the rice with the fingers and teeth in order to eat the grain raw – spoken of the manner of rats and birds or of children who fancy freshly-harvested rice'

Kng *ku:tim* 'to rub out the grains of rice ears before or during the harvest, that is, when the grains are still soft and are edible'

BtdX *gutum* 'to nibble, pinch between the teeth'

Bon *ku:tim* 'husk grains of unripe rice between the fingers for eating raw; unripe rice picked for eating'

Tuk *kutim* 'the husk of unripe or ripe but still soft rice, Job's-tears or sorghum (but not millet) removed with the teeth or fingers'

Lpn *ku:tim* 'peel (young palay)'

(20) PCo *\*lusuj* 'mortar, for pounding grain' (< PHF *\*lesúŋ* [Zorc 1971], PAn *\*lesuj* [Dempwolff 1938] 'mortar')

Isg *(?a)ltoŋ* 'mortar for pounding rice, etc.'

GadX *lu:tuŋ* 'trough (a long hollowed-out log used for holding feed for hogs)'

GadX *(qal)lu* 'mortar for betel-chew'

Kla *lusuj* 'mortar'

ItgX *?al?ul* <F> (*?al?u* + *lusuj*) 'rice mortar'

Blw *lohog* 'rice mortar'

Knk *luhog* 'mortar, primarily used for pounding rice'

Btd *luhug* 'mortar'

Amg *luhog* 'mortar'

Byn *luhug* 'mortar'

Bon *lusuj* 'mortar, primarily used for pounding rice'

Tuk *lusuj* 'mortar'

Knk *lusuj* 'rice mortar'

Sgd *lusuj* 'mortar'

Lpn *lusuj* 'mortar'

(21) PCo *\*lu:tu* 'to cook; ripe' (< PHF *\*lú(n)tuŋ* [Zorc 1971], PAn *\*lu(N)[t]uh* 'cook' [Dempwolff 1938])

Isg *lu:to* 'ripe; cooked'

Gad *lu:tu* 'cooking; ripe'

Ilk *lu:tu* 'to cook, in general'

Png *lutu* 'to cook'; *nilutu* 'cooked rice or other food'

Ibl *dutu* 'to cook, a generic term'

PKIX *\*?u:tu* <\*l to ?> 'cook'

Btd *lu:tu* 'cook by boiling'

Knk *lu:tu* 'cook by boiling, especially to cook rice'

BlwX *?u:to* <\*l to ?> 'cook'

Bon *lu:tu* 'cook by boiling, especially to cook rice'

Tuk *lutu* 'to cook something completely'

SgdX *?u:tu* <\*l to ?> 'to cook, especially to boil rice'

Lpn *lutu:(-an)* 'large pot'

(22) PCo *\*pa:jey* 'pondfield rice plant; unthreshed pondfield rice' (< PAn *\*pa:jey* 'rice plant' [Charles 1973])

Gad *pa:y* 'rice'

IbgB *palay* (Tag) 'unhusked rice'

Ilk *pa:gay* 'rice'

Png *pagey* 'rice plant'

Ibl *pagey* 'rice'; *palay* 'rice in the field or harvested that is still on the stalk'

Kla *pa:goy* 'rice (unhusked)'

Itg *pa:gey* 'rice in sheaf'

Knng *pa:ge* 'rice growing in the fields, or bundles of rice ears'

Btd *pa:guy* 'a panicle of rice with its stalk'

Blw *pa:giy* 'rice on the stalk'

Bon *pa:gey* 'unthreshed rice; rice plant'

Tuk *pa:gey* 'rice plant still on the stalk'

Sgd *pa:gey* 'unthreshed rice'

Lpn *pa:gey* 'rice on the stalk; unhusked rice'

(23) PCo *\*pakpak* 1. 'to slap, to beat with a flat surfaced instrument', 2. 'to fasten two flat surfaces together' (< PPh *\*pakpak* 'slap together; clap' [Zorc 1971]; cf. PHF *\*pakpak* 'wing' [Zorc 1971]; > PNuCo *\*pakpak* 1. 'to fasten two flat surfaces together', 2. 'to stick mud on something, as the top of a retaining wall to prevent leakage')

Ilk *pakpak* 'to slap with the open hand, the flat of a sword, etc.'

Ibl *pakpak* 'to cause s.th. to adhere to s.th. else'

(24) PCo *\*pa:naj* 'level area, plain' (cf. PHF *pa(n)taR* 'level area' [Zorc 1971]; > PS-CCo *\*pa:nad* 'level area; to level')

Isg *pa:nag* 'plain, level land'

(25) PCo *\*payaw* 'pondfield'

Gad *payaw* 'rice field'

Ibl *payew* 'rice field, paddy, spoken of that which is level and potentially can be flooded'

Kla *payaw* 'rice field'

Knng *payo* 'pondfield' (*payaw*)

Blw *payaw* 'pondfield'

Bon *payew* 'pondfield'

Tuk *payew* 'pondfield'

Lpn *payew* 'rice field'

(26) PCo *\*penar* 'rice grains' (> PNuCo *\*penal* 'rice seed; to sow a rice seed bed')

Isg *pannar* 'detached grains and spikelets of rice in and around the *sixay* [hut built in rice fields]'

(27) PCo *\*pideR* 'be adjacent to' (> PNuCo *\*pidel* 'that part of a pondfield which is adjacent to the base of the retaining wall that supports the pondfield above it')

Ilk *pideg* 'to push an object against another, to put in contact with'

(28) PCo *\*rakem* 'harvesting knife'

Ilk *rakem* 'a reaper's knife, used to cut rice below the ear'

Isg *rakam* 'the reaper's knife'

Kla *lakom* 'knife used for harvesting'

Bon *lakem* 'a harvesting knife'

Lpn *lakem* 'a small instrument used to reap *palay*'

(29) PCo *\*ta<sup>?</sup>ep* 'to winnow; husk of grain' (< PPh *\*tahep*, PAn *\*taSép* 'winnow rice' [Zorc 1971])

Gad *ta:p* 'winnowing (of rice)'

Ilk *ta<sup>?</sup>ep* 'chaff, glume, husk, hull; to winnow'

Png *taʔep* ‘winnow rice’

Ibl *taʔap* ‘winnow rice’

KlaX *topa* <BF> ‘to winnow’

Kng *taʔop* ‘winnow rice; rice husks’

Btd *taap* ‘winnow rice’

Blw *tʔip* ‘winnow’

BonX *tapa* <BF *tapʔan*> ‘winnow rice; rice husks’

TukX *tapa* <BF> ‘to winnow anything; chaff from coffee, grain that is winnowed’

Lpn *taep* ‘winnow; rice husk’

(30) PCo *\*teneg* ‘division in a field’ (> PNuCoX *\*batneg* ‘stone boundary marker in a field; mud dike in a pondfield’; possibly from *\*batu-n teneg* ‘stones which are boundary markers’)  
Isi *tannag* ‘division in a field’

## II. TERMS RECONSTRUCTABLE TO PROTO SOUTH-CENTRAL CORDILLERAN

(31) PS-CCo *\*ʔugbu* ‘an exchange labour working group’

IblX *ʔubbu(wan)* ‘cooperative work, i.e. help given to a person that is repaid in kind, as planting, harvesting, threshing’

PifX *\*ʔubbu* <A> ‘working group’

Kng *ʔubbu* ‘group work; number of workers (e.g. women) who form a more or less permanent group accustomed to work together during harvest time’

Btd *ʔubbu* ‘a working group of two or more persons sharing the work of each member’

BonX *ʔubbu* <A> ‘working group of married and single men from one ward with single women from one girls’ dormitory’

Tuk *ʔugbu* ‘working group; exchange labour’

SgdX (*ʔub-*)*ʔubbu* <A> ‘joining into groups to do the work of each member of the group in turn’

Lpn *ʔugbu* ‘help, aid one another’

(32) PS-CCo *\*b(a,e)neg* ‘dike for retaining water’ (> PNuCo *\*baneg* 1. ‘top section of a pondfield terrace retaining wall’, 2. ‘pondfield’)

Ibl *beneḡ* ‘dam, dike for retaining water’

(33) PS-CCoX *\*liga:ʔu* ‘winnowing basket’ (< PCo *\*biga:ʔu*)

PngB *bigaʔu* (Ilk) ‘winnowing basket’

Ibl *digaʔu* <A> ‘winnowing tray’ (syn. *khiyag*)

KlaX *ʔiga:ʔu* <\*l to ʔ> ‘winnowing basket (without holes)’

Kng *liga:ʔu* ‘winnowing basket’

Btd *liga:ʔu* ‘winnowing basket’

Blw *ligaw* ‘winnowing basket’

Bon *liga:ʔu* ‘winnowing basket’; also *ligʔu*

Tuk *ligʔu* ‘winnowing basket’

Lpn *liga:ʔu* ‘fan’

(34) PS-CCo *\*pa:nad* ‘level area; to level’ (< PCo *\*pa:naj* ‘level area, plain’)

Ibl *panad* ‘to do the last fine bit of levelling in making a rice field or in making the place for a wall foundation’

Kla *pa:nad* 'a level area'

Kng *pa:nad* 'hard ground under the mud of rice field terraces'

Btd *pa:nad* 'to level a ground area as for a house site, pondfield'

Blw *pa:nad* 'to level for a house'

Bon *pa:nad* 'hard ground under the cultivated surface of a pondfield, level base; the spirit which resides in a pondfield or a pasturing field for water buffalo'

Tuk *panad* 'hard earth layer beneath mud of pondfield; any flat surface on the ground; to make such a surface, to level'

Sgd *pa:nad* 'to level a field'

Lpn *pa:nad* 'to level; smooth; smoothen; make even, smooth, for instance, a field'; also: *panag* 'flat, plain; to arrive in open country'; *paniag* 'flat, plain'; *penad* (*napnad*) 'plain, flat spot, open country'

(35) PS-CCo *\*tu:ned* 'to transplant rice seedlings'

Ibl *tuned* 'to plant rice'

Btd *tu:nod* 'plant rice seedlings'

Kng *tu:nod* 'transplant the rice seedlings'

Bon *tu:ned* 'plant rice seedlings'

Tuk *tuned* 'to transplant rice seedlings'

Lpn *tu:ned* 'transplant'

(36) PS-CCo *\*tupiŋ* 'stone wall' (> PNuCo *\*tupiŋ* 1. 'stone retaining wall', 2. 'any orderly heap of objects')

Ibl *tupiŋ* 'stone wall'

ItgX *tupin* < \*ŋ to n > 'stone wall'

### III. TERMS RECONSTRUCTABLE TO PROTO CENTRAL CORDILLERAN

(37) PCCo *\*ʔa:lak* 'irrigation canal' (cf. PPh *\*qaRak* 'lead' [Zorc 1971])

Kla *ʔa:lak* 'irrigation'

Btd *ʔa:laʔ* 'to channel water by making an irrigation canal'

Bon *ʔa:lak* 'water race; canal'

Tuk *ʔalak* 'irrigation ditch'

(38) PCCo *\*ʔu:lut* 'to strip grain from rice panicles by pulling them through one's hands; straw that is left after grains have been stripped off' (cf. PPh *huRut* 'tighten, squeeze; massage' [Zorc 1971])

Kla *ʔu:lut* 'rice stalks'

Kng *ʔu:lut* 'remove grain from rice panicles by pulling them through one's hands'

Btd *ʔu:lut* 'to pull a rice panicle through the closed left fist, butt end first to strip off the grain'

Bon *ʔu:lut* 'remove grain from rice panicles by pulling them through one's hands'

Tuk *ʔulut* 'straw that is left after grains are pulled by hand'

SgdB *ʔalu:lut* 'to remove rice grains from the stem with the hands'

(39) PCCo *\*ʔu:pak* 'bark of a tree, peeling' (< PPh *úpak* [Zorc 1971]; > PNuCoX *\*ʔu(:)pek* 'rice bran; what remains after rice has been pounded and winnowed')

KlaX *ʔupik* 'outer skin (of plant)'

(40) PCCo \**bina:yu* ‘pounded rice’

Ilt *bina:yu* ‘pounded rice’

Kla *bina:yu* ‘pounded rice’

Itg *bina:yu* ‘pounded rice’

Bon *bina:yu* ‘pounded rice’

(41) PCCo \**dugi* ‘husk of rice’

Kla *dugi* ‘husk of rice; rice bran’

Itg *dugi* ‘husk of rice’

Blw *dugi* ‘husk of rice’

AmgX *dugi(h)* <E> ‘husk of rice’

Btd *dugi* ‘husk of rice’

Byn *dugi* ‘husk of rice’

SgdX *digi* <\**u* to *i*> ‘rice husk’; *degyan* ‘place for pounding rice and piling husks’

#### IV. TERMS RECONSTRUCTABLE TO PROTO NUCLEAR CORDILLERAN

(42) PNUCo \**?a:deg* ‘to fill with stones and dirt, as the space behind a stone wall as a terrace is being constructed’

Btd *?a:dog* ‘to fill in space behind a stone wall as one builds it up’

Bon *?a:deg* ‘to be covered with debris, of a pondfield after the collapse of a higher terrace wall’

Sgd *?a:deg* ‘to throw waste on, cover, fill, to impair with dirt, stones, etc.’

(43) PNUCo \**?et?et* ‘pack holes with mud’ (cf. Ilk *?et?et* ‘tight; cause to become tight’)

Kng *?ot?ot* ‘fill up gaps with mud, e.g. gaps between the large stone which covers a grave, and its borders’

Bon *?et?et* ‘inner side of the dike of a pondfield’

Tuk *?et?et* ‘to cement with mud (e.g. pondfield or irrigation ditch)’

Lpn *?et?et* ‘stop; cement (with mud, etc.)’

(44) PNUCo \**?u:gas* ‘a grain of unhusked rice which has fallen from a harvested rice stalk’

Kng *?u:gah* ‘rice ears with their respective thin stalks which happened to fall in the field and on the straw when the women are busy harvesting’

Btd *?uga:h* ‘grains of unhusked rice dropped from bundles’

Bon *?u:gas* ‘one grain of unhusked rice; remnant, as the seeds dropped from rice when harvesting or drying’

Tuk *?ugas* ‘any portion of a grain panicle which falls off during harvesting, drying or transport; that which is separated from the rest of the group or collection (e.g. children born after the death of older siblings)’

Lpn *?u:gas* ‘detached grains; spikes fallen off; what remains after picking up bundles of *palay* from the ground’

(45) PNUCoX \**?u(:)pek* ‘rice bran; what remains after rice has been pounded and winnowed’ (< PCCo \**?u:pak* ‘bark of a tree, peeling’)

Kng *?upok* ‘chaff of rice ears, husks of winnowed rice grains’

Btd *?u:po?* ‘rice bran’

Bon *?upek* ‘rice bran’

Tuk *'upek* 'husk of rice, corn, millet, etc. of the finest (thinnest) grade'

Lpn *'upek* 'husk of corn'

(46) PNuCo *\*baneŋ* 1. 'top section of a pondfield terrace retaining wall', 2. 'pondfield' (< PS-CCo *\*beneŋ* 'dike for retaining water')

Kla *banonŋ* 'rice paddy, rice field'

Kng *banonŋ* 'dike (mostly an earthen dike) of a rice field terrace'

Btd *banonŋ* 'the top of a retaining wall including the inside basin of the retained pondfield'

Bon *baneŋ* 'top section of the dike of a pondfield; by extension, the pondfield itself'

Tuk *baneŋ* 'top of retaining wall of pondfield, on which one can walk; bund'

Sgd *baneŋ* 'top of stone wall, serves as dike to retain water in field'

Lpn *baneŋ* 'lower side; path at the lower side (of a rice field); the opposite of the side from where the water flows'

(47) PNuCo *\*ba:new* 'to serve cooked food'

Kng *ba:no* 'act of scooping what has been cooked out of the pot (*ba:naw*)'

Btd *ba:naw* 'to dish out cooked food'

Blw *ba:naw* 'serve cooked rice'

Bon *ba:new* 'serve cooked rice'

Tuk *banew* 'wood or bone spatula used for serving cooked solid foods such as mashed taro, rice, millet, etc.; not for liquids or meats'

Lpn *ba:new* 'slops; hogwash; dishwater'

(48) PNuCo *\*batneŋ* 'stone boundary marker in a field; mud dike in a pondfield'; possibly from *\*batu-n teneŋ* – 'stones which are boundary markers' (< PCo *teneŋ* 'division in a field')

Kng *batnoŋ* 'low mud dike, forming a boundary within a pondfield'

Btd *batnoŋ* 'to imbed something in soil as a stone in building, a wall, boundary'

BonX *batnuŋ* <*\*e* to *u*> 'low mud dike, forming a boundary within a pondfield'

TukX *batnuŋ* <*\*e* to *u*> 'temporary wall within pondfield'

Lpn *batneŋ* 'to curb; to restrain a bank of earth with stones'

(49) PNuCo *\*beŋel* 1. 'bundle', 2. 'a bundle of harvested grain' (< PCo *\*beŋel* 'to press or squeeze together')

Kng *boŋol* 'bundle of three, four, or more objects of the same kind which are bound together, or simply held in one hand by their strings if they must be given to somebody'

BtdX *poŋol* <*\*b* to *p*> 'a group of three or more objects held or tied together; to group objects as described above'

Bon *beŋel* 'one bundle of harvested rice'

Tuk *beŋel* 'one bundle of grain (i.e. rice or millet) on the stalk'

Sgd *beŋe* 'a bundle of harvested rice about an inch in diameter where the stalks are tied below the head'

(50) PNuCo *\*dubdub* 'movement of soft mud'

Kng *dubdub* 'act of oozing, trickling, applied to muddy or soft dikes of a rice field'

Bon *dubdub* 'be scoured out, as soil is scoured out by running water'

TukX *kubkub* 'act of scouring out soil or rock such as what a stream does to a soil bank'

(51) PNuCo *\*gu(:)waŋ* 'breach in a pondfield dike' (< PCo *gi:waŋ* 'to make an opening or hole through; to make a breach in')

Kng *gu:waj* 'open a breach in a pondfield dike'

Btd *gu:waj* 'to open an outlet of dammed water, as in a pondfield'

Bon *guwaj* 'open a breach in a pondfield dike'

Tuk *guwaj* 'to open a passageway for water to flow in through a dike, irrigation canal or *batnug*'

Lpn *guaj* 'breach; gap; open a ditch'

(52) PNuCo *\*la(:)siŋ* 'a branch of a rice panicle'

Kng *lahiŋ* 'rice ear including the twig supporting it'

Btd *laheŋ* 'a branch of a rice panicle'

Bon *la:siŋ* 'branch of a panicle of rice'

TukX *lusij* < \*a to u > 'a branch of a panicle of rice or sorghum'

Lpn *la:siŋ* 'branch of a panicle of rice; *carabao*, in tales'

(53) PNuCo *\*leweŋ* 'dig deeply'

Kng *lowoŋ* 'small pit or depth in the ground'

Bon *leweŋ* 'cultivate deeply in a pondfield'

(54) PNuCo *\*li(:)saŋ* 'clods of dried mud or dirt'

Kng *li:haŋ* 'outermost part of a bunch or a heap of mud in a rice field'

Btd *li:haŋ* 'to break up chunks of dried mud in a pondfield'

Bon *lisaŋ* 'dig into a bank of dirt, as to extend the width of a levelled area'

Tuk *lisaŋ* 'a unit or quantity of soil turned by a *taŋlay*, shovel or spade before or without being broken up (e.g. in pondfield, swidden, river bank or elsewhere)'

Lpn *lisaŋ* 'that which is frequently said of these venerated things'

(55) PNuCo *\*paduŋ* 'rice seedling'

Blw *p(-in-)achuŋ* 'rice seedlings'

Bon *paduŋ* 'to sow rice seed; rice seedlings'

Lpn *paduŋ* 'seedling of palay, to be transplanted or recently transplanted'

(56) PNuCo *\*pakpak* 1. 'to fasten two flat surfaces together', 2. 'to stick mud on something, as the top of a retaining wall to prevent leakage' (< PCo *\*pakpak* 1. 'to slap, to beat with a flat surfaced instrument', 2. 'to fasten two flat surfaces together')

Btd *pa?pa?* 'to fasten one of the large surfaces of an object to that of another; to stick mud on something'

Blw *pa?pa?* 'touch, as of sugar, and then touch something else, leaving some'

BlwB *pakpak* 'beat with an instrument'

Bon *pakpak* 'to fasten together, of two flat surfaces; to stick mud onto a terrace wall to prevent leakage; to remake a path on a terrace wall by packing it with mud'

Tuk *pakpak* 'mud plastered to top of retaining wall of pondfield; to tap, pat, or hit lightly'

Lpn *(na-)pakpak(-an)* 'dirty all over, muddied up to the eyes'

(57) PNuCo *\*paŋdew* 'stepping stones built into the wall of a pondfield'

Kng *paŋdo* 'stones of retaining stone walls which jut out, are longer than the other ones, and serve as footholds from one terrace to another'

Btd *paŋdaw* 'a stepping stone jutting from a stone wall'

Bon *paŋdew* 'rock built into the wall of a terrace as a stepping stone'



(58) PNuCo *\*pegnad* 'foundation'

Bon *pegnad* 'the base of a terrace wall'

Lpn *pegnad* 'foundation, groundwork, basis'

(59) PNuCo *\*penal* 'rice seed; to sow a rice seed bed' (< PCo *\*penar* 'rice grains')

Kla (*mam-*)*enal* 'to plant rice; to make a seed bed'

BonX *panal* <*\*e* to *a*> 'rice seed; to sow a rice seed bed'

(60) PNuCo *\*pidel* 'that part of a pondfield which is adjacent to the base of the retaining wall that supports the pondfield above it' (< PCo *\*pideR* 'be adjacent to')

Kng *pidol* 'place close to a retaining stone wall of a rice field terrace'

Btd *pedol* 'the edge of a pondfield bounded by a retaining wall above it'

Bon *pidel* 'part of a terrace, or field, adjacent to the wall supporting the terrace above it'

TukX *piddel* <G> 'that part of the pondfield adjacent to wall or slope behind or above it'

(61) PNuCo *\*samal* 'preparation of a pondfield prior to transplanting rice seedlings'

Amg *h(-in-)amal* 'cooked rice'

Btd *h(-in-)amal* 'cooked rice'

Byn *h(-in-)amal* 'cooked rice'

Bon *samal* 'to till pondfields prior to transplanting; the season when pondfields are tilled'

Lpn *sama* 'to sow; to plant; to make the rice field ready; preparation of the rice field before transplantation'

(62) PNuCo *\*seldaj* 'stage of rice development when seed heads have appeared and are beginning to ripen'

Kng *holdaj* 'term used when the rice in the fields ripens producing ears'

Btd *holdaj* 'to begin to ripen, of growing rice'

Bon *seldaj* 'stage of rice development when it is ready for harvest'

Tuk *seldaj* 'stage of development for grains, beans, etc., at which leaves turn brown indicating readiness to be harvested'

Lpn *se:daŋ* 'begin to ripen, of rice'

(63) PNuCo *\*ta:ban* 'the cleared ground bordering a pondfield, either the mountain slope above or adjacent to it, or the area below its retaining wall'

Kng *ta:ban* 'strip of sloping ground beneath a retaining stone wall which should not be delved off'

Btd *ta:ban* 'a narrow strip of levelled ground immediately above or below a retaining wall'

Bon *ta:ban* 'cleaned space above a pondfield'

Tuk *taban* 'cleared area above, below or adjacent to a pondfield'

Lpn *ta:ban* 'ground bordering a rice field, whence its water flows; for instance, the mountain slope, etc.'

(64) PNuCo *\*teleb* 'to pour off excess water from cooking rice'

Kng *tolob* 'pour some water out of the cooking pot, because the one who was boiling rice sees that too much water had been poured in the pot'

Btd *tolob* 'to remove excess water from cooking food'

Bon *teleb* 'pour off excess water from cooking rice'

Tuk *teleb* 'to pour off excess water when cooking any food which absorbs water during the cooking process (i.e. grains, but not sweet potato, taro, beans, or meat)'

Lpn *teb* 'to remove, pour off the water; applied to cooking rice and *tapey*, respectively'

(65) PNuCo \**tupiq* 1. 'stone retaining wall', 2. 'any orderly heap of objects' (< PCo \**tupiq* 'stone wall')

Kng *tupiq* 'retaining stone wall, built in a rice field system; not a double stone wall which does not serve to retain earth'

BtdX *tapeq* '<\*u to a > a stone retaining wall'

Byn *topeq* 'stonewalled embankment'

Bon *tupiq* 'a stone wall, particularly a terrace wall; to pile one on top of another, as pigs during a mass sacrifice'

Tuk *tupiq* 'a neatly made stone wall in a pondfield, around a house, in a pig pen, etc.; neatly made pile of anything that resembles a stone wall'

Lpn *tupiq* 'stone wall'

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