INSTITUTE OF AGRICULTURAL RESEARCH (INIA)
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REHABILITATION OF DEGRADED TROPICAL FORESTRY ECOSYSTEMS

PROJECT: Rehabilitation methods in second-growth forest and degraded lands in the Ucayali region, Peruvian Amazon.

-ANNUAL REPORT 1998-

(January 1998 - January 1999)

(version in English)

Pucallpa, Peru
February 1999

1. ANNUAL REPORT 1998

REHABILITATION OF DEGRADED TROPICAL FOREST ECOSYSTEMS

1. Project subtitle:
Rehabilitation methods in second-growth forests and degraded lands in the Ucayali region, of the Peruvian Amazon.

2. Activity title:
Initial performance of 6 tree species under the influence of 3 types of cover crops in the degraded "purmas" (secondary vegetation), located along the Campo Verde and Nueva Requena highway, in the Ucayali region.

3. Researcher's and institution names:

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4. Abstract:

The execution of the programmed activities was carried out to beginnings of the month of February of 1998 with the application from a survey to 33 farmers to locate and later on to characterize the purmas with previous agricultural use that present indications of deterioration or biophysical degradation. 9 experimental parcels were selected in property the 9 farmers that showed interest in participating and whose lands are invaded by overgrowths, these parcels are distributed among the districts of "Campo Verde and Nueva Requena", to 34 Km. to the west from the city of Pucallpa.

In the month of June they settled 1,089 plants of 6 forest species distributed in the 9 experimental parcels (3 repetitions for each stratum or indicative vegetation), under the design stratified totally at random. We have carried out 3 bimonthly evaluations determining 18% of total death toll and general average in height and diameter of 55.3 and 0.81cm, respectively. At the moment it is collecting and producing germoplasma (grafts) of 22 forest species selected to have favorable natural adaptation in areas with very intensive use, with the purpose of measuring the initial growth, survival and vigor. Parallelly we will continue evaluating for the two year old period the behavior of the species settled down in the first sector.

Later on we will establish one "replies enlarged" of that executed, this time in the highway Federico Basadre (Km:40-54) where the use previous of the parcels is mainly cattle, for such an end we have interviewed to 38 cattlemen and pre-selecionado at 10 with participation interest, readiness of areas and it carries to an extreme degradation.

5. objectives:
- To know the dynamic processes of the vegetation and of the soils in abandoned "purmas" (secondary vegetation) after the use agricultural and cattle.
- To select forest species of economic and ecological value with capacity to adapt and to be developed in abandoned "purmas" and grow rapidly in abandoned agricultural land and infertile soils.
- To determine the changes in biomass, composition florística, properties of the soil and the microclima in two study places.

6. Site descriptions:
The Ucayali region in the Peruvian Amazon has a population of 391,000 and an area of 102,500 km^2, containing 7 different ecological zones and 4 transitional ecological zones (ONERN, 1976), in which the largest percentage of territory is represented by tropical rainforests, followed by sub-montane rainforest. Seventy five percent of the Ucayali region is suitable for forest protection and improvement. Located east of the study zone is the Ucayali river, and it's numerous tributaries. The most influential tributary in the area of the project is the Aguaytia river. Deforestation in the region is 30,787 ha annually, and is greatest and most intensive in Federico Basadre, Nueva Requena (Aguaytia river), Tournavista (Pachitea river) and Neshuya river areas.

Geologically, the land formation corresponds to the Cenozoic era and the Tertiary system, formed from residual material and old alluvial deposits. Geomorphologically, it is defined as dissected alluvial (Rasamen, 1993). Topographically, there is little elevation. The relief is flat to slightly undulating and slope which varies between 1-8%. Drainage is generally good, however there are areas in the region near Nueva Requena where drainage is poor. The first profile encountered is almost totally wet due to the cover of grasses and weeds which prevents evaporation. The area is classified ecologically as tropical rainforest (Holdridge, 1982). A meteorological station does not exist in the study area, however the site under study is located midway between the Pucallpa (8° 23' S; 74° 34' W) and San Jorge (8 ° 30' S; 74° 52' W) meteorological stations. Climatic data for the study site was therefore interpolated from the data of these two stations: average annual precipitation 1,800 mm; marked by a wet season with the majority of the precipitation occurring between November and April; and a dry season, with less precipitation occurring between May and October. The average annual temperature is 25.2°C, with an average maximum of 30.9°C and an average minimum of 19.6 °C. During the last decade the average monthly temperature oscillated between 23°C and 26°C. The average evapotranspiration potential is 1,200 and average relative humidity is 77%.

The creation of a highway 35 years ago, opened the region, initially stimulating agricultural cultivation activity, and during the last 15 years, farms have combined agricultural production with livestock production. Generally, farms are between 20 to 100 ha with variable widths, and lengths up to 2 km, and contain primary or secondary forests. The majority of farmers allot 8-10 % of their farmland to production of rice, corn, yucca and plantain during the first 2 years, after first slashing and burning the forest. Due to loss of soil fertility after cultivation, the farmer leaves the land bare and returns to use it within 2 - 3 years. Thirty percent of the farm land contains pasture used for livestock grazing in which they plant forage grains such as *Brachiaria decumbens* after the first agricultural crop. However, these pastures are then abandoned and invaded by weeds (native grasses and shrubs). Fifty percent of the area contains young and old "purmas" (secondary vegetation), and the remainder is covered in primary forest.

The study site is comprised of 9 experimental plots in farmers' fields, located between six and eighteen kilometers from the highway, between the districts of Campo Verde and Nueva Requena. This zone is located 34 km from Pucallpa in the Coronel Portillo province, of the Ucayali region (Fig. 1). Geographically it is located between 8° 19' 36" South & 8° 24' 30" South latitude and 74° 49' 06" East & 74° 54' 40" East Longitude. The influential area in combination with the experimental plots covers a surface area of 650 ha (Fig. 2), of which 20 % of the area was abandoned due to impoverished soils.

Acrisol soils dominated in 8 plots, while the remaining plot contains Utisol soil. Two soil profiles (A & B). were defined. Between 10 and 30 cm depth, there is a high percentage of aluminum (> 60 %), low organic matter content (< 2 %), acidic to very acidic pH (< 4.5), low phosphorous content (< 7 ppm), low cation exchange capacity (< 15 mEq/100g), and soil texture predominantly sandy loam (Arca et al., 1996). The major land use classification in this area is 50 % in pastures and 50 % in permanent cultivation (ONERN, 1981). According to IIAP (1996) actual use is cultivated pastures and land use (78 %), secondary forests (15.5 %), and early fallow land (4 %).

This region is highlighted by the presence of communally owned cooperatives, which contain planted pastures, in which a high density of these crops are influenced by the invasion of adjacent plots. The following grasses and weeds exist in the young fallow: *Brachiaria decumbens, Imperata brasiliensis, Pueraria phaseoloides, Rottboellia exaltata, Baccharis floribunda*, and native grasses (Torourco) of the genera: *Homolepis, Paspalum*, and *Axonopus*. Also found alone and in older fallow are trees of the following genera: *Tabebuia, Cecropia, Inga, Jacaranda, Trema* and *Croton*.

The second place is located among the kilometers from the 40 to the 54 of the main highway Federico Basadre, this highway is ago but of 50 years and in its influence environment they are pastures strongly degraded on soil compactados, the relief in general is plane to lightly wavy and the main vegetation this represented by *Brachiaria decumbens* and native grasses "Torourcos" of the goods: Homolepis and Paspalum. At the moment these areas are property of medium cattle and mainly of farmers that abandoned their pastures.

7. Methodology:

The experiment consists of 8 parts.

7.1 Diagnostic study by means of surveying each farmer to determine.

- the interest and aptitude that farmers demonstrate through tree - planting on their property.
- the amount of degraded areas available for experimental plantations on each property.
- the level of degradation, approximate size, type of soil, previous use, abundance, age and height of weeds, frequency of fires, flooding, and relief of the available area.
- the tree species and traditional agriculture in degraded environments.

7.2 Experimental design lands previous agricultural use.

A randomized complete block design was employed in order to determine the tree species with the greatest response to the effect of cover or weeds. Each plant was randomly distributed within the experimental plots.
Number of weed treatments: 3 *Imperata brasiliensis, Rottboellia exaltata*, and *Baccharis floribunda*
Number of repetitions (blocks): 3 by treatment (weed)
Total number of plots: 9
Number of test forest species: 6 *Tabebuia serratifolia* (Tahuari), *Calycophyllum sprucenum* (Capirona), *Amburana cearencis* (Ishpingo), *Terminalia oblonga* (Yacushapana), *Cedrelinga catenaeformis* (Tornillo), and *Schizolobium amazonicum* (Pashaco).
Number of plants/species: 20
Total number of plants/plot: 120
Total umber of plants/test: 1,080
Distance between plants: 3 x 3 m
Minimum calculated area per experimental plot: 1,290 m^2

7.3 Biophysical characterization and selection of the experimental plots.

The selection of plots was a function of three factors: availability of farmer, presence of weeds, and previous agricultural use.

7.3.1 General information about the experimental plots

- *insitu* verification of the measurements (40m x 40 m), delimiting each plot with sides parallel to an azimuth (0° and 90°).
- farmer's knowledge regarding slash and burn technique and of selected weeds (shoot persistence or natural regeneration) or other reproduction features.
- previous use of the experimental plot, previous cultivation, duration of rest period, average height of weeds, slope, type of soil, frequency of fires, flood or other influential factors.
- micro-relief, natural and artificial land forms adjacent to the plot
- location of the plot within the farm, approximate distance from the highway, reference to paths and principal roadways, and information about herbaceous vegetation, shrubs, and trees adjacent to the plot.

7.3.2 Edaphic features

Each experimental plot (1,600 m^2) was subdivided into four squares (8 m x 8 m). After removing weeds, soil samples at 0 - 15 cm and 15 - 30 cm depth, were obtained with a soil auger, and the predominant vegetation at each sample site recorded.

In all the samples of the first depth (0 - 15), texture, wetted color, pH, diameter and quantity of roots were recorded , using touch, a Munsell table, pH meter, and Vernier, respectively. Results of these samples facilitated blocking of the experimental plots, and correlation of the actual vegetation with the predominant textural classes. In addition, these data were used to help relate the initial response of the forest tree species to the treatments. The samples of 15 - 30 cm depth were prepared for fertility analysis (but are not yet available).

7.3.2.1 Water infiltration into soil: for each of the 9 plots the rate of water infiltration was calculated, by measuring for each textural strata, the time required for water to infiltrate 5 cm in slightly humid soil (25% humidity or field capacity). This was repeated three times for each representative site.

7.3.3 Biotic or floristic characteristics

Two sample designs were employed depending on the characteristics of dominant plant vegetation in each plot.

Model one: performed on 6 plots with primarily herbaceous vegetation less than 1.5 m height (*Imperata brasiliensis*, *Rottboellia exaltata*). Using the "Botanal" method to estimate each component or botanical species in terms of percentage of occupation of a sample area (1 m^2); the sample size was 1 % of the total surface area of each experimental plot with 16 square samples. The distribution was systematic and zigzag, so that the perimeter of the vegetation sample sites used the same positions as the soil sample plots (Fig. 3). The data analysis related the location of the samples to a map of textural layers, to obtain an average percentage of occupation or coverage per layer and the principal species (also considering the species which exceeded 0.5% of the cover).

Model two: performed on three plots containing shrubby vegetation greater than 1.5 m height (*Baccharis floribunda*). Sample plots were selected at 5m intervals using the transect method, with transects positioned in such a way as to sample all the soil types. One hundred percent of the vegetation was inventoried including re-growth, natural regeneration (< 1.5m in height) and mature vegetation (> 1.5 m in height). At each plot 5 sample plots (4 m^2) (i.e.; 1.25% of the total surface area of each plot) were selected and diameter & height of each plant recorded (Fig.4).

In both designs, with the assistance of a local forest expert (matero), tree species were counted and identified, and botanical samples of species, not identified in the inventory were collected. The data analysis first related average abundance of sample plots to textural stratas, obtaining an average abundance per strata. Additionally this information had to consider species (from 0.1 to 1.5 %), and be able to transform it to an average percentage of cover by strata of the principal species (also considering the species which exceeded 0.5% of the cover).

7.3.3.1 Weed density was determined by counting individual weeds (natural and mature regeneration) in a 1m^2 sample area, using a wire fence (1m x 0.5m) containing two interior divisions of 0.5 x 0.5 for herbaceous weeds. Likewise tape measures and short sticks formed a 1 m x 1 m square for shrubby weeds, repeated four times in both cases. The location of the density samples were also a function of the sites most representative of each textural layer, in such a way that the weed density results by strata within experimental plots.

7.3.3.2 Biomass and water content measurements were performed on total vegetation (sum of green weight of all the species present in 1 m^2). Sites representative of the textural layers of each experimental plot were also used to locate biomass sample plots. For these samples a sub-sample no greater than 300 g was collected and the dry weight was determined after subjecting them to 85 °C for 48 hours in an oven. To calculate the water content, the weight of water in the sub-samples was determined and divided by the dry weight. Dry weight of the sub-samples was then summed to determine the total biomass of the sample plot.

7.4 Plantation establishment.

He carried out in three stages, the first one determined by the previous activities to the plantation, the second for the properly this plantation and finally the activities the post-plantation.

7.4.1 Previous Activities.

7.4.1.1 Grubbed: The cut of the shaft or total cleaning of the overgrowth at level of the soil, with the use of the machete. It was necessary 16 workers/hour to clean a parcel of 1,600 m^2 of " Cashupsha " or " Arrocillo ". In " Sachahuaca " it was necessary 12 workers/hour for the same surface.

7.4.1.2 Marked and installation of posts: It consisted on locating 121 wooden stakes in each parcel with the help of a metric tape of 50 m, this when being tensed in address This - West indicated the position of each stake (3 x 3m); the operation repeated along 11 lines. The stakes were colored red color in the superior end and beveled in the inferior. The activity was carried out with 4 workers that marked and estaqueaban 81 posts/hour.

7.4.1.3 Perforation of holes: To perforate in the floor 121 holes of 30 x 30 x 30 cm, in each parcel, for it the first portion (15 cm of thickness) it was removed, extracted and placed to the right of the hole, and the 15 remaining cm they were retired to the left, this with the purpose of locating the biggest quantity in organic floor quickly in the moment of the plantation. The position of the hole was determined by the location of the stakes (5cm in front of each stake). You uses plane shovels and it was necessary 7 workers/hour for open the 121 holes of the parcels with frank textural class, and 9 workers/hour for parcels with loamy textural class.

7.4.1.4 Planning of the plantation: Requiring 121 plants for parcel and 20 plants for species, the distribution of each species was at random, and verifying that a minimum of 6 plants exists for each species in each stratum textural, this strata was determined in the stage of characterization edafic with the purpose of incorporating in the statistical analysis the effect of the texture of the soil in the growth of the plants, this way was the position of each plant for species, this position was registered in the maps or location outline.

7.4.1.5 Distribution of the plants: The transport of 1,089 plants besides an additional of 15% (for reassignment) of the total to sure, fresh and near places to each one of the 9 parcels, for it was used it 1 cart of 4 m^3, crawled by agricultural tractor and 1 van of simple booth, the roof of the chassis was covered with polyethylene awning to avoid deterioration of the apex of the plants.

7.4.2 Properly this Plantation.

7.4.2.1 The plantation: He was carried out after a day of intense rain. The distribution of plants was for transporting manual and located according to the outline elaborated in the activity (7.4.1.4). For this activity you employment filler the own organic soil that was to the right of the hole, as well as the portions soil of 5 cm removed to each side of the hole, arriving to reaperturar the hole up to 40 cm in both sides; the "stuff" technique allowed to incorporate near 80% of organic soil. It was necessary to use 10 workers/hour to plant the 121 plants of a parcel.

7.4.3 Post-plantation.

7.4.3.1 Evaluation of survival: Was carried out 30 days after having installed the plantation with the purpose of determining how many individuals of each species they lived and consequently how many they died. You uses the outline of distribution of the plants for species to mark all the affected plants.

7.4.3.2 Reinstatemen: This activity consisted on restoring the total of dead plants registered in the activity previous, this event one carries out to the 45 days of having installed the plantation. The technique employee was the same one that you use in the plantation (stuff), previous to the extraction of the dead graft .

7.4.3.3 Support installation for rule: It consisted on inserting with manual pressure a small wooden stake hard of 1x 1 x 10 cm, with tapered base and head plane, this stake was located to 1 inch of the axis the plant, with the purpose of supporting the base of the rule every time that is carried out this way the mensurations and uniformizar the mensuration surface

7.4.3.4 Maintenance of plot: It consisted on the opening of trails or strips of 1 m of wide (half meter to both sides of each plant) for 40 m of long, following the axis determined by the line of orientation plantation this - west. The maintenance frequency was bimonthly and generally two days before the evaluation. Court employee's tool was the Knife

7.4.3.5 Evaluation of growth: Carried out to determine the total height, by means of the approach of the apex of the plant with the centimeters of a telescopic rule, besides measuring the diameter or grosor from the shaft to the 10 cm of height, with the vernier use. This activity was carried out bimestralmente and the evaluation journey was in relation to the orientation of the trails. The data registered in forms made previously with the numbered code of each species and respecting the aleatory distribution order of each plant. Additionally you registers information of the vigor of the plants represented in three categories, some excellent observations were also written down in descriptive form.

7.5 Determination of species to rehearse.

7.5.1 First selection of forest species: You considers the following approaches, presence frequent abundant y/o in areas with evident environmental deterioration (low purmas, old pastizales), abundant natural regeneration, individuals with exhibition and resistance to the strong elements (fire, livestock), seed readiness in collection time, species with antecedents of good adaptability in degraded areas, the knowledge and local experiences on species mejoradoras and recuperadoras of the soil, the use current potential y/o of the species, quick growth to medium, surrounds wide.

7.5.2 Second selection of forest species: Of the original list of species (first selection) they were eliminated progressively some were eliminated by reason of factors characteristic of the same species (altered phenology low production of seeds, low germination percentage); however other species in those that later on was similar or even better characteristics, they were added in their replacement.

7.6 Experimental desing land previus pastures use.

To determine the initial answer before the effect of overgrowths the design it will be applied stratified totally at random; the number of strata this in reason of the quantity of overgrowths (treatments) you present with bigger frequency and abundance in the degraded pastures. Inside the parcels the 15 species will be planted determined in the second selection, with aleatory distribution and distancing of 3 m among plants, we contemplate three repetitions for treatment and to include 20 plants for each species

7.7 Production of plants.

7.7.1 Germoplasma collection (seeds and/or natural regeneration): The programming of the collection was in function three main factors; bibliographical revision on information phenological, the individual's verification in-situ to collect and pursuit fenological ith the purpose of obtaining in the opportune time the quantity of fruits and necessary seeds to obtain 500 grafts for species. Location references, diameter, height and the collected individual's observations were written down. We use scissor telescopic y/o subidor of spikes mostly. This activity was carried out among the months of July to December of 1998.

7.7.2 Prosecution of seeds: In all the cases you registration the weight of the collected fruit, the first treatment generally consisted on to diminish the content of humidity and to liberate them of covers protectors, later on one wrote down the total weight of impure seed and number of seeds in 100 grams. Generally the seeds you germinator drawer few days of having processed, was also subjected to pre-germinative treatments of being the case; the remainder of seeds was conserved in tightly closed containers and to 10° C of temperature; we write down the date once initiate the germinator process.

7.7.3 Properly this production of plants: The local of production of plants (vivero) of Former-CENFOR (Km 4.2 of the highway Federico Basadre) it was the chosen place to produce the grafts of 22 forest species and 500 grafts for species; we write down the number of pealed plants and number of alive plants. You uses as enriched sustrato: earth, sand and humus in proportion (2:1:1), besides 15 gr of "Cupravit" for each cubic meter of sustrato like disinfectant preventive. The period of demurrage in vivero will be from 6 to 7 months, to get plants with at least 50 cm of height. The later activities to the chiming consist basically on waterings, formation prunings, classification for sizes, fertilization to foliate, handling of light, selection of plants and fumigation of being necessary

7.8 Revision of antecedents.

One carries out a search of information about the relationship of arboreal species and bush that were and they come being employees in reinstatement rehearsals for the rehabilitation of areas degraded in the humid tropic of the world, with the purpose of to reply with native species or to introduce exotic species of wide geographical distribution.

8. Results:

8.1 Between the districts of Campo Verde and Nueva Requena (including the households of Sarita Colonia) 33 farmers were interviewed, of which 49% , 13.5% and 36.5% respectively demonstrated strong, average and poor interest respectively, in having experimental plots in their fallow fields. In the first group, 16 farmers demonstrated strong interest. In general, the most representative habitats or degraded sites were characterized by the following information:

Total number of weed species observed: 14
number of abundant & frequent weed species: 3
type of vegetation: herbaceous: 80%, shrubby 20%
height: < 1 m (40%), 1-2 m (30%), >2m (30%)
age: 1-3 yr. (80%), 3-7 yr. (15%), > 7 yr. (5%)
previous use: agricultural (80%), pasture (20%)
frequency of fires: annual (90%), none (10%)
floods: none (98%), regular (2%)
relief: flat (85%), undulating flat (15%)
soil type: Acrisol (80%), Utisol (20%)
soil texture: Silt (80%), Sandy (20%).

Based on farmer's knowledge, the following tree genera were identified in degraded environments of the study area: *Tabebuia, Aspidosperma* and *Amburana* re-growth, in burned areas these species re-sprouted. *Swietenia* and *Croton*, grew well in sandy loam soils associated with shrubby weeds such as *Vernonia baccharoides* (Ocuera) and *Baccharis floribunda* (Sachahuaca).

8.2 Through the selection process it was determined that only 9 experimental plots fulfilled the necessary prerequisites. These plots belonged to 9 different owners (1 experimental plot/owner) and covered an approximate area of 6.5 km ^{2} (650 ha). Details regarding each experimental plot is provided in square 1.

We encountered the nine plots distributed along 12 km of the highway, each less than 450 m from the farm entrance. Three weed species were present: *Imperata brasiliensis* (Cashupsha), *Rottboellia exaltata* (Arrocillo), and *Baccharis floribunda* (Sachahuaca), with each species represented in three plots. A direct relationship did not exist between the specific type of agricultural cultivation and the actual predominant weed species, nevertheless it became evident that yucca and maize were in 2 plots for each species of weed, which represented the last cultivated agricultural crops prior to abandonment of the fallow field. A third of these plots had no agricultural activity for a period of 1 year, and the last cultivated crop was yucca, a third had no cultivation for between 2-3 years, and the remaining third rested for periods of greater than 5 years. Although no relationship existed between the rest period and any weed type, it is Cashupsha which appeared the most frequently after rest periods of between 5 and 14 years. The annual frequency of fires in the plots is 66.5 %, and the affected weeds in all cases were Cashupsha and Arrocillo, both reached heights > 1.5 m. A third of the plots had no fire problems, and coincidentally did not affect the 3 plots of Sachahuaca which reached heights between 1.5 - 3.5 m. It is necessary to state that the 3 weeds re-sprouted after slash and burn techniques were used. The topography is flat and varies little, between 1-2 % in 8 of the 9 plots, and 3 % in one plot. Ninety percent are Acrisol soils and only 10 % (equivalent to one plot) possessed Utisols. The surface area per plot is greater than the minimum established, in 90 % of the cases it is 0.16 ha, and only one plot with 0.15 ha, which comprises a total test surface area of 1.5 ha.

8.3 The biophysical features offer the following results for each experimental parcel (the summary this in the square 2):

Plot 1: S. Grandez

The first profile is characterized by encountering a limit between a loam soil and clay, with low levels of sand, the pH is very strongly to moderately acidic, the water soil infiltration rate at field capacity (MC 25%) is slow with an average of 42.5 cm^3 / min.; the presence of medium to fine diameter roots is abundant throughout the plot; the primary cover is Cashupsha which covers 74.5 % of the plot's surface area; followed by *Pueraria phaseoloides* (Kudzú) with 1.8 %; the density of the principal weed is 287 plants/m^2, average total biomass is 6.4 T/ha and an average water content of 96%.

Specific analysis of the first depth (0 - 15 cm) defines two textural layers: the first is clay loam in 44.5 % of the total area of the plot; color yellowish brown (10 YR. 5/4) when wet; moderately acidic, water infiltration rate at field capacity (MC = 25 %) was moderately slow at 62.9 cm^3/min.; the primary floristic composition is Cashupsha, Kudzú, *Cyperus sp.* (Piri-piri), *Brachiaria decumbens* (Brachiaria), at 74.1%, 13 %, 0.9 %, and 0.6 % cover respectively. A second textural layer silty clay was found in 55.5 % of the area of the plot; color yellowish red (10 YR. 5/6)when wet; soil reaction very strongly acidic (pH = 4.9), soil water infiltration rate is slow at 22.5 cm^3/min.; the floristic layer is similar to the previous layer in that most of the cover is Cashupsha, but differs by the absence of Brachiaria, and a greater percentage of Kudzú coverage. This plot contains Cashupsha, Kudzú, Piri-piri, with 75.3 %, 2.3 %, and 1.4 % cover respectively; the plant density of Cashupsha is 298 plants/m^2; 6.2 T/ha total biomass at 86% water content.

Plot 2: J. Grandez

The first textural layer is characterized by a loamy to sandy soil with high levels of sand (50 - 85 %), a lower level of silt (40%) and less clay (20%). The pH is extremely acidic; roots are rare and those present are of fine to very fine thickness; the water infiltration rate is notably increased to moderate at 310 cm^3/ min.; the floristic association is represented by Sachahuaca, Kudzú, Cortadera, Lengua de perro, Pega-pega, and Arrocillo at 73.9%, 15.4%, 2.8%, 1.2%, 1.2%, and 0.8% cover respectively; the density of Sachahuaca is 27 plants/m^2; average total biomass is 4.5 T/ha at an average water content of 190 %.

It should be emphasized that the sandy loam layer fits into 58 % of the plot's area, and that this layer is also present in Plots 8 and 5, with the same weed specie (Sachahuaca). However, the remaining characteristics are somewhat similar. The color is strongly brown (7.5 YR. 4/6); soil reaction is extremely acidic (pH = 4.7); water infiltration rate is moderate at 393 cm^3/ min.; the primary floristic association is represented by

Sachahuaca, Kudzú, Cortadera, Pega-pega, Lengua de perro (*Pseudoelephantopus sp.*), and Arrocillo with 74%, 15.9%, 2.9%, 2.5%, 1.8%, and 0.8%, cover respectively; the density of Sachahuaca is 25 plants/m^2 and total biomass of 3.0 T/ha at a water content of 193%. The second layer is sandy loam and covers the remaining surface area (43%); color is dark yellowish brown (10 YR. 4/4) when wet; soil reaction is strongly acidic (pH = 4.7); water infiltration rate is moderate at 228 cm^3/min; the floristic association is represented by Sachahuaca, Kudzú, Cortadera, Huamanzamana, Arrocillo and Lengua de perro at 73.9%, 14.9% 2.7%, 0.9%, and 0.7% cover respectively; the density of Sachahuaca is 28 plants/m^2 with a total biomass of 6.1 T/ha at a water content of 188%.

Plot 3: S. Aspajo

This site contains loam soil having a lower percentage of clay, a high percentage of sand, and an intermediate level of silt with a tendency to decrease when sand increases; pH is strongly acidic; the average water infiltration rate at field capacity (MC = 25%) is moderately slow at 71 cm^3/min.; there is an abundance of very fine roots throughout the plot; the primary cover is Arrocillo (48.2 %), followed by Kudzú (16.6 %) and Brachiaria (10.3 %); the average density Arrocillo is 237 plants/m^2 but with a high coefficient of variation between the 2 textural layers; the average total biomass is 3.9 T/ha at an average water content of 554 %.

The 2 textural layers were further distinguished: the first layer is loam and is found in a large portion of the plot (65 %); color yellowish red (10 YR. 5/8)when wet; strongly acidic (pH = 5.2); water infiltration rate at field capacity is moderately slow at 110.1 cm^3/min; the primary floristic association has an average height of 1.5 m and consists of Arrocillo, Brachiaria, and Kudzú, at 40.9 %, 20.7 % and 19.7 % respectively; the density of Arrocillo is 50 plants/m^2 and total biomass is 4.8 T/ha, at a water content of 330 %. It's high level is likely due to Kudzú which contains a high water content. The second layer is sandy loam covering relatively little surface area (36 %), very pale brown (10 YR. 7/4); very strongly acidic (pH = 5); slow water infiltration rate at field capacity at 32.2 cm^3/min.; the floristic association is only represented by Arrocillo and Kudzú at 55.5 % and 14.1 % cover respectively; the density is significantly greater than the previous layer with 424 plants/m^2, but with a decrease in the average total biomass at 3.1 T/ha . This contrast would be due to the average height of Arrocillo being significantly lower in this layer.

Plot 4: J. Tenazoa

This plot is characterized by loam soil with 20% to 60% silt, not exceeding 40% sand and a nearly constant level of clay between 30 and 40%. The pH is strongly acidic; the water infiltration rate at field capacity is slow; there are abundant roots of medium to fine thickness homogeneously distributed throughout the first depth of the entire plot. The color is brown (10 YR. 5/3) when wet; the primary cover is Cashupsha, followed by Kudzú and Lengua de perro, at 85.2%, 1.8% and 1.4% respectively; the average density of Cashupsha is 285 plants/m^2; the average total biomass is 6.7 T/ha at an average water content of 143%

The first textural layer is silty clay loam which covers 50% of the plot; soil reaction is extremely acidic (pH = 4.5); water infiltration rate is slow at 25.6 cm^3/min; the color is pale brown (10 YR. 6/3) when wet; the primary floristic association has as its principal species Cashupsha, Kudzú, Lengua de perro, Sachahuaca with 85%, 2.5%, and 0.8% cover respectively; the density of Cashupsha is 236 plants/m^2; total biomass is 5.6 T/ha at a water content of 173%. The other textural layer is clay loam covering the remaining 50 % of the plot, similar to the second layer of Plot 1 which possesses the same textural and cover characteristics. Comparisons with Plot 1 also shows similar pH (4.9), but the water infiltration rate is three times greater (60.8 cm^3/min), and moderately slow; the primary floristic association is represented by Cashupsha, Kudzú, Sachahuaca, and Lengua de Perro at 85.5%, 1.1% , and 0.6% respectively, a similarity only with the first two species; the density of Cashupsha is slightly greater at 333 plants/m^2 but equal in the total biomass of 7.8 T/ha, at a similar water content at 114.4%

Plot 5: J. Arirama

This plot has textural features and cover similar to the plot 8, but the percentage of silt and clay is less, 40 % and 20 % respectively. However, the decrease in silt and clay is matched by an increase in the percentage of sand, which is greater than 40 %. The pH is moderately acidic; the average water infiltration rate is moderately slow at 85.9 cm^3/min.; there is an increased quantity of roots of medium to fine thickness in the sandy loam soil, and a scarce presence in the loam soil. In this plot the main cover is also Sachahuaca at 42.5%, followed by *Hyparrhenia rufa* (Yaragua) at 31 %, (Lengua de perro) at 14.2 %, Yuca at 2.3 %, Ocuera at 1.3 %, Arrocillo at 0.9 %, *Desmodium tortuosum* (Pega-pega) at 0.7 %, and *Pseudoelephantopus sp.* (Pichana peluda) at 0.6%. This demonstrates a marked increase in the floristic diversity. The average density of Sachahuaca is 26 plants/m^2, with an average height and diameter of 2.2 m and 0.85 cm respectively; average total biomass is 4.2 T/ha at an average water content of 190 %.

Two textural layers are distinguished: a sandy loam soil occupies the majority of the plot covering 72 % of the total area; color is yellowish brown (10 YR. 5/4) when wet; soil reaction is moderately acidic (pH = 5.3); water infiltration rate at field capacity is slow at 70.5 cm^3/min. The primary floristic association is composed of Sachahuaca, Lengua de perro, Yuca, Kudzú, Ocuera, Arrocillo, Pega-pega, Pichana peluda at 77 %, 14.2 %, 4.7 %, 3.6 %, 2.6 %, 1.8 %, 1.5 % and 1.2 % cover, respectively; the density of Sachahuaca is 42 plants/m^2, similar to the density of Plot 8, which coincidentally, possessed the same textural class. However, the total biomass is lower at 3.9 T/ha, at a water content of 186.8 %. The other layer is loam, which covers a lower percentage of total surface area (28 %); color brown (7.5 YR. 5/4) when wet; the soil reaction is slightly acidic (pH = 6.2), a moderately slow water infiltration rate at 101.3 cm^3/min; the floristic association is represented by cover of only Yaragua, Sachahuaca and Kudzú with 61 %, 8 %, and 1.7 % cover, respectively. This marked contrast in which Yaragua has a greater representation than Sachahuaca is due to a half open plot in which a Yaragua pasture is encountered, and which in general, is frequently found forming small and isolated patches in secondary vegetation and/or invading crops. The density of Sachahuaca is much less than in the first layer with only 14 plants/m^2, due to constant invasion by Yaragua; the total biomass is 4.5 T/ha, at a water content of 194.3 %, probably increased due to the presence of Kudzú.

Plot 6: J. Rios

The first soil profile is primarily loam; the reaction of soil is very strongly acidic (pH = 4.8 - 5.0); it has a slow water infiltration rate at field capacity, averaging 49.4 cm^3/min.; very fine roots are abundant throughout the plot; the primary vegetation is Arrocillo (53.3 %), followed by Kudzú (13.6 %), Sachahuaca (6.5 %), *Urena lobata* (Yute) (4.6 %) and Piri-piri (1.4 %); the average density of Arrocillo is 68 plants/m^2 and an average height of 1.8 m; average total biomass is 6.3 T/ha at an average water content of 252 %

This plot contains 2 textural layers: the first is silty clay loam in 40 % of the plot's total area; color reddish yellow (7.5 YR. 6/6) when wet; soil reaction is strongly acidic (pH = 4.8); water infiltration rate at field capacity is moderately slow at 69.2 cm^3/min; the primary floristic association is represented by Arrocillo, Kudzú, Sachahuaca, and Yute at 42.4 %, 15 %, 11.7 %, and 7.9 % cover respectively; the density of Arrocillo is 78 plants/m^2; total biomass is 7.6 T/ha at a water content of 243 % being elevated due to the presence of Kudzú and Sachahuaca. The other layer is silty loam and covers the majority of the plot (60 %); color light yellowish brown (10 YR. 6/4) when wet; soil reaction very strongly acidic (pH = 5); slow water infiltration rate at field capacity at 29.7 cm^3/min; the primary floristic association is Arrocillo, Kudzú, Sachahuaca, Yute, Piri-piri at 64.2 %, and 12.3 %, for the first two species and, 1.4 % each for the last three species. It is distinguished from the previous layer by it's major cover being Arrocillo as the primary species but lesser amounts of Sachahuaca and Yute; the density of Arrocillo is less at 58 plants/m^2, probably due to the greater height of Arrocillo; the total biomass 4.9 T/ha, at a water content similar to the previous layer at 261 %.

Plot 7: A. Flores

The soil is extremely sandy, having high levels of sand and low percentages of silt and clay. The pH is neutral; the water infiltration rate is moderately slow at 181 cm^3/ min.; there are abundant roots of medium to fine thickness; color pale brown (10 YR. 6/3) when wet; the floristic association is represented by Cashupsha, Kudzú, Sachahuaca, and Lengua de perro, at 78%, 7.6%, 1.2%, and 0.8% cover respectively. Density, biomass, water content, and predominant weed species, are very similar to Plots 1 and 4, but in the majority of cases, different textural classes exist. The average density of Cashupsha is 288 plants/m^2; average total biomass is 6.5 T/ha at a water content of 100%.There are also 2 textural layers, that occupies most (72%) of the plot; soil reaction is neutral (pH = 6.7); the water infiltration rate increases to moderate at 248 cm^3/min; the floristic association is composed of Cashupsha, Kudzú, Sachahuaca, and Lengua de perro at 79%, 4.9%, 2.1% and 0.5% respectively; the density of Cashupsha is 262 plants/m^2; total biomass is 6.5 T/ha at a water content of 100%.

The other layer (28 % of the total surface area) is loamy sand; it is also neutral, pH = 6.7; water infiltration rate is moderately slow at 114 cm^3/min, slower than the previous layer; the floristic association is represented only by Cashupsha, Kudzú and Lengua de perro with 78%, 10.3%, and 1.1% cover respectively. The density of Cashupsha is 314 plants/m^2 and total biomass of 6.4 T/ha at a water content of 101%.

Plot 8: V. Flores
In general the soil is loam containing levels of silt less than 40 % and 20% clay, with a tendency to decrease the average sand content 40 % increases; the pH is extremely acidic; the water infiltration rate at field capacity is moderately slow at 86 cm^3/min.; roots are scarce and of fine to medium thickness throughout the plot; the primary cover is Sachahuaca which covers an average of 69.2 % of the total area of the plot, followed by *Talinum paniculatum* (Yuyo verdolaga) (9.1 %), Kudzú (7.2 %), Arrocillo (3.7%), *Killinga sesquiflora* (Cortadera) (2.8 %), *Vernonia baccharoides* (Ocuera) (2.2 %) and *Cecropia sp.* (Cetico) (0.85 %), demonstrating a large floristic diversity in this plot; the average density of Sachahuaca is 33 plants/m^2 with average height and diameter of 3.2 m and 1.4 cm respectively; the average total biomass is significantly greater at 15.2 T/ha at an average water content of 241 %.

Two textural layers were also defined: sandy loam throughout 50 % of the plot; color yellowish brown (10 YR. 5/6) when wet; soil reaction extremely acidic (pH = 4.1); water infiltration rate at field capacity is slow at 38 cm^3/min; the primary floristic association is Sachahuaca, Yuyo verdolaga, Kudzú, Arrocillo, Ocuera, and Cortada, at 74 %, 14.3 %, 5.3 %, 4 %, 2.6 %, and 2.4 % cover respectively; the density of Sachahuaca is 40 plants/m^2; the total biomass of this layer is 8.7 T/ha at a water content of 180 %. The other layer which comprises 50 % of the area is loam; color brown (7.5 YR. 5/4) when wet; very strongly acidic (pH = 4.5); water infiltration rate at field capacity is moderately slow at 134.1 cm^3/min; floristically it contains the majority of the species of the previous layer and is highlighted by the presence of Cetico, but the percentage of coverage is less for each species Sachahuaca, Kudzú, Yuyo verdolaga, Arrocillo, Cortadera, Ocuera, and Cetico at 64.6 %, 9.1 %, 3.9 %, 3.5 %, 3.1 %, 1.7 %, and 1.7 % cover respectively. Sachahuaca is less dense than the previous layer at 26 plants/m^2, but the plants are larger, such that the biomass significantly increases to 21.6 T/ha, at a high water content likely due to the presence of Sachahuaca and Kudzú which contain abundant water.

Plot 9: F. Vargas
This plot contains the same textural characteristic and primary cover as Plot 3. It is primarily sandy with greater than 50% sand, lower than 50% silt and less than 25% clay; the pH is moderately acidic at 5.7; the water infiltration rate is slow at 113 cm^3/ min.; there is an abundance of fine roots throughout the plot; the primary cover is Arrocillo, Sachahuaca, Liana 1 (unidentified), and Kudzú with 74.5%, 3.9%, 2.9% and 2.1% cover respectively; the average density of Arrocillo is 101 plants/m^2; average total biomass is 6.0 T/ha at an average water content of 209%.

The first layer is sandy loam and covers the majority of the plot's surface area (70 %); color yellowish brown (10 YR. 5/4) when wet; pH is moderately acidic at 5.7; water infiltration rate is moderately slow at 150 cm^3/min. The primary floristic association is as follows: Arrocillo, Liana 1, Kudzú and Sachahuaca with 83.5%, 4.7%, 1.6%, and 0.5% cover respectively; the density of Arrocillo is 90 plants/m^2; total biomass is 6.7 T/ha at 173% water content. The second layer is loam and occupies 30% of the remaining surface area, the color is strongly brown (7.5 YR. 5/6); soil reaction is moderately acidic (pH = 5.6); the water infiltration rate is slow at 76 cm^3/ min.; the floristic cover is Arrocillo, Sachahuaca, Kudzú, and Liana 1 at 65.6%, 7.4%, 2.6% and 1%, respectively. Although the plant density (112 plants/m^2)is greater than in the previous layer, the biomass is slightly lower to (5.4 T/ha), probably due to less coverage by the principal species.

8.4 Regarding the plantation:
- 95% of the period in which carried out the previous activities to the plantation was low conditions of high heatstroke (35 °C to the shade and 40 °C to full sun).
- 98% of the fisiografia is plane.
- The labor personnel's 85% is specialized in these works.
- 85% on the average of each parcel this cover for some of the three mentioned coverings.
- 80% of the floors is of frank textural class.
- 100% of the plants came from the "viveros" of the INIA (Km. 4.2 and Km 86 of the highway Federico basadre).
- To consider in all the activities that a wage is equivalent to 6 working hours cash in field.

-Cleaning or grubbed: The yield was related to the presence of some of the three overgrowths but important, it is so for *Imperata brasiliensis* and *Rottboellia exaltata* it was of 0.06 there is /jornal, on the other hand with *Baccharis floribunda* it was of 0.08 ha/wage.

-Marked and installation of posts: The yield was of 120 posts/wage

-Perforation of holes: The yield was also in function of the texture of the floor, in such a way that the parcels with fine texture (loamy franc) the advance single is of 81 holes/wage on the other hand for textures stockings and thick (franc to sandy franc, respectively) is of 104 holes/wage.

-Planning of the plantation: It was elaborated 9 maps with the distribution of the plants/specie/plot, in function of each textural stratum. In most of the cases this strata they are two for each parcel (Annex - textural Maps).

-Properly this plantation: 1,089 plants were planted. The yield average for the 9 parcel was of 75 you plant installation/wage.

8.5 Regarding the evaluations of growth and general information:

-He was carried out 3 bimonthly evaluations of growth (square 3). In the moment of the installation the general average in height and diameter was of 35 and 0.38 cm, respectively; at the moment lapsed the first six months they present an increment general average of 20.4 cm in height and 0.43 cm in diameter. The factor height among individuals of oneself species and among parcels sample significant variations with regard to the general stocking (D.S: 13.9), being smaller among individuals of oneself species inside the parcels. Later on the soil analysis for each textural unit will evidence the influence of this factor in the growth of the species. In the same square it is shown in falling index of the height average, *Schizolobium amazonicum* has the biggest height average, followed by *Calycophyllum spruceanum, Amburana cearencis Terminalia oblonga, Tabebuia serratifolia* and finally *Cedrelinga catenaeformis*. Also the parcels with better yields in terms of height are the #2 and 8, however the parcel #5 possess those but low increments.

-In the square 4 the level of death toll of the plants is shown in each parcel, besides the behavior in survival after each evaluation. The parcels #: 4, 5 and 8 presented smaller death toll to 9.9% and the parcels #: 1, 2, 3, 6, 7 and 9 between 10 and 16.8%. The parcel with smaller percentage of death toll is the parcel #8 with 7.4% and that of more death toll is the parcel #7 with 16.8%.

-In the square 5 the percentages of death toll are detailed by species, in such a sense the species in upward order of death toll to the date are: *T. oblonga* with 0%, followed by *C. sprucenum* (0.5%), *T. serratifolia* (1.6%), *A. cearencis* (6.1%), *S. amazonicum* (20%) and singly *C. catenaeformis* with 83%. Lapsed six months of installation all the parcels showed the biggest increment in death toll to the four months (9.3%), after which I diminish up to 1.9%. however *C. catenaeformis* is the species that more individuals lost so much to the moment of the installation, like to the four months, it is necessary to stand out that 90% of the dead plants of this species presented infestación of insects of the family TERMITIDAE in the portion of earth of the plants.

-In the square 6 the mortadad is shown by parcel and for species of it finishes it evaluation, highlighting the species *T. oblonga., C. sprucenum, T. serratifolia* to present insignificant death toll. The general average of death toll for all the species until the moment is of 18.5%; of them 14% singly belongs to *C. catenaeformis* and the biggest number in dead plants of this species they are in the parcel #7. *A. cearencis* and *S. amazonicum* present intermediate death toll and they also have the biggest number of having affected in the parcel #7.

-In the square 7 the general information of the 22 forest species is shown prioritized for the collection of seeds, between July and December of 1998. To the date seeds of 18 species were collected, 4 species were discarded to present very low germination or scarce production of seeds in this year. At the moment 5,338 grafts of 13 species have taken place and 5 species are even in almacigado process. 60% of the collected seed was obtained between July and September. The period between the almacigado and chiming for 70% of the obtained seeds is from 45 to 60 days. The collection places are presented in the outline of location of the trees nurseries (Figures N°5), the entirety of them was obtained in the environment of influence of the highway Federico Basadre among the kilometers 44 and 86 of the same one; 40% of the trees is important part (abundant) of those in degraded landscapes, and althought 60% remaining you doesn't locate in this atmospheres they presents certain natural adaptability to have regeneration in low purmas and stockings, besides registering resistance antecedents to the elements, as well as good behavior in plantations to open field.

-The square 8 details the relationship of the 10 pre-selected proprietors, starting from 38 interviewed, this properties are located in 14 kilometers of the highway Federico Basadre; 40% presents good readiness for reinstatement works in its pastizales and 50% of very good to excellent dispoción, single 1 proprietor had the but qualifying first soil. The age of opening of its pastures is of among 15 to 45 years, evidencing in most of them annual frequency of fires. Regarding the presence of vegetation invasora the grass *Brachiaria sp*. is that of more abundance, besides being present in 80% of the properties, in 80% of the cases is also found in associate with other species invasoras of smaller abundance.

-In the square 9 presents the relationship of 54 native species that we consider high-priority to rehearse in the works of rehabilitation of degraded areas of the region Ucayali. This synthesis is the result of having revised, gathered and evaluated the knowledge and the local experiences of the farmers with the use current and/or potential of each the species. It was determined that 44.4% has high priority for rehearsals, equivalent to 24 native species; the 33 are of medium priority and 22.2% of low priority.

-In the square 10 the relationship of 55 exotic forest species is observed used previously in rehearsals of rehabilitation of areas degraded in the tropic of the world, as a result of having conjugated its answer in the original place of the rehearsal with its kindness restoring y/o of protection of the soil, obtaining the priorización of species that we consider important to introduce to the Amazon region with the same end. You determines that 43.6% is of high priority; 40% of medium priority and 16.4% of low priority.

-The square 11 sample the development of the individuals (vigor) in each parcel and the tendencies in 3 carried out evaluations. Regarding the individuals of the 9 parcels, the results of the first evaluation indicate that 39.9% of the grafts had normal development (vigor 2), continued by the population's 29.4% with development but strong (vigor 1) and 22% with inferior development (vigor 3). In the second evaluation 40.8% of the individuals had the best vigor besides being increased in 11.4% after 4 months. At the moment o 6 months of their installation the whole population shows a marked tendency to the best development in her individuals, because 44.9% of them meets with vigor but strong and the general increment from its installation is of 15.5% in this category; the individuals with inferior development (vigor 3) alone they conform the total population's 10.9%. Inside each parcel the individuals are manifested with different behaviors regarding the vigor, we differentiate this way two groups; the first one integrated by the parcels #1, 2, 3, 8 and 9 whose tendency to improve in the last 6 months has been progressively satisfactory until reaching 33% of increment average in the category of stronger development; it is necessary to mention that the parcel #8 are the one that at the moment has better development to have their population's 83% with vigor 1. The second group conforms it the parcels #4, 5, 6 and 7 that contrarily had a descent average in the number of plants with better vigor, from 29 up to 24%; the parcel but affected it is the #5, in the one that although the descent in the number of individuals with development but vigorous it is quite low (3.4%) the biggest quantity in individuals (41.3%) they have inferior development.

-The square 12 sample the state development of the 6 species and the tendencies in the 3 carried out evaluations. In the first evaluation *C. spruceanum* it was the species with bigger quantity of vigorous individuals represented by their population's 44.7%; *T. oblonga, A. cearencis, T. serratifolia* and *S. amazonicum*, have the adult I number of individuals with normal development (vigor 2) corresponding to 53%, 46.9%, 43.6% and 35.9% respectively, *C. catenaeformis* had its population's bigger percentage however (32.6%) with inferior development. In the second evaluation the species of better vigor are increased at 4, these they are: *C. spruceanum, S. amazonicum, T. Oblonga, T. serratifolia*; the specie *A. cearencis* he maintains in normal develoment y *C.* catenaeformis he maintains with the older number of individuals in inferior develoment. At the moment 5 species have evolved favorably, because the tendency improves due to an increment average of 20.3% in the number of individuals with development but strong; however the population of *C. catenaeformis* with vigor 1 diminishes in 4.9% besides that the biggest quantity in individuals of this species (8.2%) you corresponds to the category of but low vigor. The species but vigorous the present time continues being *C. spruceanum*, represented by its population's 65.2%; in the same category *S. amazonicum* it presents 63.5% of their individuals, *T. Oblonga* (54.1%), *T. serratifolia* (46.9%,) *A. cearencis* (40.3%) and finally *C. catenaeformis* with single 3.8%.

-The square 13 represents the chart of composition total vegetation, it was identified preliminarily to 45 species collected in an land de14,400 m^2 Until the moment the families of more presence are: Cyperaceae, Graminaceae and Verbenaceae, in order of importance. In the 9 parcels, the 16 species of more abundance in falling order, they are represented for: *Imperata Brasiliensis, Rottboelia exaltata, Baccharis floribunda, Pueraria phaseoloides, Hyparrhenia rufa, Speudoelephantopus sp, Brachiaria decumbens, Talinum paniculatum, Urena lobata,* Unknown, *Scleria pterota, Vernonia baccharoides, Cyperaceae, Desmodium trotuosum, Cecropia sp.* , Unknown 2.

-The square14 represents the chart of composition vegetation of 3 experimental parcels (#1, 3 and 8) of the same study area. 50 especimens was collected that at the moment are being identified and that they possibly diminish in number to have repetitions.

-In the squares 15 and 16 is shown the variations of total biomass after 6 months for places with reinstatement treatment and witness, in the influence of the parcels #1, 3, 8. we Highlight very variable increments, of 30 up to 325% tons of total biomass for hectare, in the 5 subparcelas belonging to those the parcels #1 and 3 of *Imperata brasilinensis* (Cashupsha) and *Rottbellia exaltata* (Arrocillo), respectively. However the following 4 subparcelas belonging to the parcel #8 of the species *Baccharis floribunda* (Sachahuaca), it shows descents of 27.8 up to 91% of total biomass, perhaps like an answer of the slow growth of this invasora before the effect of the fire to which was object three months after the first evaluation. Contrarily the third subparcela of the parcel #3 (Arrocillo) he had a substantial increment of 325%, perhaps because for this species the fire is a factor that promotes the quick regeneration of its vegetative structure.

9. Discussion:

-The productivity of secondary forest in the tropics varies in relation to type, intensity, and duration of the agroforesty activities performed in the initial successional stage (Gomez Pompa and Vasquez - Yanes 1981 cit. Bernal, 1998). In this respect, according to referred to specifications of dominance of species, average height, regeneration rate, and species richness (Uhl et al., 1988), and to compare the structural characteristics of secondary forests abandoned for 8 years with the magnitude of each one of these characteristics encountered in our experimental plots we were able to determine the intensity of previous use in all our experimental plots as the strongest.

-At the same time (Uhl et al.,1998) mentions that in sites where agricultural use was strongest, the productivity was significantly reduced and was dominated by grasses and herbs. This was also confirmed by the same author when the total dry biomass for 2 primary forests in Paragominas, Para, Brazil, exceeded 300 T/ha, and in abandoned pastures after "light" use it was 90 T/ha, 30 T/ha after "moderate" use, and 10 T/ha after "heavy" use. However, in our plots, the use was strictly agricultural, and the total biomass was closest to the "light" level of use, indicating that the level of degradation and productivity is extremely low in our assessed plots.

-In the majority of experimental plots the pH was close to 5.0. According to several authorities (Wright 1989; Shuman 1990, cit. by Bernal 1998), when the pH is less than or equal to five, aluminum toxicity is the most important factor affecting plant growth.

-According to Fujisaka (1997), farmers reported the weeds of annual crops (% of sub-sample) in Pucallpa, Peru, as *Imperata brasiliensis* 51%, followed by *Homolepis* (Torourco) 48 %, *Rottboellia* C. (Arrocillo) 45 %, and *Baccharis L.* (Sachahuaca) 39% noting that *Imperata brasiliensis* (Cashupsha) is an indicator species of degraded fallow fields. Our study obtained similar results for composition (3 out of 4 weed species) and representation (approximate percentages).

-The relationship between edaphic features and floristic characteristics in secondary tropical forests is poorly understood. Autecological investigations have primarily concentrated on factors that affect site colonization (Uhl et al 1981; Whitemore 1983, cit. by Bernal 1997), substrate fertility, and previous site use (activities and duration of use) (Gomez-Pompa and Vasquez-Yanes 1981; Finegan 1992, cit. by Bernal 1997). Regarding characterization of our experimental plots, lack of seed sources of tree species near the plots in seven out of nine plots, annual fires in six out of nine plots, and prolonged periods of agricultural use in all 9 plots, may have contributed to the poor floristic diversity encountered in six out of the nine experimental plots.

-In general 2 of the predominant overgrowths in the study area don't show selectivity with relationship to the type of textural unit, however for the case of *Baccharis floribunda* the relationship is increased toward the texture franc sandy, this result it is debatable and it will be solely expert by means of the increase of the I number of samples in areas that relate to the species with the origin place.

-The death toll and early vigor of the species *Schizolobium Amazonicum* and *Amburana cearencis* are questionable in reason that they were motivated by the bad quality from the grafts to the moment of the reassignment, and not to factors characteristic of the species, the evolutionary results of the vigor and death toll for the two species supports this position.

-For *Cedrelinga catenaeformis* the high percentage of death toll and vigor has bigger relationship with the negative reaction to the moment of the installation (stress); besides a high susceptibility of the species to damages caused by attack of insects of the family TERMITIDAE at level of the roots. In this case 100% of the plants went from excellent quality to the moment of the plantation and reassignment.

10. Conclusion:

-Until the moment the species *Schizolobium amazonicum* and *Calycophyllum spruceanum* have responded with excellent development potential (interaction of the growth, vigor and death toll); followed by *Amburana cearencis, Terminalia oblonga* and *Tabebuia serratifolia*, with very good development potential, all them for floors of texture franc to sandy franc and with the overgrowth *Baccharis floribunda*.

-80% of the parcels pre-selected in the second study area is dominated by the grass *Brachiaria decumbens*, they catch fire every year and the use for cattle raising it is very low, for what we can define them in process of abandonment.

-The work of prioritizing native and exotic species demonstrates that there is a great one I number of not very well-known species with high potential for the handling of plantations in completely discovered areas and in purmas; the results of this first approach should motivate and to stimulate the interested investigators to prove their potential low different place conditions.

11. Expected outcome for next sted:

-Was carried out the caracterization edafic, physiographic and biotic of 9 experimental parcels with age of more opening to 35 years.
-Establishment of 6 forest species in 1.5 hectares of plantations, distributed in 9 parcels with influence area in 650 hectares.
-Elaboration of a base with 3,226 data of growth, derived of 3 bimonthly evaluations.
-Intermediate elaboration of a thesis work in charge of a high school of the local University.
-An annual report and a directory of data
-Production of 5,338 grafts with enriched soil, of 13 forest species.
-Identification of 29 botanical species of abundant and frequent presence in lands with evident degradation state.
-Identification of 6 soil units, represented in 9 maps that relate the textural class with the location of the trees.

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13. Publication:
Elaborating a scientific article, title: "Adaptability of forest tree species to degraded lands in Pucallpa, Peruvian Amazon".

14. Collaborated condition:
This project was collaborated with the following investigators and institutions:

Silvicultural specialist:	Dr. Cesar Sabogal/CIFOR.
Pastures y overgrowth specialist:	Mg. Sc. Keneth Reategui/CIAT
Soils specialist:	Dr. Julio Alegre/ICRAF.
Estatistic and ecology specialist:	Dr. Manuel Guariguata/CATIE-CIFOR.
Biomass specialist:	Mg. Sc. Arnoud Braun/ICRAF.
Ecology specialist:	Dr. Shigeo Kobayashi/CIFOR.
Botanical specialist:	Dr. Mirella Clavo/IVITA.

15. Abstract in each mother language:
La ejecución de las actividades programadas se realizó a inicios del mes de febrero de 1998 con la aplicación de una encuesta a 33 agricultores para ubicar y posteriormente caracterizar las purmas con uso agrícola anterior que presenten indicios de deterioro o degradación biofisica. Se seleccionaron 9 parcelas experimentales en propiedad los 9 agricultores que mostraron interés en participar y cuyos terrenos están invadidos por malezas, estas parcelas se encuentran distribuidas entre los distritos de Campo Verde y Nueva Requena, a 34 Km. al oeste desde la ciudad de Pucallpa.

En el mes de junio se instalaron 1,089 plantas de 6 especies forestales distribuidas en las 9 parcelas experimentales (3 repeticiones por cada estrato o vegetación indicadora), bajo el diseño estratificado completamente al azar. Hemos realizado 3 evaluaciones bimestrales determinando 18% de mortandad total y promedio general en altura y diámetro de 55.3 y 0.81cm, respectivamente. Actualmente se está colectando y produciendo germoplasma (plantones) de 22 especies forestales seleccionadas por tener favorable adaptación natural en áreas con uso muy intensivo, con el fin de medir el crecimiento inicial, sobrevivencia y vigor. Paralelamente seguiremos evaluando por el período de dos años el comportamiento de las especies establecidas en el primer sector.

Posteriormente estableceremos una "replica ampliada" de lo ejecutado, esta vez en la carretera Federico Basadre (Km:40-54) en donde el uso anterior de las parcelas es principalmente pecuario, para tal fin hemos encuestado a 38 ganaderos y pre-selecionado a 10 con interés de participación, disponibilidad de áreas y extrema degradación.

ANNEXES:

N° FIGURES: 5
N° SQUARES: 16
N° TEXTURAL MAPS: 9
N° PICTURES: 7

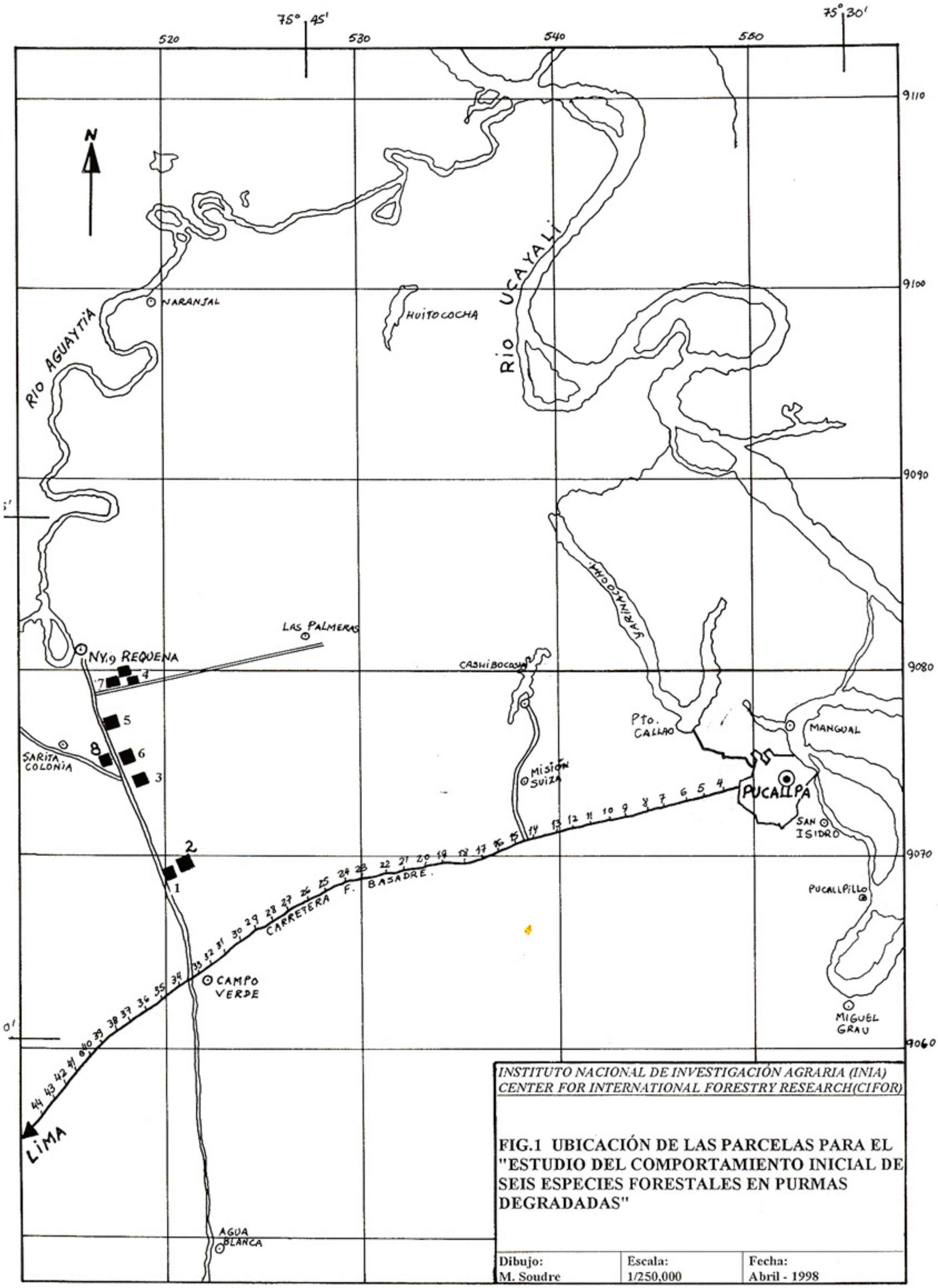

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FIG.1 UBICACIÓN DE LAS PARCELAS PARA EL "ESTUDIO DEL COMPORTAMIENTO INICIAL DE SEIS ESPECIES FORESTALES EN PURMAS DEGRADADAS"

Dibujo:	Escala:	Fecha:
M. Soudre	1/250,000	Abril - 1998

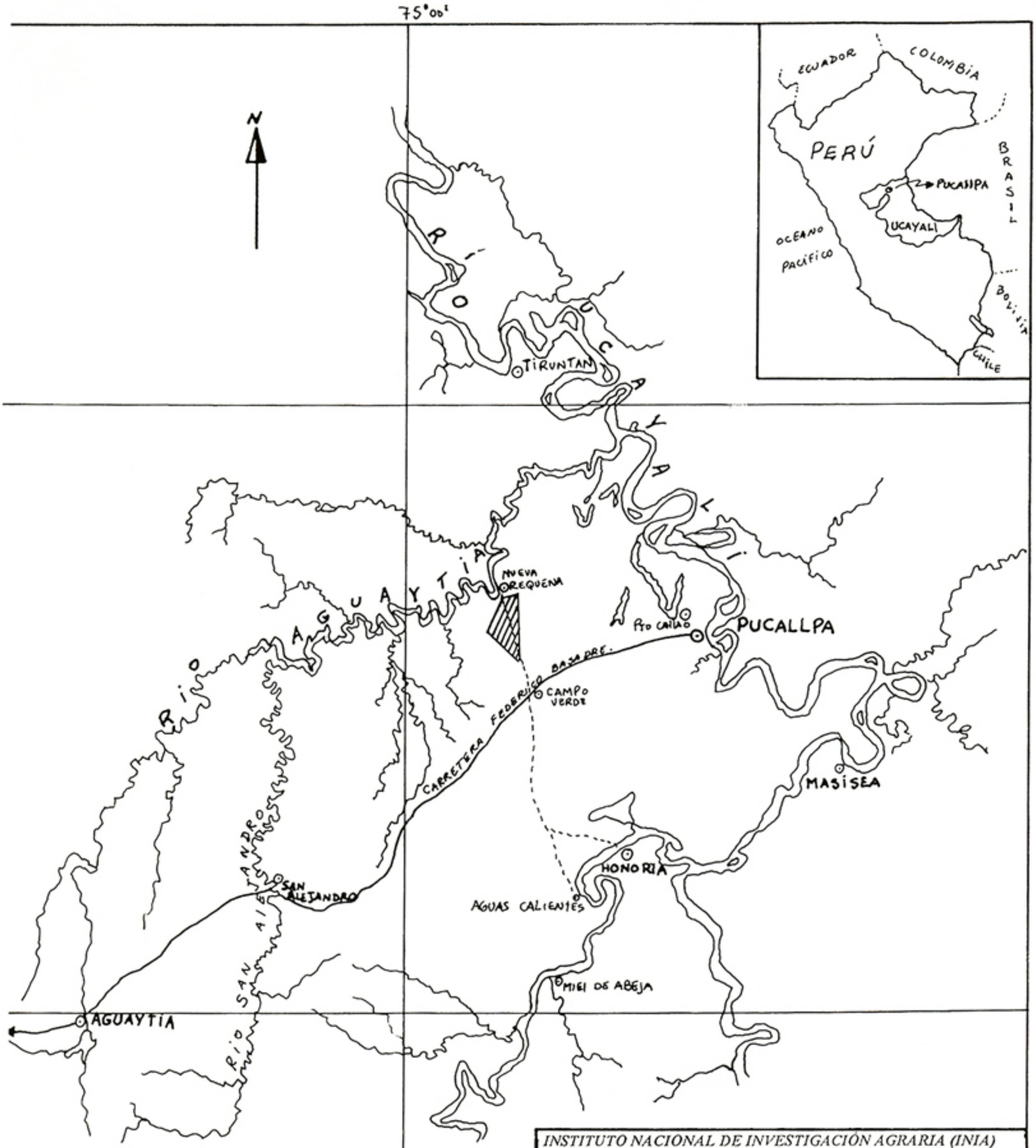

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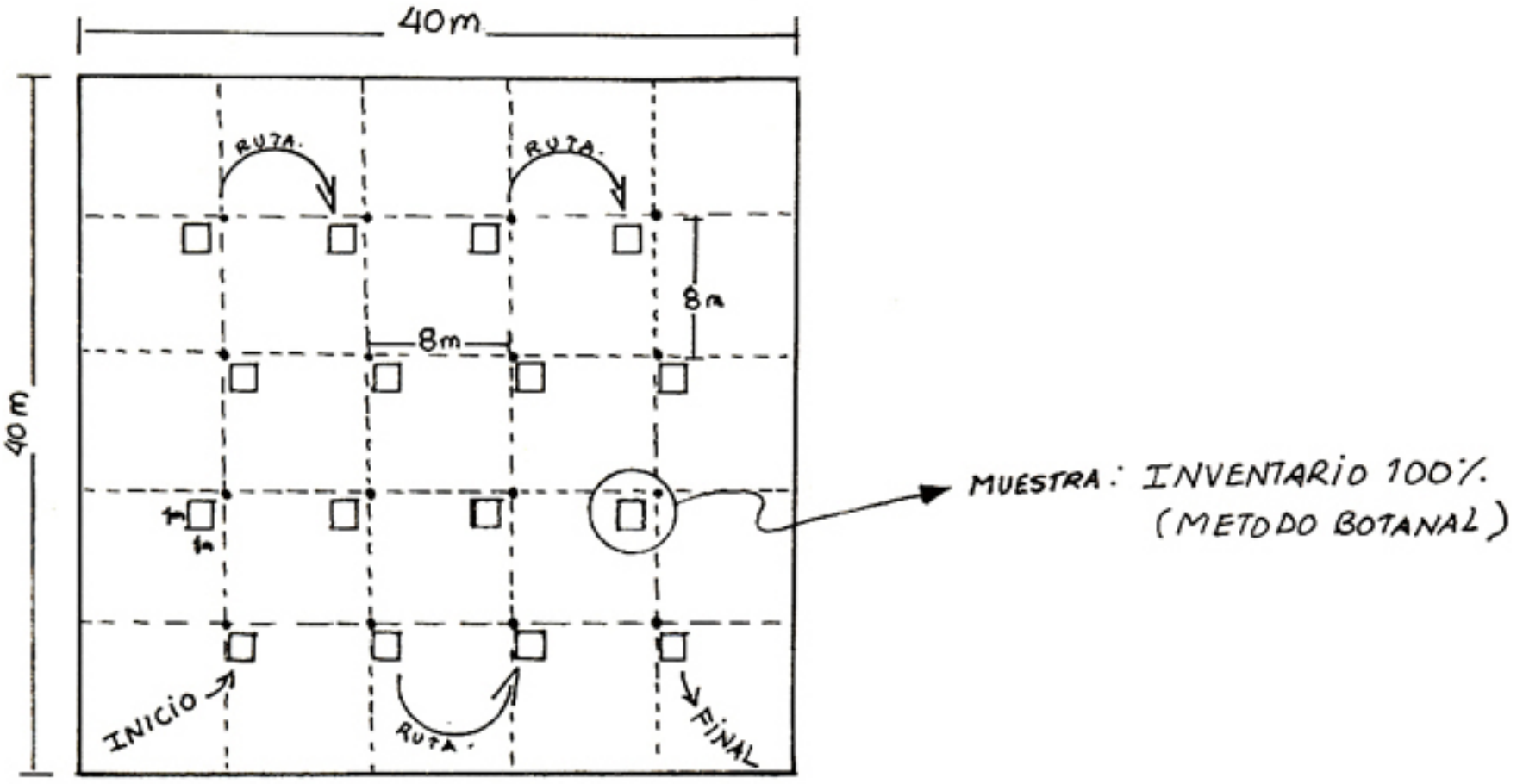
FIG.2 ÁREA DE INFLUENCIA DE LA PRIMERA FASE DEL PROYECTO:

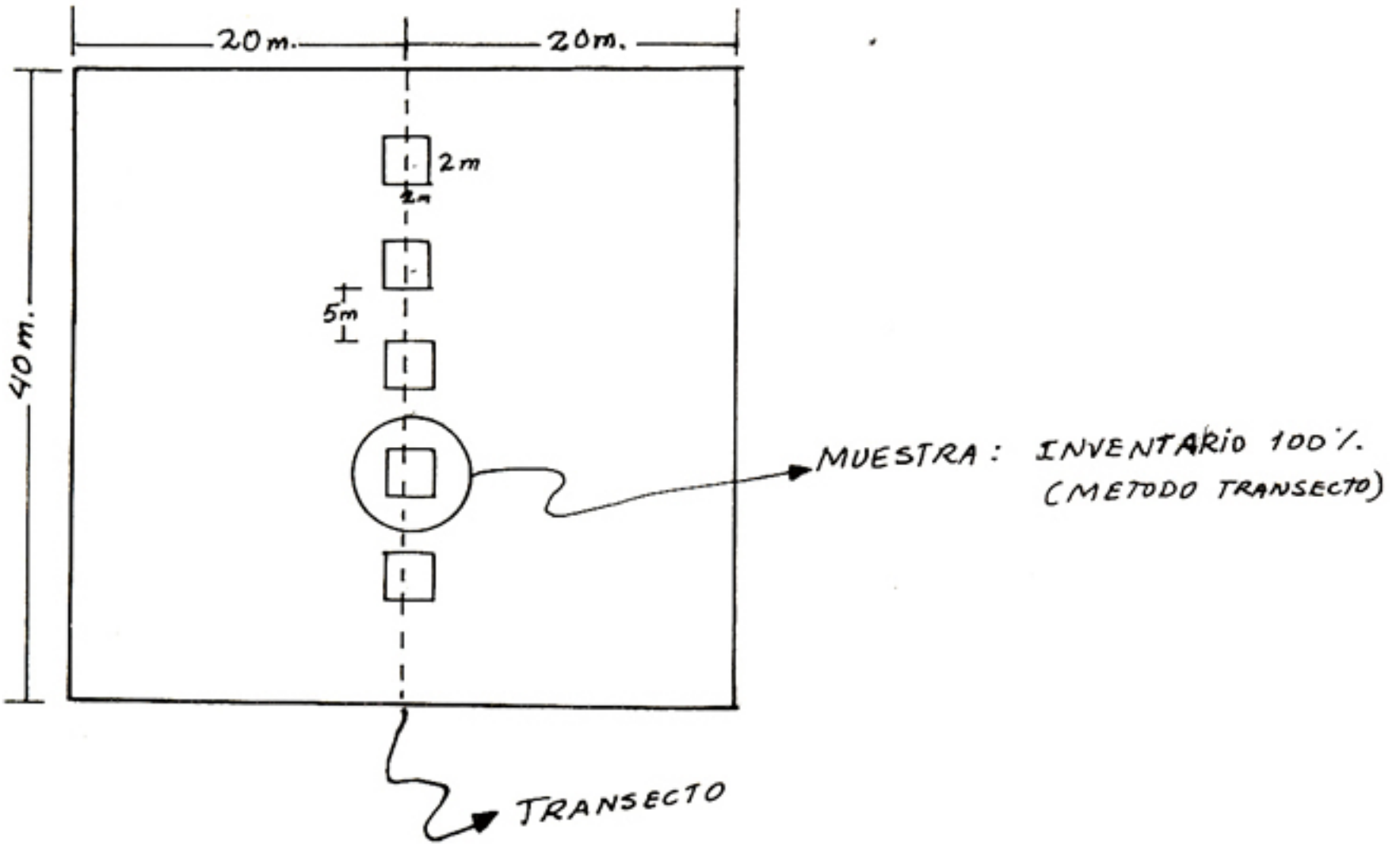
"REHABILITATION OF DEGRADED TROPICAL FOREST ECOSYSTEMS"

Dibujo:	Escala:	Fecha:
M. Soudre	1/1,000.000	Abril - 1998

FIGURES 3. DESIGN OF VEGETATIVE SAMPLING IN HERBACEOUS PARCELS.



FIGURES 4. DESIGN OF VEGETATIVE SAMPLING IN PARCELS OF BUSHES.



LEYENDA	
1	TORNILLO
2	PUMAQUIRO
3	ESTORAQUE
4	SANGRE DE GRADO
5	BOLAINA BLANCA
6	CAPIRONA
7	TAHUARI AMARILLO
8	PEINE DE MONO
9	MAQUISAPA ÑACCHA
10	YACUSHAPANA AMARILLA
11	HUALAJA AMARILLA
12	PALISANGRE BLANCO
13	AUCA ATADIJO
14	LORO MICUNA
15	ACEITUNA CASPI
16	ANONILLA
17	PINO CHUNCHO
18	AÑALLO CASPI
19	HUAMANZAMANA NEGRA
20	YACUSHAPANA NEGRA
21	ACHIOTE CASPI
22	MARUPA

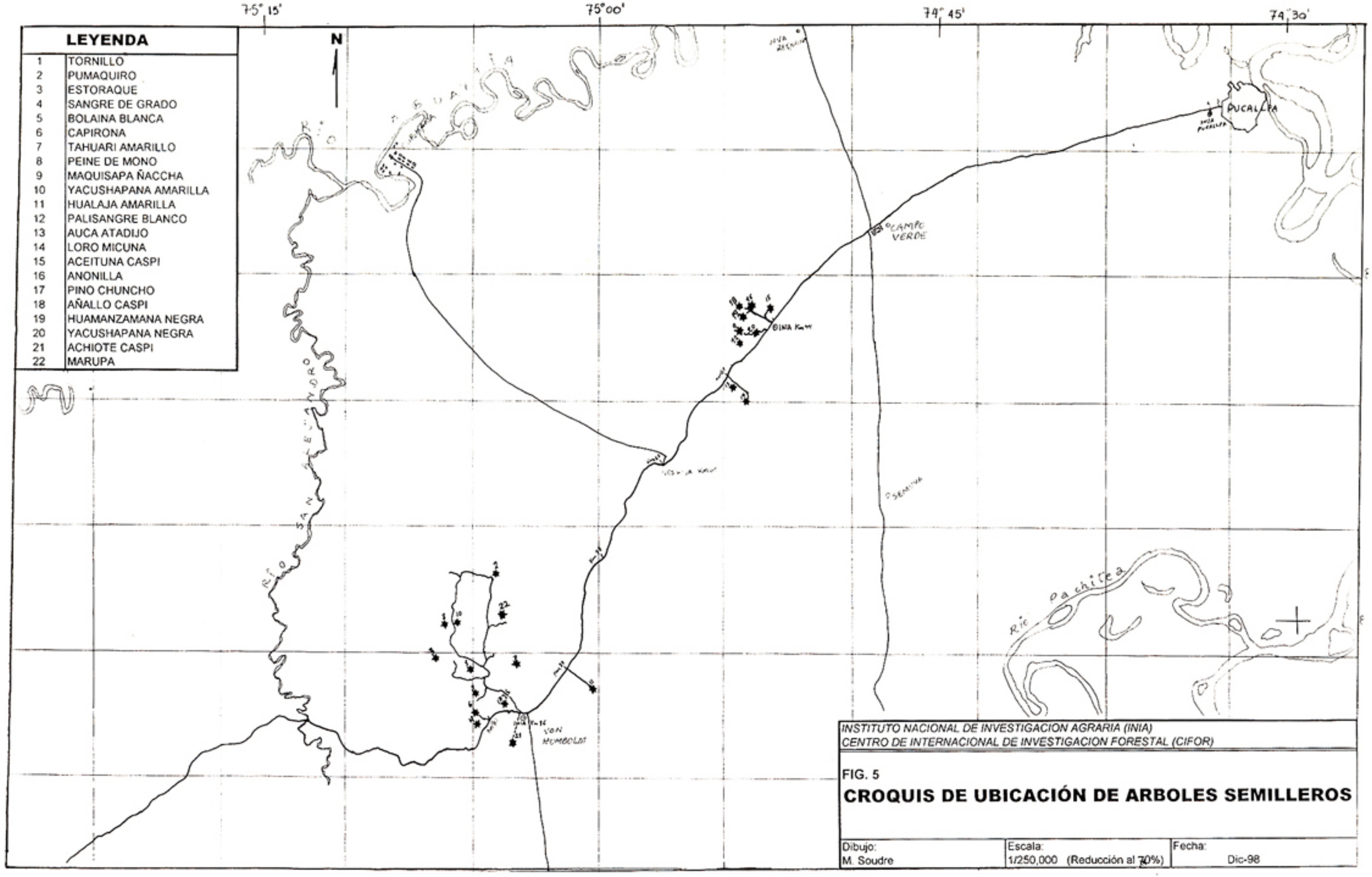


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FIG. 5

CROQUIS DE UBICACIÓN DE ARBOLES SEMILLEROS

Dibujo:	Escala:	Fecha:
M. Soudre	1/250,000 (Reducción al 70%)	Dic-98

SQUARE 2. CONSOLIDATION OF BIOPHYSICAL RESULTS FOR EXPERIMENTAL PARCEL

CHARACTERISTIC	PARCEL S								
	P1/S.Grandez	P2/J.Grandez	P3/S.Aspajo	P4/J.Tenazoa	P5/J.Arirama	P6/J.Rios	P7/A.Flores	P8/V.Flores	P9/F.Vargas
Overgrowths*	Cashupsha	Sachahuaca	Arrocillo	Cashupsha	Sachahuaca	Arrocillo	Cashupsha	Sachahuaca	Arrocillo
Location of the founded (km)	5,9	6	11	18	14	12,5	17	12,2	17,5
Location of the parcel to the axis of the highway (m)	80	450	400	15	300	400	10	350	120
Cultivate previous	Rice	Yucca	Yucca	Corn	Yucca	Corn	Yucca	Corn	Yucca
Time opf rest (years)	14	3	1	2,5	1	7	5	2	1
Height average (m)	1,2	3,5	1,1	1	1,5	1,5	1	3	1,8
Frequency of fires	Annual	Poco	Annual	Annual	Never	Annual	Annual	Never	Annual
Inundability	Not	Not	Not	Not	Not	Not	Not	Not	Not
Microrelief	Plane	Plane	Plane	Plane	Plane	Plane	Plane	Plane	Plane
Slope (%)	2	2	1	1	1	2	1	3	2
Thickness of organic matter (cm)	2	2	2,5	3	2	2,5	3	2	3
Tipe of soil	Acrisol	Acrisol	Ultisol	Acrisol	Acrisol	Acrisol	Acrisol	Acrisol	Acrisol
Texture **	F.Ar/Ar.Li	F.A./A.F.	F/F.A.	F.Ar/F.Ar.Li	F/F.A.	F.Li/F.Ar.Li	A.F./A	F/F.A.	F./F.A.
Drainage	Regulate	Excellent	Good	Bad	Good	Regulate	Good	Good	Good
pH	5	4,5	5,1	4,5	5,6	4,9	6,7	4,3	5,6
Roots (quantity - diameter)***	1-B	3-C	1-D	1-B	3-B	1-D	1-B	3-B	1-D
Biomass (T/ha)	6,4	6,1	3,9	6,7	4,8	6,3	6,4	15,2	6
Density of overgrowths (N°/m2)	287	28	237	285	26	68	314	33	101

*

Name common	Name scientific
Arrocillo	*Rottboellia exaltata*
Cashupsha	*Imperata brasiliensis*
Sachahuaca	*Baccharis floribunda*

**

textural	code
loam	F
clay	Ar
ozzy	Li
sand	A

***

ROOTS			
quantity	code	diameter	code
Abundant	1	> 5mm	A
Regulate	2	2-5mm	B
Scarce	3	1-2mm	C
Anything	4	<1mm	D

SQUARE 3. RESULTS OF AVERAGE GROWTH FOR SPECIES AND GENERAL AVERAGE AT SIX MONTHS OF ITS INSTALLATION

date of plantation: 01/07/98

date of 3° evaluation: 01/01/99

Plots (Number)	*Yacushapana*		*Pashaco*		*Tahuari*		*Tornillo*		*Ishpingo*		*Capirona*	
	total height (cm)	diameter (cm)	total height (cm)	diameter (cm)	total height (cm)	diameter (cm)	total height (cm)	diameter (cm)	total height (cm)	diameter (cm)	total height (cm)	diameter (cm)
1	56.70	0.97	70.00	1.11	66.60	0.95	28.67	0.53	74.07	0.91	68.20	1.01
2	53.09	0.92	92.50	1.59	77.10	1.06	34.00	0.40	75.76	0.90	62.50	0.85
3	50.75	0.68	68.56	0.96	58.89	0.80	29.00	0.30	56.05	0.66	63.85	0.82
4	41.35	0.87	84.85	1.31	39.80	0.66	28.33	0.45	42.26	0.56	66.05	1.01
5	50.30	0.82	51.67	0.66	29.60	0.49	27.57	0.38	41.19	0.54	44.00	0.58
6	55.55	0.98	83.07	1.34	58.89	0.91	26.33	0.46	69.50	0.91	78.15	1.29
7	57.90	0.88	88.13	1.32	54.17	0.76	00.00	0.00	57.83	0.63	72.71	0.99
8	59.25	1.04	69.58	1.09	37.67	0.59	38.17	0.52	57.37	0.73	60.40	0.76
9	44.05	0.72	76.23	1.04	39.78	0.65	29.50	0.45	56.37	0.72	57.33	0.77
Average for specie	52.10	0.88	76.06	1.16	51.39	0.76	30.19	0.44	58.93	0.73	63.68	0.90

	HEIGHT (cm)	DIAMETER (cm)
GENERAL AVERAGE	55.39	0.81
STANDARD DEVIATION	13.96	0.21

SQUARE 4. PLANTS DEATH TOLL FOR EVALUATION AND FOR PLOTS						
Plot (number)	1° Evaluation (01/09/98)		2° Evaluation (01/11/98)		3° Evaluation (01/01/99)	
	quantity of death plants		quantity of death plants		quantity of death plants	
	number	percentage	number	percentage	number	percentage
1	11	13.75	20	11.05	21	10.40
2	9	11.25	21	11.60	22	10.90
3	3	3.75	20	11.05	23	11.38
4	4	5.00	17	9.40	20	9.90
5	2	2.50	12	6.63	18	8.91
6	16	20.00	23	12.70	25	12.37
7	22	27.50	32	17.68	34	16.83
8	2	2.50	13	7.18	15	7.43
9	11	13.75	23	12.70	24	11.81

SQUARE 5. PERCENTAGE OF DEATH TOLL FOR EVALUATION AND SPECIES							
species (code)	species	1° evaluation (01/09/98)		2° evaluation (01/11/98)		3° evaluation (01/01/99)	
		quantity of death plants		quantity of death plants		quantity of death plants	
		number	percentage	number	percentage	number	percentage
1	Yacushapana	2	2.5	0	0	0	0
2	Pashaco	9	11.25	32	17.68	36	17.82
3	Tahuari	1	1.25	1	0.55	3	1.48
4	Tornillo	65	81.25	139	76.80	151	74.75
5	Ishpingo	2	2.50	8	4.42	11	5.45
6	Capirona	1	1.25	1	0.55	1	0.50
Total		80	7.3	181	16.6	202	18.5
increment		0	7.3	101	9.3	21	1.9

SQUARE 6. DEATH TOLL FOR PARCELS AND SPECIES (01/01/99)								
Plots (number)	S p e c i e s						Q U Total	P E % R/120
	Yacushapana (quantity)	Pashaco (quantity)	Tahuari (quantity)	Tornillo (quantity)	Ishpingo (quantity)	Capirona (quantity)		
1	0	2	0	17	2	0	21 N	17.5 C
2	0	3	0	17	2	0	22 T	18.3 E
3	0	5	1	17	0	0	23 I	19.2 N
4	0	0	0	17	3	0	20 T	16.7 T
5	0	5	0	13	0	0	15 Y	~~20.8~~ A ~~15.~~
6	0	5	1	18	1	0	25	20.8 G
7	0	10	1	20	2	~~0~~ 1	~~33~~ 34	~~27.5~~ E 28.3
8	0	1	0	13	1	0	15	12.5
9	0	5	0	19	0	0	24 (#)	20.0 (%)
TOTAL	0	36	3	151	11	(1)	202	18.5

SQUARE 7. GENERAL INFORMATION OF THE FOREST SPECIES PRIORITIZED IN THE COLLECTS OF SEEDS FOR THE REHABILITACION RESEARCH IN PASTURES INIA/CIFOR.

	OF THE TREE COLLECTS							OF THE SEEDS OBTAINED								
N°	NAME COMMON	NAME SCIENTIFIC	PLACE OF COLLECTS	DIAMETER (cm)	TOTAL HEIGHT (m)	DATE OF COLLECTS	OBSERVATION OF THE TREE AND OTHERS (DESCRIPTIVE)	WEIGHT OF FRUITS (gr)	WEIGHT OF SEEDS (gr)	SEEDS NUMBER IN 100 gr.	DATE THE BED OF SEEDS	DATE OF GERMINATION	DATE OF PEAL	NUMBER PLANTS PEALED	NUMBER PLANTS ALIVE	OBSERVATION OF SEEDS
1	Tornillo	*Cedrelinga catenaeformis*	Km 86, [6 km	180	40	23/07/1998	Located in slope 20%	5000	1650	58	31/07/1998	14/08/1998	03/09/1998	286	236	30% germination
2	Pumaquiro	*Aspidosperma macrocarpum*	Km 86, [11km	65	35	21/07/1998	little production of fruits	4200	1735	112	31/07/1998	20/08/1998	03/09/1998	558	509	30% germination
3	Estoraque	*Myroxylon balsamun*	Km 86, [8km	30	26	18/08/1998	75% of seeds miscarried	6000	2710	98	26/08/1998	19/09/1998	20/10/1998	226	226	8.5% germination
4	Sangre de grado	*Croton lechleri*	Km 90, [0.35km	25	17	25/09/1998	60% not very mature fruits	660	58	30290	16/10/1998	09/11/1998	15/12/1998	208	196	1.4% germination
5	Bolaina blanca	*Guazuma crinita*	Km 86, [4km	35	25	18/08/1998	it was cut	2300	75	72720	28/08/1998	07/09/1998	01/10/1998	498	448	90% germination
6	Capirona	*Calycophyllum spruceanum*	Km 90, [0.35km	16	18	01/09/1998	located in pasture	1355	38	448700	14/09/1998	25/10/1998	15/12/1998	606	580	60% germination
7	Tahuari amarillo	*Tabebuia serratifolia*	Km 86, [4km	53	30	18/09/1998	seeds disseminating	184	110	1310	22/09/1998	03/10/1998	20/10/1998	580	579	95% germination
8	Peine de mono	*Apeiba membranacea*	Km 86, [9.2km	66	24	25/09/1998	located to the foot highway	2940	300	5200	16/10/1998	25/10/1998	19/11/1998	484	457	83% germination
9	Maquisapa flaccha	*Apeiba tibourbou*	Km 45, [0.5km	15	12	15/09/1998	behave bush	1320	50	46100	02/11/1998	12/11/1998	30/12/1998	406	369	40% germination
10	Yacushapana A.	*Terminalia oblonga*	Km 86, [8.3km	34	29	10/08/1997	seeds conserved artificially	430	400	3230	21/12/1998	03/01/1999	25/01/1999	219	207	25% germination
11	Hualaja amarilla	*Zanthoxylum sp.*	Km 80,]2.5km	46	29	11/11/1998	it was collected regeneration natural	750*	750*	750*	N/S/A	N/S/A	12/11/1998	689	640	not germination
12	Palisangre blanco	*Pterocarpus amazonum*	Km 47, [0.05km	35	12	12/10/1998	three shaft	650	600	430	12/10/1998	31/10/1998	31/12/1998	628	606	78% germination
13	Auca atadijo	*Croton matourensis*	Km 5'0,]0.8km	37	10	27/01/1999	inclined shaft	400	52	7550	05/02/1999	E/P				in prosecution
14	Loro micuna	*(Moraceae) s/l*	Km 50,]2km	23	8	27/01/1999	many shaft and located in pasture	358	245	1046	05/02/1999	E/P				in prosecution
15	Aceituna caspi	*Vitex Pseudolea*	Km 44, [0.15km	39	17	12/01/1998	located in vegetable garden	560	280	550	22/01/1999	02/02/1999				in prosecution
16	Anonilla	*(Annonaceae) s/l.*	Km 44,]2km	10	4	27/01/1999	tree young	550	24	3240	05/02/1999	E/P				in prosecution
17	Pino chuncho	*Schizolobium amazonicum*	Km 86, [1.5km	50	25	18/09/1998	located in pasture, it was cut	470	350	141	16/10/1998	20/10/1998	N/S/R	0	0	not pealed
18	Añallo caspi	*Cordia sp.*	Km 44,]2km	25	9	12/01/1999	not very mature fruits	2700	251	865	22/01/1999	E/P				in prosecution
19	Humanazamana N.	*Dictyoloma peruvianum*	Km 44,]2km	7	6	03/10/1998	seeds disseminating	56	21	68200	16/10/1998	28/10/1998	N/S/R	0	0	3% germination
20	Yacushapana N.	*Terminalia amazonia*	Km 45, [0.1km	35	26	15/09/1998	located in vegetable garden	20	4	1348	16/10/1998	15/11/1998	N/S/R	0	0	0% germination
21	Achiote caspi	*Bixa sp.*	Km 86,]1.8km	35	23	02/12/1998	90% of seeds miscarried	9	2	6100	N/S/A	0	0	0	0	little seed collected
22	Marupa	*Simaruba amara*	Km 86, [9 km	34	22	15/02/1998	seeds conserved artificially	340	230	280	20/02/1998	28/02/1998	30/03/1998	289	285	80% germination
												quantity of plants produced 30/01/99:			5,330	

[Highway Federico Basadre, side right.

] Highway Federico Basadre, side left.

SQUARE 8. CHARACTERISTIC OF THE PROPERTIES PRE-SELECTED FOR REHEARSAL IN DEGRADED PASTURES.						
N°	NAME OF PROPERTIES	LOCATION (km C.F.B)	DISPONIBILITY OF PROPERTIES	AGE OPENING (years)	FREQUENCY OF FIRES	OVERGROWTHS (association)
1	Dionisio Serruche	40.5	excellent	20	annual	Brachiaria+Yutillo, Brachiaria+Sachahuaca
2	Julio Tuesta	42.0	excellent	27	not	Brachiaria+Huaquilla.
3	Alfredo Bardales	45.0	very good	24	not	Brachiaria+Stylosantes+Sachahuaca
4	Wenseslao Barrueto	46.5	excellent	30	annual	Brachiaria+Sachahuaca+Botoncillo
5	Orlando Santillan	49.0	regulate	15	annual	Sachahuaca+Liana
6	Fundo "San Jorge"	43 - 50	good	45	annual	Brachiaria, Liana, Botoncillo
7	Alberto Maita	49.8	good	20	annual	Brachiaria+Sachahuaca
8	Genaro Mozombite	45.0	good	28	annual	Yarahua + Sachahuaca
9	Miguelina Mendoza	51.0	good	17	annual	Brachiaria+Liana, Brachiaria+Huaquilla, Huaquilla
10	Alfredo Santamaria	43.5	excellent	40	annual	Brachiaria

SQUARE 9. RELATIONSHIP OF SPECIES PROMISSORY NATIVE FOR REHABILITATION OF "PURMAS" AND LANDS DEGRADED IN THE REGION.

N°	SPECIE	SCIENTIFIC NAME	FAMILY	DISSEMINATION TIME	LOCAL USES	ASPECT ENVIROMENTAL	PRIORITY
1	Aceituna caspi	*Vitex pseudolea*	Verbenaceae	january - february	posts	ecological (it fire resists)	1
2	Aceite caspi	*Didymopanax morototoni*	Araliaceae	august - september	pulps, drawers, construction slight	ecological	2
3	Achiote caspi	*Bixa platicarpa*	Bixaceae	december - janunary	posts	ecological	1
4	Anonilla	*Rollinia sp.*	Annonaceae	january - february	construction rural, fruits	ecological	1
5	Añallo caspi	*Cordia ucayaliensis*	Boraginaceae	september - december	construccion slight, wood sawed	ecological	1
6	Añallo caspi	*Cordia nodosa*	Boraginaceae		nectar	ecological	2
7	Auca atadijo	*Croton tessmanii*	Euphorbiaceae	january - february	wood sawed	ecological	1
8	Auca atadijo	*Croton matourensis*	Euphorbiaceae	january - february	wood sawed	ecological	1
9	Atadijo	*Trema micranta*	Ulmaceae		rope, construction rural	ecological	3
10	Bellaco caspi	*Hymatentus sucuuba*	Apocynaceae	april - june	medicinal	ecological	2
11	Bolaina blanca	*Guazuma crinita*	Sterculiaceae	september - october	wood sawed	ecological - social	1
12	Bolaina negra	*Guazuma ulmifolia*	Sterculiaceae	september - october	cajoneria	ecological	3
13	Caoba	*Swietenia macrophylla*	Meliaceae	July - august		ecological - social	2
14	Capirona	*Calycophyllum spruceanum*	Rubiaceae	september - october	wood sawed, fire wood	ecological - social	1
15	Capuena	*Sterculia sp*	Sterculiaceae			ecological	3
16	Cetico blanco	*Cecropia membranacea*	Cecropiaceae		pulps paper	ecological	2
17	Cetico rojo	*Cecropia francisci*	Cecropiaceae		medicinal	ecological	3
18	Espintana blanca	*N.N*	Annonaceae		posts, construction rural	ecological	3
19	Hualaja amarilla	*Zantoxylum sp*	Rutaceae	november - december	wood sawed, construction rural	ecological	1
20	Huamanzamana b.	*Jacaranda copaia*	Bignoniaceae	december - january	tutor, construccion slight, cajoneria, pulps	ecological	1
21	Huamanzamana n.	*Dictyoloma peruvianum*	Rutaceae	september - october	live fence, medicinal	ecological	1
22	Huimba negra	*Ceiba samauma*	Bombacaceae	july - august	construction slight, live fence	ecological - economic	2
23	Ishpingo	*Amburana cearensis*	Fabaceae	june - july	wood sawed	ecological - economic	1
24	Loro micuna	*N.N*	Moraceae	december - january	livestock shade	ecological (it fire resists)	2
25	Llausaquiro	*Helicarpus popayanensis*	Tiliaceae		rope	ecological	2
26	Marupa	*Simarouba amara*	Simaroubaceae	december - jaunary	wood sawed	ecological - economic	1
27	Peine de mono	*Apeiba membranacea*	Tiliaceae	august - november	wood for interiors	ecological - economic	1
28	Maquisapa ñaccha	*Apeiba tiborbou*	Tiliaceae	august - november	wood for interiors	ecological	1
29	Ocuera negra	*Vernonia baccharoides*	Asteraceae		medicinal	ecological	3
30	Palisangre blanco	*Pterocarpus amazonum*	Fabaceae	october - november	wood sawed	ecological	1
31	Pichirina negra	*Vismia cayenensis*	Guttiferae		pulps,medicinal	ecological	2
32	Pichirina blanca	*Vismia amazonica*	Guttiferae		pulps, medicinal	ecological	2
33	Pincha caspi	*Aspidosperma subincanum*	Apocinaceae		construction rural, livestock shade	ecological (it fire resists)	1
34	Pinochuncho	*Schizolobium amazonicum*	Caesalpiniaceae	august - september	cajoneria, tutor, pulps	ecological - economic	1
35	Pichohuayo	*Siparuna guianensis*	Monimiaceae		firewood, construction rural	ecological (it fire resists)	2
36	Pucaquiro	*Aspidosperma cylindrocarpon*	Apocynaceae		wood sawed	ecological	2
37	Pumaquiro	*Aspidosperma macrocarpon*	Apocynaceae	july - august	wood sawed	ecological - economic	1
38	Rifari blanco	*Miconia sp.*	Melastomataceae		posts	ecological	2
39	Ri fari colorado	*Miconia longifolia*	Melastomataceae		firewood, pulps	ecological	2
40	Sacha oregano	*Lantana camara*	Vervenaceae	june - july	honey, pollen	ecological (it fire resists)	3
41	Sacha uvilla	*Coussapoa asperifolia ssp.*	Cecropiaceae		wood sawed	ecological	2
42	Sangre de grado	*Croton lechleri*	Euphorbiaceae	august - september	medicinal	ecological - social	1
43	Shaina	*Colubrina ferruginosa*	Rahmnaceae		posts, live fence	ecológica	2
44	Shihuahuaco	*Dipteryx odorata*	Papilionaceae	june - july	sleepers	ecological - social	2
45	Siucahuito	*Solanum estroites*	Solanaceae		medicinal	ecological	3
46	Tahuari	*Tabebuia sp.*	Bignoniaceae	august - september	construction	ecological	2
47	Tahuari amarillo	*Tabebuia serratifolia*	Bignoniaceae	august - september	wood for construction, sleepers	ecological - social	1
48	Tangarana negra	*Triplaris cf.*	Poligonaceae		posts, charts	ecological	3
49	Topa	*Ochroma pyramidale*	Bombacaceae	august - september	floats, toyshop	ecological	1
50	Uchumullaca c.	*Alchornea triplinervia*			construction rural	ecological	3
51	Ucshaquiro blanco	*Tachigalia sp*	Caesalpiniaceae	february - march	wood for muebles	ecological	3
52	Yacushapana amarill	*Terminalia oblonga*	Combretaceae	august - september	wood for muebles, construction rural	ecological	1
53	Yacushapana negra	*Terminalia amazonica*	Combretaceae	september - october	wood for construction, firewood	ecological	1
54	Yutubanco	*Hymenaea oblogifolia*	Caesalpiniaceae	april - may	rope, posts	ecological	3

Prioridad:
(1) high
(2) medium
(3) lowers

SQUARE 10. RELATION OF SPECIES FOREST EXOTIC USED IN REHEARSAL OF REHABILITATION LANDS DEGRADED IN THE TROPICAL AND PRIORITY OF USE FOR THE AMAZON

N°	SPECIES	LOCATED THE REHEARSAL	YEARS	SISTEM OF INSTALLATION	RESULTS	OBSERVATION OF THE SPECIE	PRIORITY
1	*Acacia auriculiformis*	Nganjuk	1937	Plantation in open field	good		2
2	*Acacia cadam*	Titibungur	1940	Plantation in arrays	very good		2
3	*Acacia nelanoxylon*	Rwanda	1990	Plantation in open field	excellent		2
4	*Acacia sicarpa*	Jayapura	1957	Plantation in open field	excellent		2
5	*Acacia guachapele*	Brasil	1994	Plantation in open field	good	In soil fertility poor	1
6	*Acacia auriculiformis*	Australia	1990	Plantation in open field	excellent	adapts soil acids, protection against fire	1
7	*Acacia crassicarpa*	Australia	1990	Plantation in open field	good	In soil acids	1
8	*Acacia aulacocarpa*	Australia	1990	Plantation in open field	very good	Protection against fire (covering)	1
9	*Acacia mangimun*	Australia	1990	Plantation in open field	good	Protection against the winds	2
10	*Agathis sp.*	Jayapura	1957	Plantation in open field	excellent		2
11	*Aghatis labillardieri*	Jayapura	1957	Plantation in open field	excellent		2
12	*Albizia saman*	Brasil	1994	Plantation in open field	good	poor soil in nitrogen and phospate	1
13	*Aeschynomene sp.*	Sumatra meridional	1940	Plantation in open field	good	Protection of soil	1
14	*Anthocephalus cadamba*	Java (Natar)	1940	Plantation in open field	Regulate	Afeccted for weed	2
15	*Byrsonima spicata*	Trinidad (caribe)	1944	natural regenaration	good	Disseminated for birds and bats	2
16	*Blumea balsamifera*	Sumatra meridional	1940	Plantation in strips	good	Protection contra el fuego (covering)	1
17	*Cassia sp.*	Jayapura	1957	Plantation (?)	excellent		2
18	*Cedrela odorata*	Ecuador	1945	Plantation (?)	good	Explotation intensive of the specie	3
19	*Cecropia sp.*	Brasil	1990	Plantation in open field	good		2
20	*Cordia alliodora*	República Dominicana	1990	Plantation (?)	very good	Soils of lower fertility	1
21	*Cratylia argentia*	Colombia	1990	Plantation in open field	very good	bush, food for cows	1
22	*Didymopanax morototoni*	Trinidad (caribe)	1944	natural regenaration	excellent	Disseminated for birds and bats	1
23	*Desmodium veluntinum*	Colombia	1990	Plantation in open field	very good	bush, food for cows	1
24	*Eupatorium pallescens*	Sumatra meridional	1937	Plantation in open field	Regulate		3
25	*Euphorbia geniculata*	Sumatra meridional	1937	Plantation in open field	Regulate		3
26	*Eucalyptus deglupta*	Filipinas	1975	Plantation in open field	excellent		3
27	*Eucalyptus saligna*	Jayapura	1957	Plantation in open field	excellent		3
28	*Eucalyptus tereticornis*	Brasil	1990	Plantation in open field	Regulate		3
29	*Erechtes hieracifolia*	Sumatra meridional	1940	Plantation in strips	good	Protection against fire (covering)	1
30	*Esclerobium paniculatum*	Brasil	1994	Plantation in open field	good	poor soil in nitrogen and phospate	1
31	*Gmelina arborea*	Filipinas	1975	Plantation in open field	excellent		2
32	*Hieronyma caribae*	Trinidad (caribe)	1944	natural regenaration	excellent	Disseminated for birds and bats	1
33	*Lantana camara*	Sumatra meridional	1940	Plantation in strips	good	Protection against fire	1
34	*Leucaena sp*		1940	Plantation (?)	negative	hight percentage of death	3
35	*Leucaena glauca*	Sumatra meridional	1937	Plantation in open field	Regulate		2
36	*Leucaena diversifolia*	Rwanda	1990	Plantation in open field	negative	lowers adaptability on soil acids.	3
37	*Melastoma malabathricum*	Sumatra meridional	1940	Plantation in strips	good	Protection against fire	1
38	*Mimosa scabella*	Rwanda	1990	Plantation in open field	excellent		2
39	*Ochroma bicolor*	Karangsarie	1937	Plantation in open field	good		2
40	*Ochroma tomentosa*	Bantam	1940	Plantation in open field	bad	percentage hight of death	2
41	*Ochroma lagopus*	America tropical	1938	Plantation in open field	bad	percentage hight of death	2
43	*Ochroma sp. (balso)*	Java	1939	Plantation in open field	good	wood sawed	2
42	*Octomeles sumatra*	Jayapura	1957	Plantation in open field	good		1
44	*Pterocarpus indicus*	Jayapura	1957	Plantation in open field	good		1
45	*Sesbania sesban*	Sumatra meridional	1940	Plantation in open field	good	Protection against fire	1
46	*Schima bancana*	Sumatra meridional	1940	Plantation in strips	good	Protection against fire	1
47	*Schima sp.*	Sumatra meridional	1937	Plantation in open field	Regulate		3
48	*Shorea javanica*	Java	1940	Plantation (?)	good	wood sawed	2
49	*Shorea ovalis*	Java	1940	Plantation (?)	good	wood sawed	2
50	*Shorea sp.*	Java	1940	Plantation (?)	good	wood sawed	2
51	*Stryphnodendron excelsum*	Costa Rica	1990	Plantation in open field	excellent	Rehability of pastures degraded	1
52	*Tabebuia serratifolia*	Trinidad (caribe)	1944	natural regenaration	good		1
53	*Tephrosia sp.*	Titibungur	1940	Plantation in arrays	good		2
54	*Terminalia obovata*	Trinidad (caribe)	1944	natural regenaration	good		1
55	*Terminalia amazonia*	Costa Rica	1989	Plantation in open field	excellent	Pastures y lands degraded in general	1

Priority:

(1) hight

(2) mediate

(3) lowers

SQUARE 11. QUANTIFICATION OF THE DEVELOPMENT STATE (VIGOR) OF THE INDIVIDUALS, FOR PARCEL AND EVALUATION

PARCELS (number)	1° EVALUATION			2° EVALUATION			3° EVALUATION		
	VIGOR (code)			VIGOR (code)			VIGOR (code)		
	1	*2*	*3*	*1*	*2*	*3*	*1*	*2*	*3*
1	48	36	21	55	35	10	89	2	0
2	42	53	15	54	35	11	82	13	3
3	16	58	40	41	39	20	47	30	21
4	46	47	24	58	37	9	44	40	17
5	15	59	44	27	58	23	11	42	50
6	46	42	17	59	28	10	29	56	11
7	36	44	19	45	29	10	32	43	12
8	56	46	17	57	40	9	100	5	0
9	15	50	43	49	42	7	55	36	5
TOTAL	320	435	240	445	344	109	489	271	119

SQUARE 12. QUANTIFICATION OF THE VIGOR OF THE INDIVIDUALS FOR SPECIES AND FOR EVALUATION.				
SPECIES (code)	VIGOR (code)	1° EVALUATION (quantity)	2° EVALUATION (quantity)	3° EVALUATION (quantity)
1	1	64	90	98
	2	96	72	63
	3	19	18	19
2	1	58	99	115
	2	65	41	27
	3	51	16	9
3	1	73	78	85
	2	79	71	64
	3	24	23	26
4	1	16	8	7
	2	35	12	5
	3	59	17	15
5	1	27	61	73
	2	85	86	53
	3	65	23	37
6	1	81	108	118
	2	75	59	47
	3	21	12	12

Collection place: Environment of the highway "Campo verde - Nueva Requena", Ucayali region.
It dates of collection: March and April of 1998.
Collectors: Manuel Soudre, Ysela Carbajal.
Characteristic of the places: Used in agriculture, periods of rest of 2 to 14 years, annual frequency of fires, floors with sandy texture franc, plane relief, landscape dominated by the following species invasoras: *Imperata brasiliensis, Rottboelia exaltata, Baccharis floribunda* .

SQUARE 13. RELATIONSHIP OF FOUND SPECIES IN 9 EXPERIMENTAL PARCELS.			
N°	Names common	Names scientific	Family
1	Cashupsha	*Imperata brasiliensis*	
2	Arrocillo	*Rottboelia exaltata*	Poaceae
3	Sachahuaca	*Baccharis floribunda*	Compositaceae
4	Lengua de perro	*Pseudoelephantopus sp.*	
5	Kudzu	*Pueraria phaseoloides*	
6	Sensitiva	*Mimosa pudica*	
7	Escama de pescado	*N.N*	
8	Pega pega	*Desmodium tortuosum*	
9	Tahuari	*Tabebuia sp.*	
10	Chanca piedra	*Phyllanthus ninuri*	
11	Yute	*Urena lobata*	
12	coquito	*Fimbristytis amua*	Cyperaceae
13	Liana1	*N.N*	Cyperaceae
14	Remolino	*Paspalum virgatum*	
15	Hoja ancha desconocido	*N.N*	
16	Braquiaria	*Brachyaria decumbens*	
17	Liana2	*N.N*	
18	Bellaco caspi	*Himathantus*	
19	Pajilla	*Digitaria sanginalis*	
20	Borreria	*Borreria laevis*	
21	Guayaba	*Psidium guajaba*	Myrtaceae
22	Sacha oregano	*Lantana camara*	Verbenaceae
23	Puru puru	*N.N*	
24	Liana3	*N.N*	
25	Huamanzamana negra	*Dictyoloma peruvianum*	
26	Pichana peluda	*Pseudoelephantopus sp.*	
27	Piojillo	*Hyptis capitata*	
28	Sacha ocuera	*N.N*	
29	Yuyo verdolaga	*Talinum paniculatum*	
30	Bijauillo	*N.N*	
31	Ocuera	*Vernonia baccharoides*	Asteraceae
32	Pichana amarilla	*Croton trinitatis*	Euphorbiaceae
33	Liana4	*N.N*	
34	Liana5	*N.N*	
35	Pucaquiro	*N.N*	
36	Pasto elefante	*Andropogon sp.*	Gramineae
37	Desconocido1	*N.N*	
38	Desconocido2	*N.N*	
39	Shapumba	*Pteridium aquilinum*	Polypodiaceae
40	Cola de caballo	*Andropogon bicornis*	Gramineae
41	Pichana peluda	*N.N*	
42	Yaragua	*Hyparrhenia rufa*	
43	Cortadera	*Scleria pterota*	Cyperaceae
44	Carrocillo	*Pennisetum purpureum*	Gramineae
45	Añallo caspi	*Cordia Ucayalensis*	Boraginaceae

It dates of collection: 9 at June 11 1998
Collector: Shigeo Kobayashi.
Characteristic of the place: Use agricultural previous, period of rest: 14, 1 and 2 years, annual frequency of fires, floors with texture loamy franc, sandy franc and sandy franc, plane fisiografia, overgrowth species invasoras of more dominancia: *Imperata brasiliensis, Rottboelia exaltata, Baccharis floribunda* , in order respective.

SQUARE 14. RELATIONSHIP OF IDENTIFIED SPECIES PRELIMINARILY.			
Code	Names common	Names scientific	Family
A1	kudzú	*Pueraria phaseoloides*	
A2	Desconocido	*N.N*	
A3	Desconocido	*N.N*	
A4	Desconocido	*N.N*	
A5	Desconocido	*N.N*	
A6	Arrocillo	*N.N*	
A7	kudzú	*Pueraria phaseoloides*	
A8	Desconocido	*N.N*	
A9	Chanca piedra	*N.N*	
A10	Sin muestra	*N.N*	
A11	Pichana peluda	*N.N*	
A12	Desconocida (liana)	*N.N*	Apocinaceae
A13	hoja ancha (liana)	*N.N*	Euphorbiaceae
A14	Desconocido	*N.N*	
A15	Desconocido (arbusto)	*N.N*	
A16	Desconocido	*N.N*	
A17	Sacha oregano	*Hiptis sp.*	
A18	Desconocido	*N.N*	Asteraceae
A19	Sacha tabaco	*Solanum sp.*	
A20	Desconocido	*Lantana sp.*	Verbenaceae
A21	Lengua de perro	*N.N*	
A22	Desconocido	*Cucunis sp.*	Cucurbitaceae
A23	Bijahuillo	*Yschonshae sp.*	Marantaceae
A24	Ocuera	*Vernonia sp.*	
A25	Desconocido	*N.N*	
A26	Campanilla(liana)	*Ypomea*	
A27	Desconocido	*Panicum pilosum*	
A28	Ocuera blanca	*Solanum Verbeniflora*	
A29	Desconocido	*N.N*	
A30	Desconocido	*Hyparrhenia sp.*	
A31	Desconopcido	*N.N*	Asteraceae
A32	Desconocido	*Dyctioloma peruvianum*	Rutaceae
A33	Desconocido	*Borreria*	Rubiaceae
A34	Desconocido	*N.N*	
A35	Gramalote	*N.N*	
A36	Desconocido	*Fimbrintylis sp.*	
A37	Desconocido	*Bideris*	
A38	Desconocido(liana)	*N.N*	
A39	Torurco del bajo	*Paspalum sp.*	
A40	Desconocido	*Solanum sp.*	
A41	Liana	*Malphigiaceae*	
A42	Carricillo	*Lirianthus*	
A43	Amor seco	*Desmodiun tortuosum*	
A44	Torurco de altura	*Axonupus sp.*	
A45	Desconocido(liana)	*N.N*	
A46	Desconocido	*N.N*	Rubiaceae
A47	Sacha palillo	*Clidemia sp.*	
A48	Sacha coconilla	*Solanum sp.*	
A49	Desconocido(liana)	*N.N*	Rubiaceae
A50	Desconocido(liana)	*N.N*	Malpigiaceae

Collector: Shigeo.
Time of drying: 30 hours
Drying temperature: 80 °C

SQUARE 15. FIRST DETERMINATION OF BIOMASS AND LITTER IN PARCELS WITH TREATMENT AND PARCELS NATURAL.								
N°	Parcels (code)	Sample (code)	Overgrowth main (Common N.)	Total weight fresh in 1m2 (gr.)	Weight fresh of sub-sample (gr.)	Weight dry sub-sample (gr.)	Total Biomass (Tn/ha)	Date of collects
1	1	Biomass	Cashupsha	1,830.0	130.0	35.0	4.9	09/06/1998
2	1	Litter	Cashupsha	420.0 *	105.0	88.0	3.5	09/06/1998
3	3	Biomass	Arrocillo	590.0	170.0	33.5	1.2	10/06/1998
4	3	Litter	Arrocillo	520.0 *	130.0	105.0	4.2	10/06/1998
5	3-natural	Biomass	Arrocillo	920.0	185.0	70.0	3.5	10/06/1998
6	3-pasture	Biomass	Brachyaria	1,630.0	100.0	54.0	8.8	10/06/1998
7	8(S-1)	Biomass	Sachahuaca	7,080.0	180.0	27.5	10.8	11/06/1998
8	8(S-1)	Litter	Sachahuaca	960.0 *	130.0	113.0	8.3	11/06/1998
9	8-natural	Biomass	Sachahuaca	21,990.0	360.0	110.0	67.2	11/06/1998

* The initial Weight is the fourth part of the signal value, because the sample took of 0.25m2

Collectors: Manuel, Ysela
Time of drying: 30 hours
Drying temperature: 80 °C

SQUARE 16. SECOND DETERMINATION OF BIOMASS AND LITTER IN PARCELS WITH TREATMENT AND PARCELS NATURAL.								
N°	Parcels (code)	Sample (code)	Overgrowth main (Common N.)	Total weight fresh in 1m2 (gr.)	Weight fresh of sub-sample (gr.)	Weight dry sub-sample (gr.)	Total Biomass (Tn/ha)	Date of collects
1	1	Biomass	Cashupsha	1,535.0	185.0	77.0	6.4	28/01/1999
2	1	Litter	Cashupsha	1,780.0 *	135.0	62.0	8.3	28/01/1999
3	3	Biomass	Arrocillo	1,745.0	245.0	72.0	5.1	28/01/1999
4	3	Litter	Arrocillo	4,040.0 *	155.0	43.5	11.4	28/01/1999
5	3-control	Biomass	Arrocillo	1,685.0	195.0	91.0	7.9	28/01/1999
6	3-pasture	Biomass	Brachyaria	1,435.0	185.0	53.5	4.2	28/01/1999
7	8(S-1)	Biomass	Sachahuaca	2,335.0	285.0	95.0	7.8	28/01/1999
8	8(S-1)	Litter	Sachahuaca	460.0 *	115.0	49.0	2.0	28/01/1999
9	8(S-2)	Biomass	Sachahuaca	2,155.0	345.0	94.0	5.9	28/01/1999

* The initial Weight is the fourth part of the signal value, because the sample took of 0.25m2

SOIL - ANNEX

Quantity of roots	Code
Abundant	1
Regular	2
Scarce	3
None	4

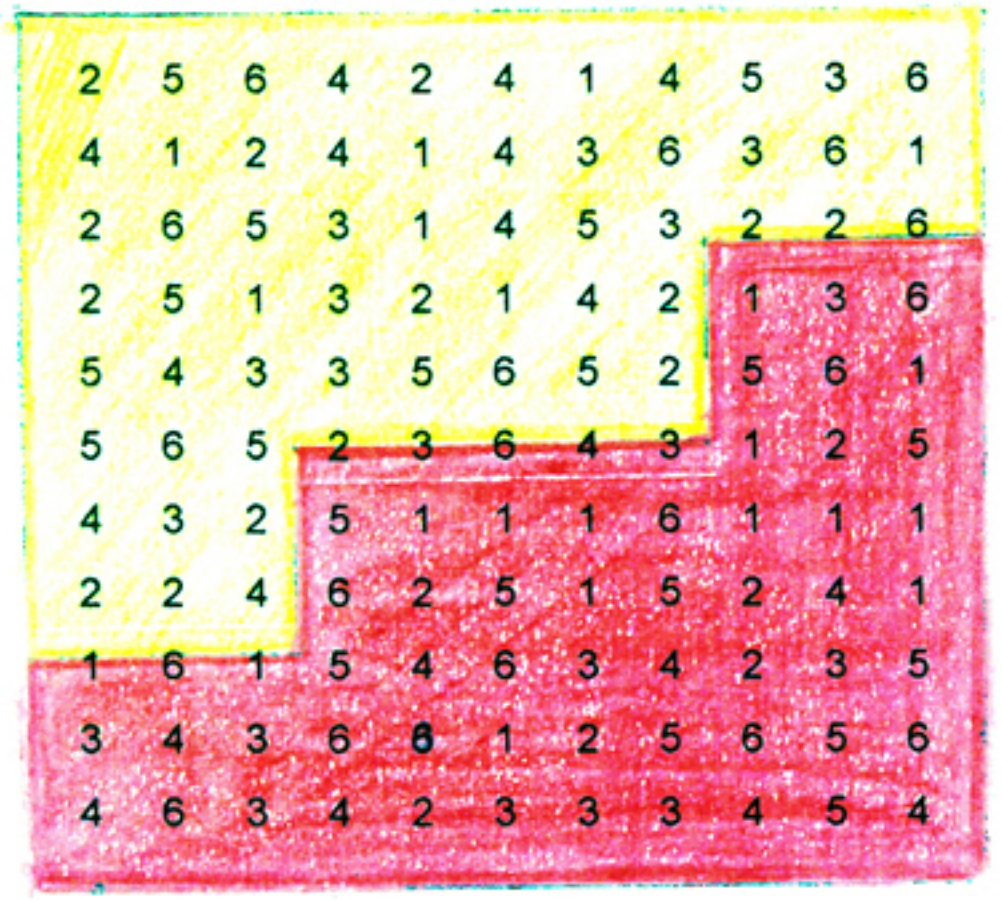
Diameter of Roots	Code
Trick (> 5mm)	A
Medium (2-5mm)	B
Fine (1-2mm)	C
Very fine (< 1mm)	D

Infiltration (cm^3/min)	Class
< 10 - 12.5	Very slow
12.5 - 50	Slow
50 - 200	Moderately slow
200 - 620	Moderate
620 - 900	Moderately fast
> 900	Fast

Soil reaction	Ph
Descript	**Rango**
Extremely acidic	< 4.5
Very strongly acidic	4.5 - 5.0
Strongly acidic	5.1 - 5.5
Moderately acidic	5.6 - 6.0
Lightly acidic	6.1 - 6.5
Neutral	6.6 - 7.3
Lightly alkaline	1.4 – 7.8
Moderately alkaline	7.9 - 8.4
Strongly alkaline	8.5 - 9.0
Very strongly alkaline	> 9.0

TEXTURAL		
General terms		Clase Textural
Soil	Textural	
Sandy	Thick	Sand Frank sand
Franc	Moderately thick	Sandy Franc
	Mediate	Franc Franc ozzy ozzy
	Moderately fine	Loamy franc Sandy clay franc Ozzy clay franc
Loamy	Fine	Sandy clay Ozzy clay clay

PARCELA: 1 (S. GRANDEZ)



LOAMY FRANC

FRANC

1: YACUSHAPANA

2: PASHACO

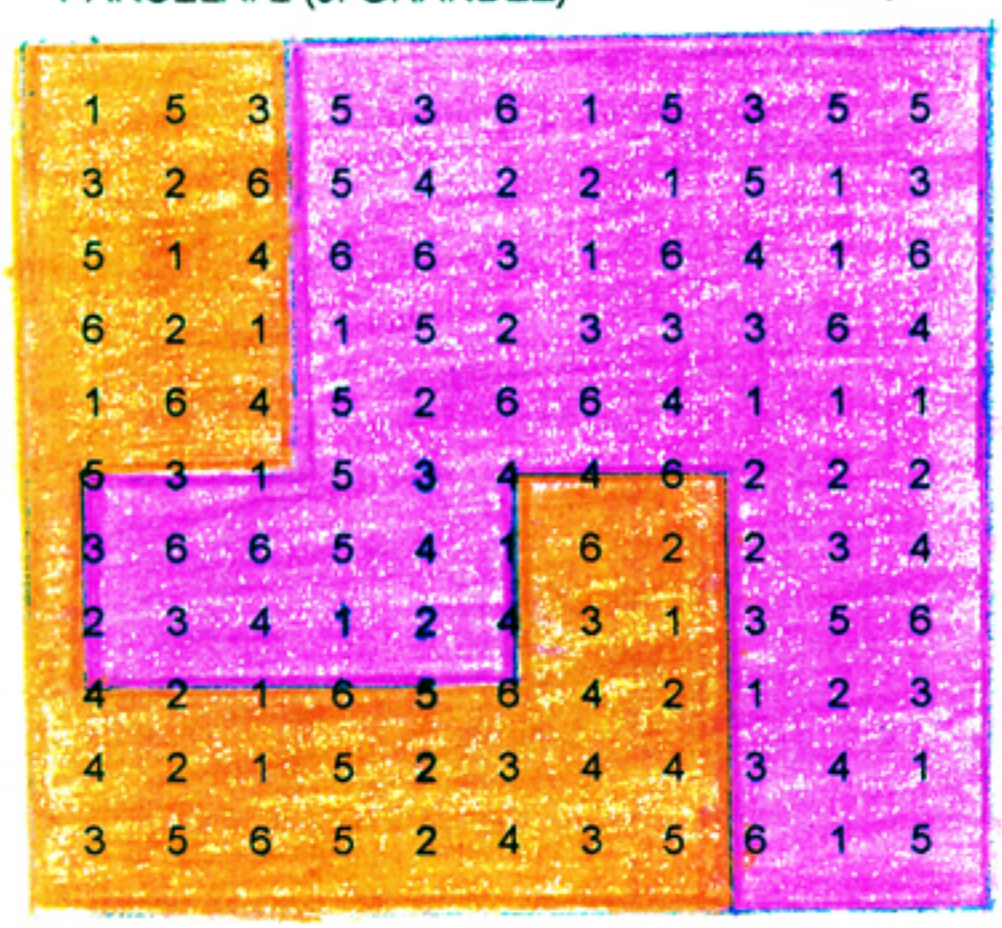
3: TAHUARI

4: TORNILLO

5: ISHPINGO

6: CAPIRONA.

PARCELA: 2 (J. GRANDEZ)



FRANK SAND

SANDY FRANC

1: YACUSHAPANA

2: PASHACO

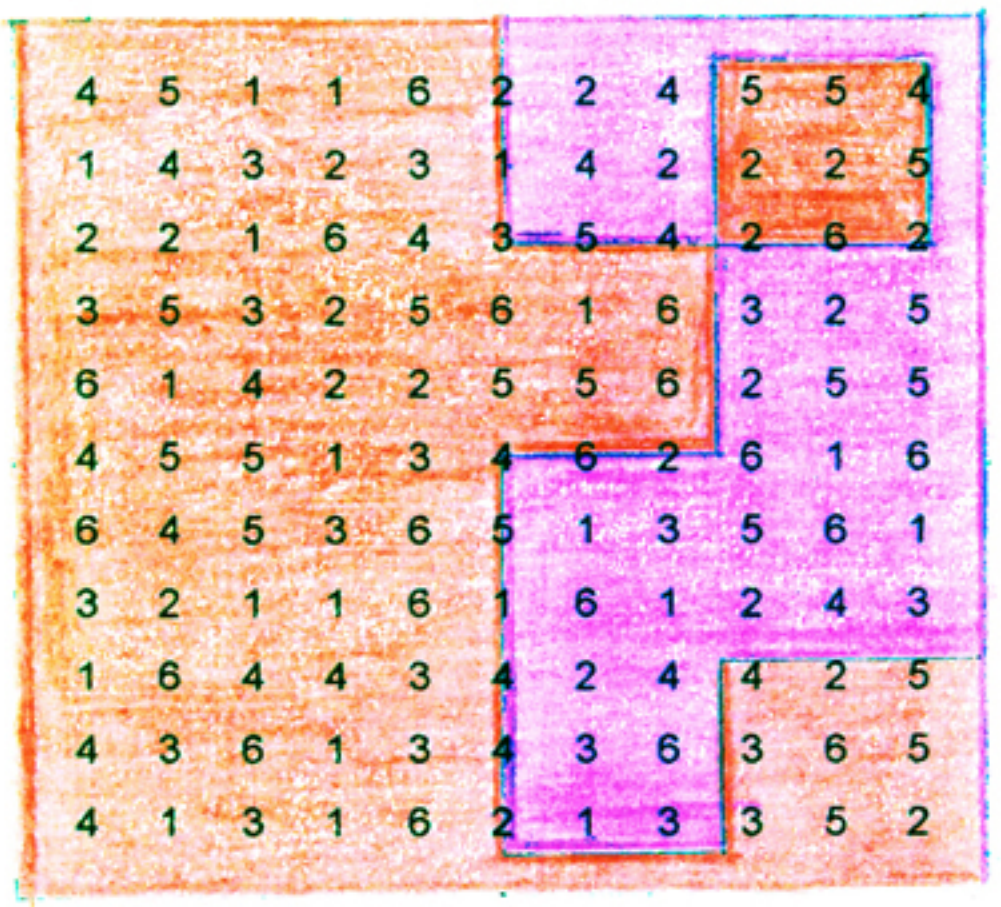
3: TAHUARI

4: TORNILLO

5: ISHPINGO

6: CAPIRONA.

PARCELA: 3 (S. ASPAJO)



SANDY FRANC

FRANC

1: YACUSHAPANA

2: PASHACO

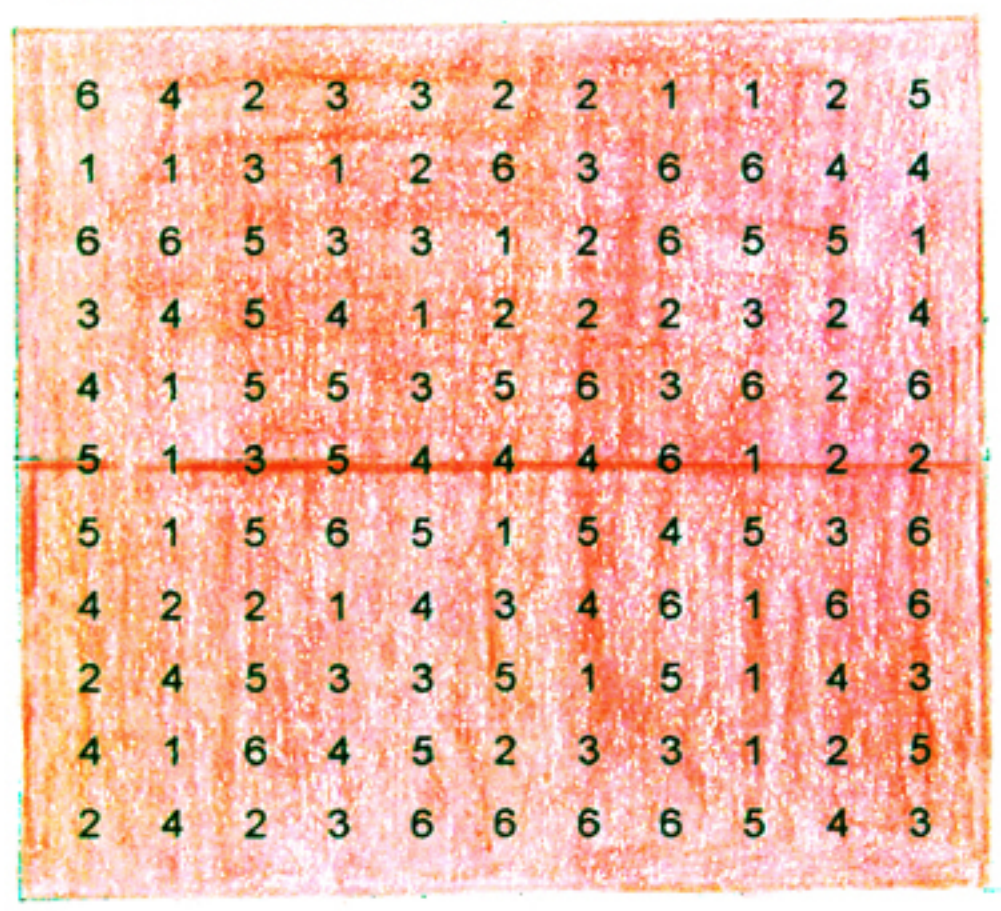
3: TAHUARI

4: TORNILLO

5: ISHPINGO

6: CAPIRONA.

PARCELA: 4 (J. TENAZOA)



FRANC

1: YACUSHAPANA

2: PASHACO

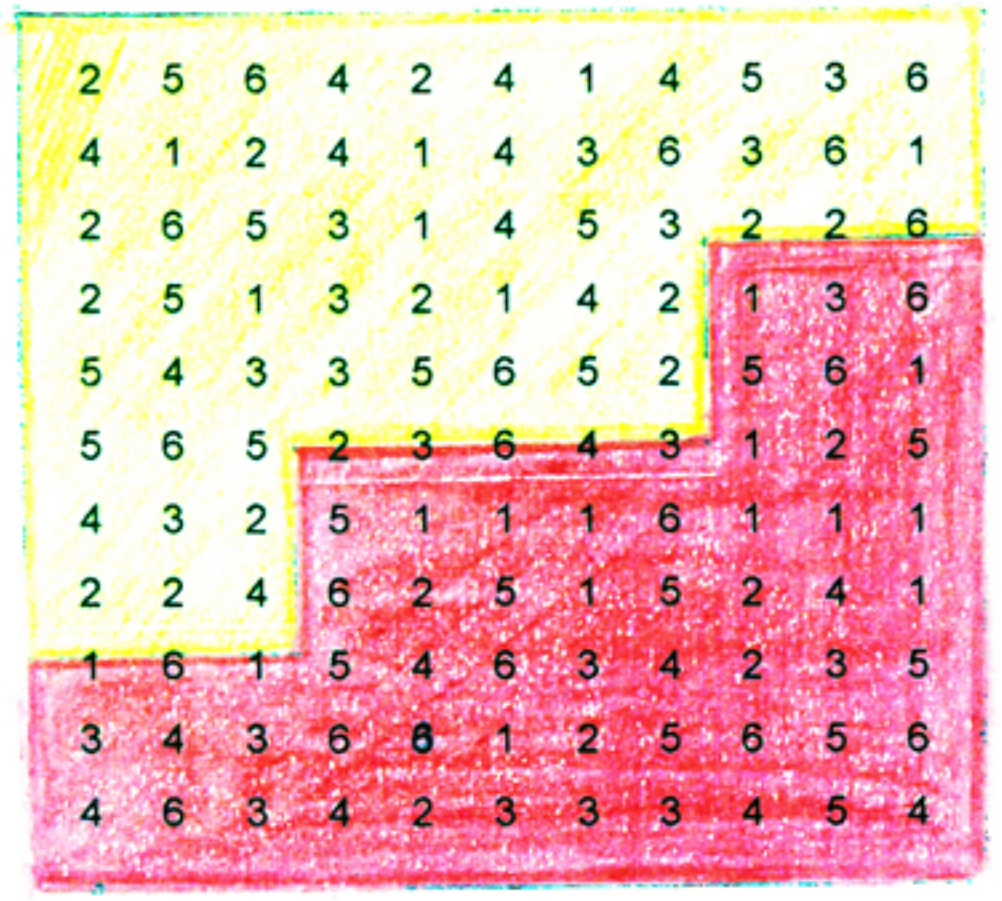
3: TAHUARI

4: TORNILLO

5: ISHPINGO

6: CAPIRONA.

PARCELA: 1 (S. GRANDEZ)



LOAMY FRANC

FRANC

1: YACUSHAPANA

2: PASHACO

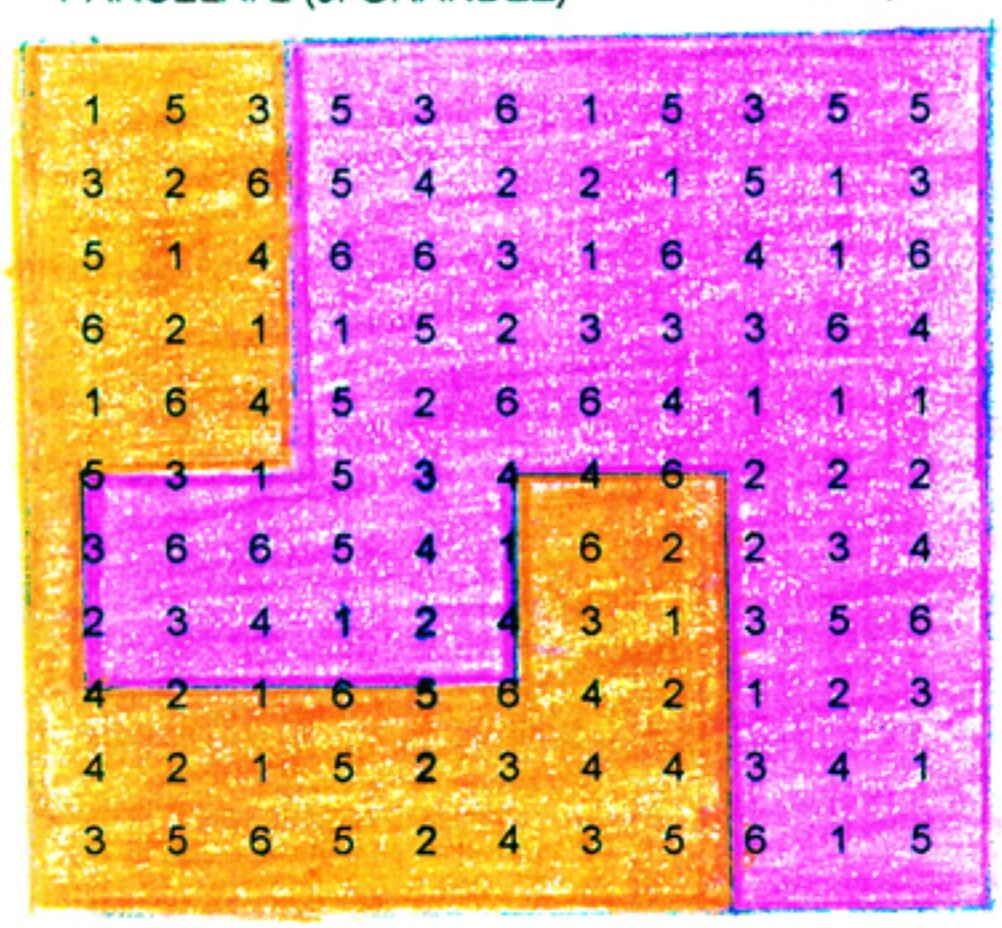
3: TAHUARI

4: TORNILLO

5: ISHPINGO

6: CAPIRONA.

PARCELA: 2 (J. GRANDEZ)



FRANK SAND

SANDY FRANC

1: YACUSHAPANA

2: PASHACO

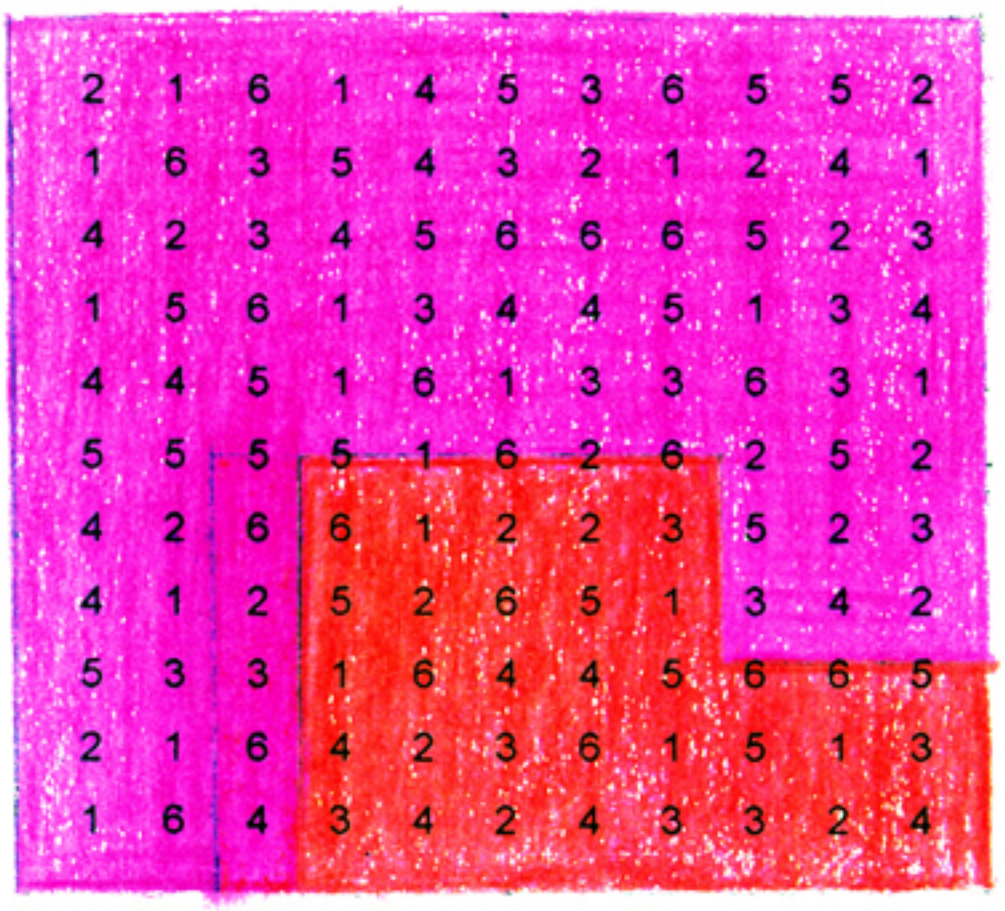
3: TAHUARI

4: TORNILLO

5: ISHPINGO

6: CAPIRONA.

PARCELA: 5 (J. ARIRAMA)

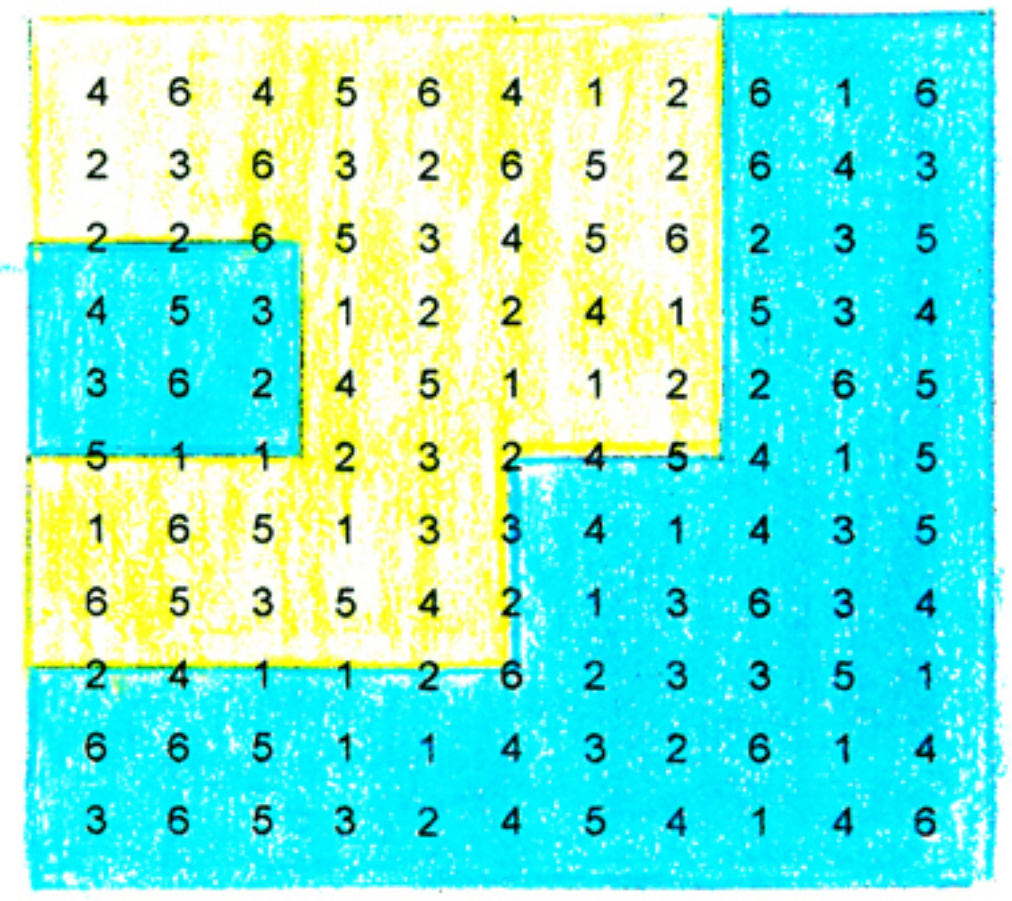


SANDY FRANC

FRANC

1: YACUSHAPANA
2: PASHACO
3: TAHUARI
4: TORNILLO
5: ISHPINGO
6: CAPIRONA.

PARCELA: 6 (J. RIOS)

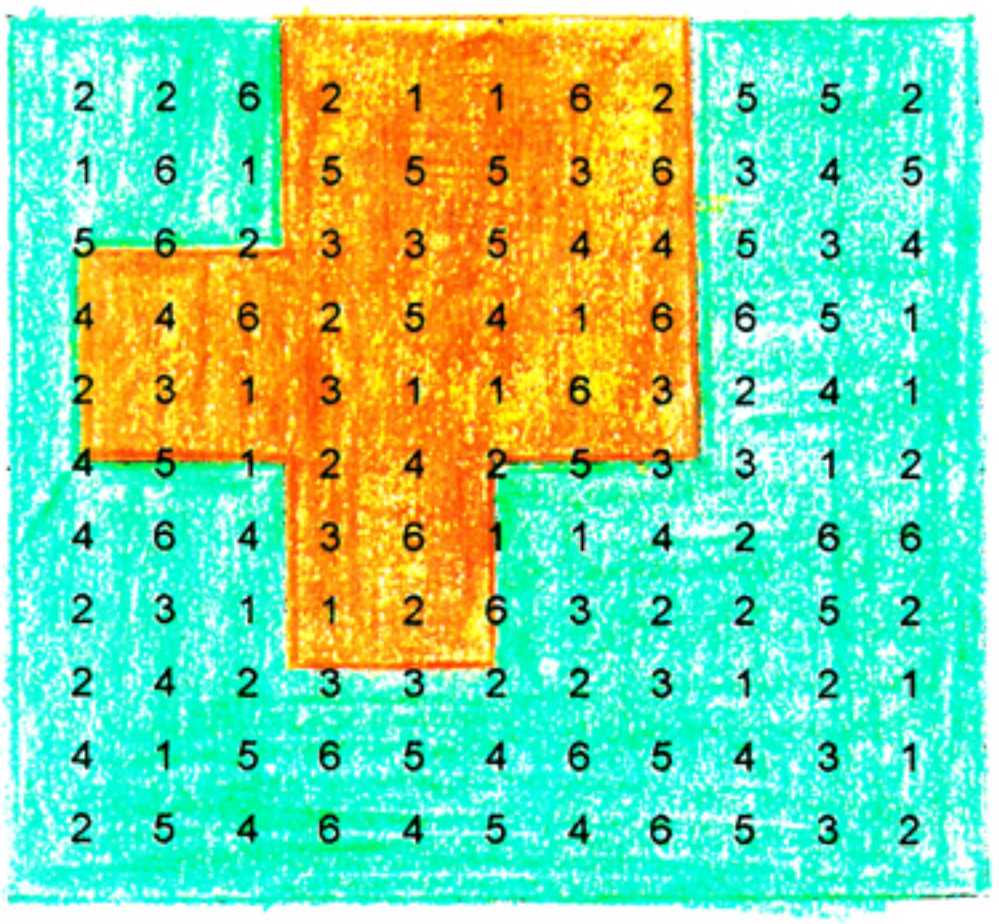


LOAMY FRANC

OOZY FRANC

1: YACUSHAPANA
2: PASHACO
3: TAHUARI
4: TORNILLO
5: ISHPINGO
6: CAPIRONA.

PARCELA: 7 (A. FLORES)



N

FRANK SAND

SAND

1: YACUSHAPANA

2: PASHACO

3: TAHUARI

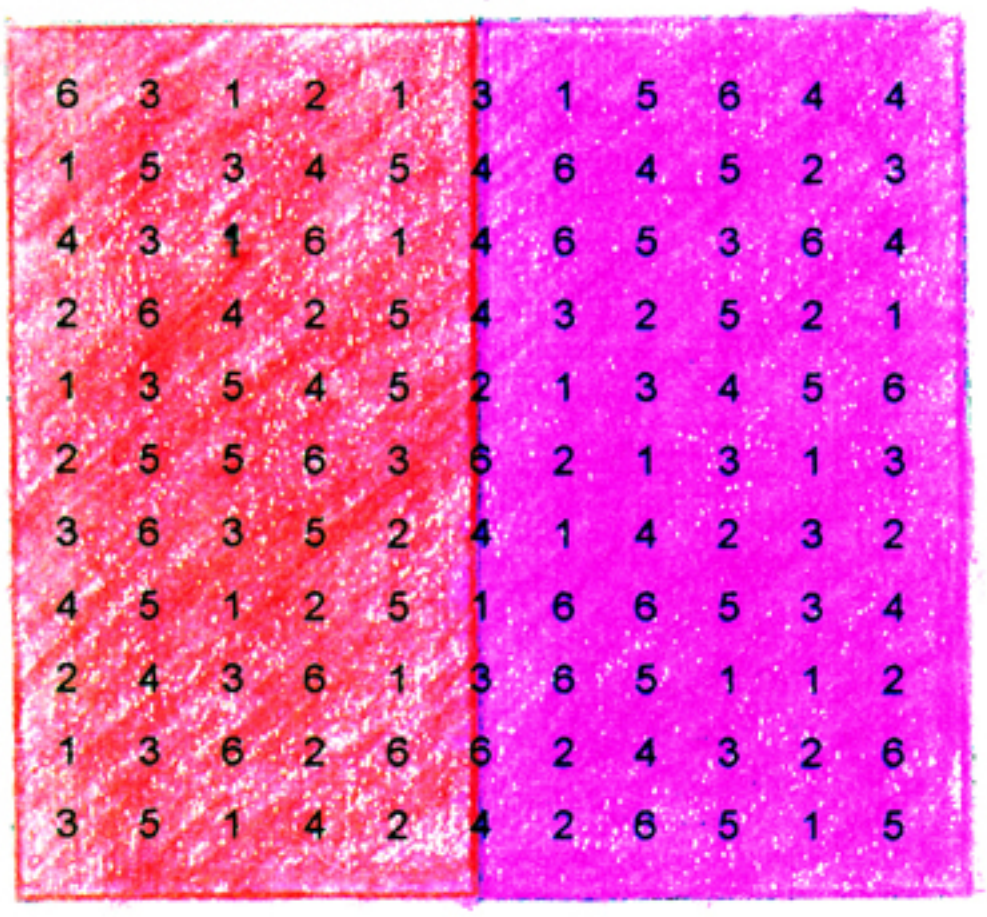
4: TORNILLO

5: ISHPINGO

6: CAPIRONA.

PARCELA: 8 (V. FLORES)

N



SANDY FRANCO

FRANCO

1: YACUSHAPANA

2: PASHACO

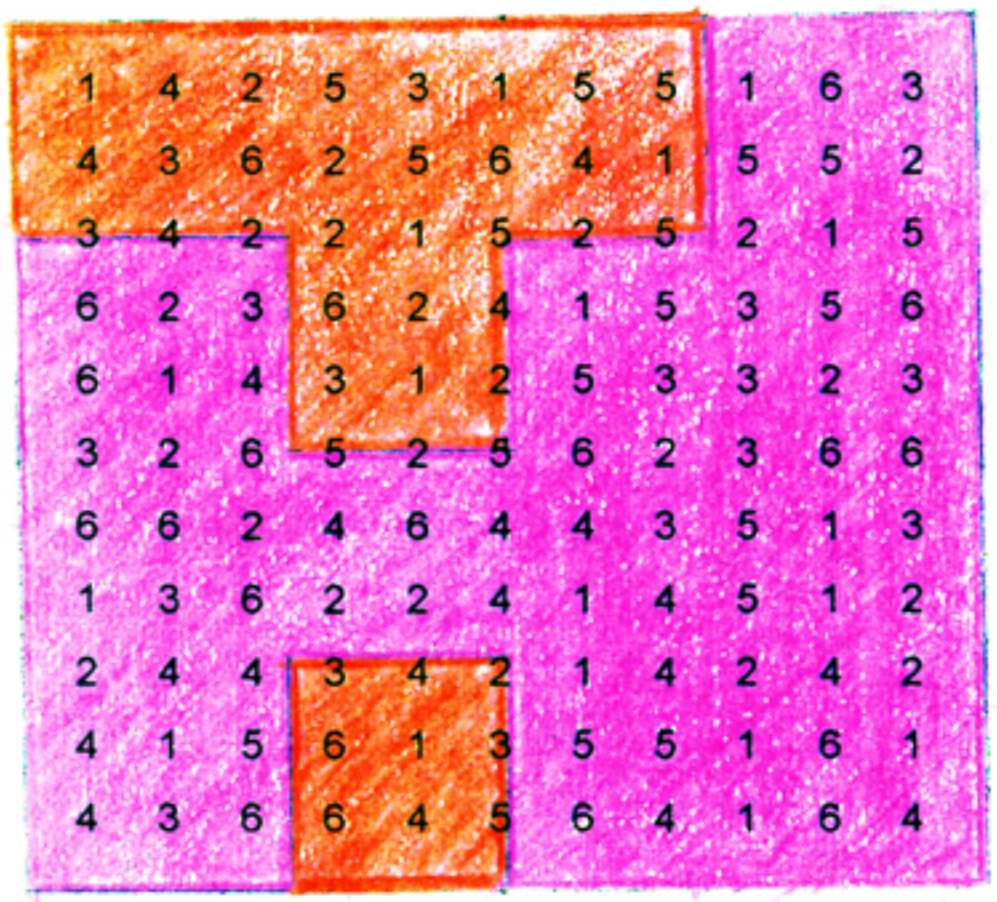
3: TAHUARI

4: TORNILLO

5: ISHPINGO

6: CAPIRONA.

PARCELA: 9 (F. VARGAS)



N

SANDY FRANC

FRANC

1: YACUSHAPANA

2: PASHACO

3: TAHUARI

4: TORNILLO

5: ISHPINGO

6: CAPIRONA.

Rottboellia exaltata (arrocillo): in a "purma" of 2 year-old.

Imperata brasiliensis (cashupsha): it is an indicative species of degraded lands.

The system of roots of Imperata brasilensis is a means of propagation for the species.

Baccharis floribunda (sachahuaca):
in "purma" of 3 year-old.

The wide system of roots of *Baccharis floribunda* can reach until 2.5 m of diameter.

Evaluation of height of the species *Calycophyllum spruceanum* in a "purma" with domain of the overgrowth *Imperata brasiliensis*.

Technique of the "filler": incorporating in the hole the portion of organic soil.

2. DATA DIRECTORY

Directory N° : 1.0.0 (Key info)-1.34.11 (Data info.)
Name of Data Set : Undergrowth species composition and density, soil, biomass, adaptability, condition of plantation.
Responsible Data Manager : Auberto Ricse and Manuel Soudre.
Period of Data Collection : 1 february - 30 december 1998
Data collectors : Shigeo Kobayashi, Manuel Soudre and Ysela Carbajal.
Media or Style of Data : Computer files
File Format : Microsoft Excell 97.
Latest Revision (Update) : January 1999
Availability of data : Permissions from the data manager and the leader is required.
Publication : Project annual report 1998.
Method of Data Collection : 1m x 1m quadrate for species composition BOTANAL method, 1m x 1m for biomass, 0.5m x 0.5m for litter and soil.

A) Key information

1. Research Project. Rehabilitation of Degraded Tropical Forest Ecosystems (CIFOR/Japan Research Project)
1.2 Sub-project: Rehabilitation methods in second-growth forests and degrades lands in the Ucayali region of the Peruvian Amazon.
1.2.3 Activity.

B) Data information

1. General information
1.2 Activity name (project manager): Initial performance of 6 tree species under the influence of 3 types of cover in purmas fallow along the Campo Verde - Nueva Requena highway in the Ucayali region. Project manager: Ing. M.Sc. Auberto Ricse.
1.3 Experimental site
1.3.1 Site
1.3.1.1 Name: Between the districts of Campo Verde and Nueva Requena.
1.3.1.2 Location (map): Figure # 1. In the political region of Ucayali, in the Province of Coronel Portillo, including 12 km along the highway between the districts of Campo Verde and Nueva Requena. Geographically located between 8° 19' 36"and 8° 24'30" S and between 74° 49' 06"and 74° 51' 40" E.
1.3.1.3 Size of experimental plot (design of plot): 9 plot of 40m2 with a total area of 1,600 m2.
1.3.1.4 Landform: surface area is flat, level 1, a flat to slightly undulating relief with slopes that vary between 1 - 8%.
1.3.1.5 Treatment of plot:
Treatment 1: Biophysical characterization pre and post experimental plantation.
Treatment 2: Blocking and random distribution of weeds and 6 tree species (totaling 120 plants per plot) in each plantation, with three repetitions.
1.3.1.6 Land utilization history: During the past 35 years this area has been opened to agricultural cultivation, and during the last 15 years, livestock production. The majority of farmers are characterized by allotting approximately 8 - 10 % of farm surface area to the cultivation of rice, corn, yucca and plantain during the first 2 - 3 years after first slashing and burning the forest. Due to loss of soil fertility the farmer leaves the land to rest, returning later to use the land for other rotations. The infertile areas are abandoned for approximately 10 - 15 years.
1.3.2 Forest and vegetation
1.3.2.1 Forest type: the general landscape of the study area is comprised of herbaceous, shrubby and tree species with 60%, 30 % and 10%, respectively, surface area coverage. The primary types are composed of the following species in the order of importance: *Brachiaria decumbens* , (Braquiaria), I*mperata brasiliensis* (Cashupsha), *Rottboellia exaltata* (Arrocillo), *Pueraria phaseoloides* (Kudzú); native pastures of the genera: Homolepis, Paspalum, Axonopus (Torurcos) and *Andropogon bicornis* (Cola de zorro). The second type is: *Inga edulis* (Guaba), *Cecropia engleriana* (Cetico), *Croton tessmannii* (Auca - atadijo), *Heliocarpus popayanensis* (Llausaquiro), *Cordia sp* . (Añallo caspi), *Jacaranda copaia* (Huamanzamana), *Ochroma pyramidale* (Topa); Family: Melastomataceas (Rifari) and *Tabebuia serratifolia* (Tahuarí amarillo).
1.3.2.2 Original dominant tree species composition: *Aspidosperma macrocarpon* (Pumaquiro), *Spondias monbin* (Ubos), *Simarouba amara* (Marupa), *Guarea kunthiana* (Requia negra), *Terminalia oblonga* (Yacushapana amarilla), *Amburana cearencis* (Ishpingo), *Cedrela odorata* (Cedro), *Hura crepintans* (Catahua), *Aspidosperma macravianum* (Quillobordón amarillo), and *Swietenia macrophyla* (Caoba).
1.3.2.3 Present dominant tree species composition: *Inga sp.* (Guaba), *Cecropia engleriana* (Cetico), *Croton tessmannii* (Auca atadijo), *Jacaranda copaia* (Huamanzamana), *Ochroma pyramidale* (Topa), and *Tabebuia serratifolia* (Tahuarí amarillo).
1.3.3 General soil
1.3.3.1 Soil type: Primarily Acrisol and Utisol with 80% and 20% respectively of the study area.
1.3.3.2 Parent material (dominate): Residual material and ancient alluvial deposits.
1.3.3.3. Soil profile: Two soil profiles A and B, the latter sub-profiles of B1, B21t, and B22.
1.3.3.4 Physical properties: the soils have sandy loam to clay loam texture; structure is fine granular to fine blocks; consistency when wetted is very friable; density of soil at a water content of 25% is 2.65 g/cc.
1.3.3.5 Chemical properties: Isolated at 10 cm depth the soil is highlighted by an elevated aluminum saturation (> 60%), low organic material content (< 2 %), variable pH from acidic to very acidic, low phosphorous content (<7 ppm), and a low cation exchange capacity (< 15meq/g)
1.3.4 General climate. No meteorological station exists at the study site, so the information is extrapolated from data from the nearest stations
1.3.4.1 Temperature
1.3.4.1.1 Monthly average: 23 °C to 26 °C
1.3.4.1.2 Monthly maximum: 32.1 °C
1.3.4.1.3 Monthly minimum: 17.4 °C
1.3.4.2 Precipitation.
1.3.4.2.1 Annual: 1,800 mm

1.3.4.2.2 Monthly: 59 to 217 mm
1.3.4.3 Evaporation.
1.3.4.3.1 Annual:
1.3.4.3.2 Monthly:
1.3.4.4 Soil water.
1.3.4.4.1 Monthly average:
1.3.4.4.2 Daily average:
1.3.4.5 Wind.
1.3.4.5.1 Monthly average speed: 3.5 Knots.
1.3.4.5.2 Monthly average direction: N (s).
1.3.4.6 Radiation
1.3.4.6.1 Annual:
1.3.4.6.2 Monthly average:
1.3.5 General Miscellaneous

2. Experimental plot before treatment.
2.1 Vegetation.
2.1.1 Tree census: two census were utilized - the first evaluated 100% of the surface area covered by the primary herbaceous species in 16 samples each 1m2 ("Botanal" method). The second quantified 100% of the primary shrubby species in 5 samples each 4 m2 (transect method).
2.1.1.1 Species composition: the association of the primary herbaceous weeds are: *Imperata brasiliensi* s and *Rottboellia exaltata* , followed by *Pueraria phaseoloide* s, *Brachiaria decumbens, Urena lobata* , *Cyperus sp* , and *Pseudoelephantopus sp.* The association of the primary shrubby plants are: *Baccharis floribunda* , followed by *Talinum paniculatum* , *Pueraria phaseoloides* , *Vernonia baccharoides, Hyparrhefia rufa, Pseudoelephantopus sp* ., and *Killingia sesquiflora*
2.1.1.2 Density: The average density was calculated for three primary covers or weeds A*) *Imperata brasiliensis* : 285 plants/m2. B**) *Rottboellia exaltat* a: 237 plants/m2. C***) *Baccharis floribunda* : 27 plants/m2.
2.1.1.3 D.B.H.:
2.1.1.4 Height: A*) 1.3 m; B**) 1.5 m; C***) 3 m.
2.1.1.5 Biomass: A*) 6.5 T/ha; B**) 6.3 T/ha; C***) 15.2 T/ha.
2.1.1.6 Miscellaneous: According to the features encountered on our experimental plots we were able to determine that the use intensity and the subsequent degradation in all of the plots was "strong", due to the shrubby and herbaceous species encountered, a marked scarceness of tree seed sources and regeneration, sufficiently prolonged periods of agricultural use, very low levels of biomass, and the height and floristic diversity in the majority of cases was not greater than 3 m and 9 species per plot
2.1.2 Sub-story and/or Under-story vegetation.
2.1.2.1 Species composition.
2.1.2.2 Biomass.
2.1.2.3 Under-story pattern and diversity.
2.1.2.4 Miscellaneous.
2.1.3 Regeneration status.
2.1.3.1 Seedlings species.
2.1.3.2 Seedling census.
2.1.3.2.1 Seedling dens
2.1.3.2.2 Seedling height.
2.1.3.2.3 Seedling mortality.
2.1.3.2.4 Miscellaneous.
2.2 Soil.
2.2.1 Soil profile description.
2.2.2 Soil physical properties.
2.2.3 Soil chemical properties.
2.2.4 Soil hydrogy.
2.2.5 Miscellaneous.
2.3 Microclimate.
2.3.1 Temperature.
2.3.1.1 Air temp.
2.3.2 Water regime.
2.3.2.1 Rainfall.
2.3.2.2 Stem flow.
2.3.2.3 Through fall.
2.3.2.4 Run off.
2.3.3.5 Soil water tension.
2.3.2.6 Relation between soil water tension and content.
2.3.2.7 Miscellaneous.
2.4 Socio-economics.
2.4.1 Value of stand.
2.4.2 Value of local society.
2.4.3 Social acceptance
2.4.4 Social effectiveness.
2.4.5 Miscellaneous.
2.5 Miscellaneous.

3.	Control plot.
3.1	Vegetation.
3.1.1	Tree census.
3.1.1.1	Species composition.
3.1.1.2	Density.
3.1.1.3	D.B.H.
3.1.1.4	Height.
3.1.1.5	Biomass.
3.1.1.6	Miscellaneous.
3.1.2	Sub-story and/or Under-story vegetation.
3.1.2.1	Species composition: *Pueraria phaseoloides, Hiptis sp, Solanum sp, Lantana sp, Cucunis sp, Yschoshae sp, Vernonia sp Ypomea sp, Panicum pilosum, Solanum verbeniflora, Hyparrhenia sp, Dyctioloma peruvianum, Borreria sp, Fimbrintylis sp , Bideris sp, Paspalum sp, Malpigiaceae, Lirianthus sp, Desmodiun tortuosum, Axonopus sp and Clidemia sp.*
3.1.2.2	Biomass: A*) 4.9 t/ha. B**) 1.2 t/ha C**) 10.8 t/ha
3.1.2.3	Under-story pattern and diversity.
3.1.2.4	Miscellaneous.
3.1.3	Regeneration status.
3.1.3.1	Seedlings species.
3.1.3.2	Seedling census.
3.1.3.2.1	Seedling density.
3.1.3.2.2	Seedling height.
3.1.3.2.3	Seedling mortality.
3.1.3.3	Miscellaneous.
3.2	Soil.
3.2.1	Soil profile description.
3.2.2	Soil physical properties.
3.2.3	Soil chemical properties.
3.2.4	Soil hydrogy.
3.2.5	Miscellaneous.
3.3	Microclimate.
3.3.1	Temperature.
3.3.1.1	Air temp.
3.3.1.2	Soil temp.
3.3.2	Water regime.
3.3.2.1	Rainfall.
3.3.2.2	Stem flow.
3.3.2.3	Through fall.
3.3.2.4	Run off.
3.3.2.5	Soil water tension.
3.3.2.6	Relation between soil water tension and content.
3.3.3	Miscellaneous.
3.4	Socio-economics.
3.4.1	Value of stand.
3.4.2	Value of local society.
3.4.3	Social acceptability.
3.4.4	Social effectiveness.
3.4.5	Miscellaneous.
3.5	Miscellaneous.
4.	Experimental plot after the treatment.
4.1	Date of treatment.
4.2	Treatment method.
4.3	Vegetation.
4.3.1	Tree census.
4.3.1.1	Species composition.
4.3.1.2	Density.
4.3.1.3	D.B.H.
4.3.1.4	Height.
4.3.1.5	Biomass.
4.3.1.6	Miscellaneous.
4.3.2	Sub-story and/or Under-story vegetation.
4.3.2.1	Species composition.
4.3.2.2	Biomass.
4.3.2.3	Under-story pattern and diversity.
4.3.2.4	Miscellaneous.
4.3.3	Regeneration composition.
4.3.3.1	Seedlings species.
4.3.3.2	Seedling census.
4.3.3.2.1	Seedling density.
4.3.3.2.2	Seedling height.
4.3.3.2.3	Seedling mortality.
4.3.3.3	Miscellaneous.

4.4 Soil.
4.4.1 Soil profile description.
4.4.2 Soil physical properties.
4.4.3 Soil chemical properties.
4.4.4 Soil hydrogy.
4.4.5 Miscellaneous.
4.5 Microclimate.
4.5.1 Temperature.
4.5.1.1 Air temp.
4.5.1.2 Soil temp.
4.5.2 Water regime.
4.5.2.1 Rainfall.
4.5.2.2 Stem flow.
4.5.2.3 Through fall.
4.5.2.4 Run off.
4.5.2.5 Soil water tension.
4.5.2.6 Relation between soil water tension and content.
4.5.3 Miscellaneous.
4.6 Socio-economics.
4.6.1 Added value of stand.
4.6.2 Added value of local society.
4.6.3 Social acceptability.
4.6.4 Social effectiveness.
4.6.5 Miscellaneous.
4.7 Miscellaneous.

5. Publication.

6. Reference.

3. ANNUAL ACCOUNTING REPORT

1. Subproject title:
Rehabilitation methods in second growth forests and degraded lands in the Ucayali region, Peruvian Amazon.

2. Activity title:
Initial behavior of six forest species under the influence of three types of cover in degraded "purmas" (secundary vegetation) near the Campo Verde - Nueva Requena highway, Ucayali.

3. Account manager and institution names:
Administrative institution: Instituto Nacional de Investigacion Agraria (INIA) Peru
Project leader: Auberto Ricse, Eng.
Administrative specialist: Arturo Yupari Villacorta, Adm.

4. Balance report:

INCOME

DATE	SUBJECT		MOUNTS ($)
11,12,97	Revenue	Income on 31/12/98.	29,200.00

OUTGO

DATE	QUANTITY	ARTICULATE AND SUBJETC	N° of RECEIPT	MOUNTS ($)
16,01,98	1	professional salary-November 97	21	555.17
16,01,98	1	profesional salary-December 97	22	555.17
20,01,98	1	professional salary-January 98	227	575.74
28,01,98	1	professional salary-February 98	312	575.74
09,03,98	1	labourer salary-February 98	382	137.08
30,03,98	1	professional salary-March 98	506	575.74
30,03,98	2	labourer salary-March 98	507	274.16
02,04,98	1	materials of construction	527	97.32
02,04,98	1	useful of desk	528	63.40
29,04,98	2	labourer salary-April 98	659	274.16
04,05,98	1	professional salary-April 98	675	575.74
27,05,98	1	printer (Epson Stylus)	858	347.94
27,05,98	1	C.P.U, monitor and keyboard	857	1,960.35
28,05,98	1	useful of desk	852	210.50
28,05,98	1	reserve of vehicle	853	243.66
28,05,98	1	materials of construction	854	57.57
28,05,98	1	materials of construction	855	252.74
28,05,98	1	professional salary-May 98	878	575.74
29,05,98	85 gl.	fuel for vehicle	887	139.14
02,06,98	1	awning of polyethylene	898	35.30
02,06,98	4	labourer salary-May 98	886	411.24
23,06,98	1	several expenses of agroforestry	997	102.81
30,06,98	4	labourer salary-June 98	1071	411.24
03,07,98	1	professional salary-June 98	1084	575.74
13,07,98	1	several expenses of agroforestry	1144	102.81
20,07,98	4	labourer salary-July 98	1267	411.24
31,07,98	1	labourer salary-July 98	1268	137.08
31,07,98	1	materials of construction	1274	457.25
31,07,98	2	teams of conditioned air	1295	1,828.00
12,08,98	1	several expenses of agroforestry	1314	36.15
12,08,98	1	several expenses of agroforestry	1313	102.81
12,08,98	1	professional salary-July 98	1315	411.24
12,08,98	1	professional salary-July 98	1316	164.49
12,08,98	1	service of translation	1324	68.54
12,08,98	1	several expenses of agroforestry	1326	34.27
20,08,98	½	labourer salary-July 98	1403	53.46

DATE	QUANTITY	ARTICULATE AND SUBJETC	N° of RECEIPT	MOUNTS ($)
20,08,98	1	cartridge of ink quarter note	1404	32.55
27,08,98	1	materials of construction	1425	130.22
27,08,98	4	labourer salary-august 98	1430	548.32
01,09,98	1	materials of construction	1440	523.82
01,09,98	1	professional salary-august 98	1439	411.24
07,09,98	1	several expenses of agroforestry	1456	65.97
08,09,98	1	several expenses of agroforestry	1463	102.81
08,09,98	1	several expenses of agroforestry	1462	41.12
08,09,98	1	several expenses of agroforestry	1461	42.15
11,09,98	1	lubricant for vehicle	1467	75.40
18,09,98	171 gl	fuel for vehicle	1498	281.86
18,09,98	166 gl	fuel for vehicle	1497	274.12
18,09,98	1	case of powdered ink (toner)	1523	107.61
18,09,98	1	service of repair of vehicle	1522	106.58
18,09,98	1	reserve of vehicle	1521	42.49
18,09,98	1	reserve of vehicle	1520	19.87
18,09,98	1	useful of desk	1519	48.76
18,09,98	1	service of maintenance of vehicle	1518	35.98
18,09,98	1	service of vehicle repair	1517	85.67
18,09,98	83 gl	fuel for vehicle	1494	135.81
22,09,98	1	lubricant for vehicle	1559	75.39
23,09,98	1	professional salary-august 98	1586	164.50
29,09,98	1	several expenses of agroforestry	1597	102.81
29,09,98	1	several expenses of agroforestry	1596	23.95
30,09,98	4	labourer salary-September 98	1605	548.32
30,09,98	95 gl	fuel for vehicle	1626	157.26
30,09,98	1	carburetor of vehicle	1609	548.32
30,09,98	70 gl	fuel for vehicle	1624	115.42
30,09,98	1	medical inputs	1622	129.19
30,09,98	1	materials of construction	1623	213.67
30,09,98	1	materials of construction	1621	279.76
30,09,98	1	several expenses of agroforestry	1620	24.57
30,09,98	1	professional salary-September 98	1610	575.74
02,10,98	1	labourer salary-September 98	1630	137.08
05,10,98	1	several expenses of agroforestry	1632	21.32
07,10,98	1	reserve of vehicle	1644	18.16
07,10,98	1	materials of construction	1642	205.62
07,10,98	1	useful of desk	1641	88.69
07,10,98	1	accesory for computer	1640	31.87
09,10,98	1	input agroveterinaric	1664	55.86
09,10,98	1	input agroveterinaric	1663	33.58
09,10,98	1	reserve of vehicle	1662	31.70
09,10,98	67 gl	fuel for vehicle	1649	110.99
09,10,98	1	labourer salary-September 98	1648	37.69
12,10,98	1	several expenses of agroforestry	1684	102.81
14,10,98	2 tn	humus of worms	1689	205.62
16,10,98	73 gl	fuel for vehicle	1754	120.90
16,10,98	1	materials of construction	1740	51.40
16,10,98	1	accesory for computer	1736	138.11
16,10,98	1	service of maintenance of vehicle	1739	75.73
16,10,98	1	useful of desk	1738	134.21
16,10,98	40 gl	fuel for vehicle	1735	66.58
19,10,98	1	reserve of vehicle	1764	21.25
22,10,98	1	glass for office	1784	354.94
22,10,98	1	service of vehicle repair	1785	27.42
22,10,98	1	phone service	1786	146.72
22,10,98	1	service of maintenance of vehicle	1781	95.95

DATE	QUANTITY	ARTICULATE AND SUBJETC	N° of RECEIPT	MOUNTS ($)
30,10,98	1	several expenses of agroforestry	1811	102.81
30,10,98	1	useful of desk	1810	171.35
30,10,98	1	professional salary-October 98	1819	575.74
30,10,98	1	service of repair of phone	1816	34.27
03,11,98	1	motor of vehicle	1836	2,124.74
30,10,98	4	labourer salary-October 98	1814	548.32
30,10,98	1	service of analisis of soil	1813	68.54
26,11,98	1	useful of desk	1958	101.10
06,11,98	1	labourer salary-October 98	1842	133.65
24,11,98	1	service of repair of phone	1983	61.68
24,11,98	4	labourer salary-December 98	2168	548.32
02,12,98	1	reserve of vehicle	1999	36.67
02,12,98	1	professional salary-November 98	1996	575.74
02,12,98	1	viatic for leader of the project	1995	255.25
02,12,98	4	labourer salary-November 98	1982	548.32
02,12,98	1	several expenses of agroforestry	2202	82.25
02,12,98	1	professional salary-December 98	2155	575.74
10,12,98	1	service of repair of vehicle	2107	49.35
15,12,98	1	service of photocopies	2108	8.46
12,12,98	87 gl	fuel for vehicle	2106	142.73
15,12,98	1	several expenses of agroforestry	2099	28.72
15,12,98	1	service of maintenance of vehicle	2100	101.10
15,12,98	84 gl	fuel for vehicle	2101	138.35
15,12,98	1	service of laundry of vehicle	2102	10.28
15,12,98	1	service of repair of vehicle	2105	47.98
15,12,98	1	service of repair of vehicle	2104	20.90
15,12,98	33 gl	fuel for vehicle	2103	54.83
15,12,98	1	several expenses of agroforestry	2172	78.82
21,12,98	56 gl	fuel for vehicle	2132	93.35
31,12,98	31 gl	fuel for vehicle	2225	51.81
31,12,98	1	service of analisis of soils	2236	34.27
31,12,98		maintenance cta.cte		20.56
		Outgo on 31/12/98		29,200.00

BALANCE on 31/12/98	000000.00