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END OF PROJECT REVIEW

BURURI FORESTRY PROJECT No. 695-0105
January 1987

Conducted by Technicians from:
AID/W S and T Forestry Support Program
REDSO/ESA Agricultural Division

EXECUTIVE SUMMARY

The Bururi Forest Project (695-0105), a U.S. \$1,114,000.00 dollar five year grant program is scheduled to terminate in June of 1987. The project has been implemented by the National Institute for Nature Conservation (INCN), a special governmental agency assigned to protect and manage a number of National Parks and Natural Forestry Reserves in Burundi. The project was evaluated in 1984 and found to be making satisfactory progress. The key recommendations at that time were to concentrate further efforts on the agroforestry and extension components of the project and to secure the services of a full-time forestry advisor. Both of these recommendations, as well as many of the very detailed technical suggestions made during the formal evaluation, have been diligently pursued since the evaluation. The second major emphasis of the project was to provide alternative sources of wood outside the forest boundaries for the local inhabitants so that the natural forest, galleries, and block plantings of timber species could be protected. This agroforestry aspect of the program really did not get started until late 1985. Even though fast growing species are being used in this outer buffer zone little usable agricultural or construction materials have been produced, or will be during the LOP.

The project has not then, in the view of the review team, completely fulfilled its goal of a well protected forest reserve with an ample alternate supply of wood products for the Bururi community. Wood harvesting still exists in the galleries, the forest, and the black wattle belts, all three protected under law from such gathering and harvesting activities. Until such time as farmer managed and communal woodlots are actively producing the materials needed on a daily basis for project beneficiaries to survive, the project cannot be judged a total success nor can the natural forest reserve be protected. At present INCN staff are working towards achieving this last goal, the creation of an outer buffer zone owned and managed by potential users.

The review team was asked to evaluate the impact of AID closing-out this project at the June 1987 PACD date. Our recommendation is for the Mission to grant a no cost extension until January 1, 1988 and to allow for the completion of the Bachelor of Science program in agroforestry currently being pursued by participant Damas Nduwumwami. The INCN does not have operational expenses budgeted into their 1987 Bururi Forest allocations. They were, until quite recently, under the impression that a second phase of the project would be financed by an USAID grant or through PL 480 funding. It would be unadvisable, the team feels, not to grant this six months extension. Nursery operations, the forest guard system, maintenance of fire-breaks and most agroforestry extension activities would have to cease until early next year, the accumulated benefits of project investments made to date would be placed in a very precarious position.

The team does agree with the former REDSO RFA, J. Seyler, that at the completion of the project INCN staff should be able to continue the agroforestry extension program without further AID assistance since most of the other major project components will have been completed. Since GRB interim funding is the question and not INCN technical abilities, we strongly urge the USAID/Burundi to consider this PACD extension, if the INCN meets the suggested conditions of this review.

1987 END OF PROJECT REVIEW RECOMMENDATIONS

The following recommendations are based on an end of project review carried out from January 10-22, 1987. Two basic groups are addressed in this section, USAID Burundi, and the National Institute for Nature Conservation.

USAID Burundi

- o If the INCN provides the documentation requested by this review in a timely manner USAID Burundi should provide bridge financing through a no cost six months extension of the PACD.
- o USAID/Burundi should ensure that participant Damas Nduwumwami is allowed to complete his Bachelor of Science program in agroforestry, although this program currently goes beyond the PACD.
- o The Mission should encourage the conduct of a national agroforestry seminar in 1987 under the leadership of ISABU and ICRAF, with INCN being a major participant.
- o Continue AID nominations and placement of INCN staff in training activities after the PACD completion date in existing training programs.
- o USAID/Burundi should assist the INCN staff in making necessary arrangements for a field visit to the agroforestry projects in Rwanda.

The INCN

- o Management and technical issues covered in Annex II. should be reviewed with USAID and the PASA advisor as to their appropriateness at this time.
- o As a condition to a PACD no cost extension the review team feels INCN should give consideration to:
 - Development of a detailed plan of work for the 1987/88 season.
 - Identify long term training and technical assistance needs.
 - Develop a Bururi forestry management plan, with emphasis in the block plantations.
 - Develop detailed procurement lists, these should include supplies and materials for the PCVs, and an operational GRB budget submission for the 1987/88 season.
- o Although this was not a technical evaluation the review teams feels that INCN should consider:
 - Silvicultural practices known to rejuvenate black wattle stands.
 - Direct seeding or seedlings to complete or fill gaps in the wattle belt as needed.
 - Urging farmers to better protect seedlings at planting time.
 - Pursuing links with the MOA so that coffee could be incorporated into INCN conservation packages.
 - Development of agroforestry packages addressed specifically to farmers who wish to use trees as a means of erosion control.

USAID/B and the INCN attention is called to Annex II for the relevancy of items yet to be accomplished as noted in the 1984 mid term evaluation.

BURURI FOREST END OF PROJECT REPORT

I. INTRODUCTION

In December of 1986 USAID Burundi requested that REDSO/ESA perform a limited evaluation report on the Bururi Forest Project. This was to be a much less complicated task than was proposed in the Project Paper or the amended grant agreement. The report would: summarize project achievements, contain essential elements of a project close-out plan, and provide a determination of the INCN's financial capability to sustain the recurrent costs following project completion.

A REDSO officer, from the Agriculture and Natural Resources Office, and an AID/W Science and Technology Forestry Support Program technician performed the review. Site visits were made to the project area where nursery, block plantation and extension planting operations were inspected. Interviews were held with the Director General of the INCN, field technical staff, the PASA advisor, USAID project managers, and project clients. Project documentation was reviewed and program compliance with the 1984 mid term evaluation recommendations was measured.

II. PROJECT BACKGROUND, STATUS AND GOALS

Annex I, prepared by the PASA Forestry Advisor and dated January 1987, contains valuable information on project background, purposes and goals. An up-dated status report on project achievements since the 1984 mid term evaluation and a detailed account of the tree plantings by species and location are also enumerated in this excellent briefing paper.

III. PROJECT COMPLETION ACTIVITIES

Foreword:

In this section, the terms "inner buffer zone" and "outer buffer zone" are employed. The former designates the black wattle belt surrounding the Bururi Forest; its perimeter marks the geographic boundary of the forest proper. The latter zone adjoins the forest preserve and includes the areas of private land where project agroforestry activities have or are taking place. No precise width is assigned to this outer zone; however, an estimate of 3 km may serve for present purposes and until such time as surveys can be conducted to fix its ideal dimensions.

Emerging opinion in the international conservation and natural resources community holds that the only effective means to ensure the integrity of natural preserves is through creation or maintenance of tree-based, land-use systems as a protective outer buffer zone.

Given the completion of block plantings within the forest perimeter, project nurseries are now devoted almost exclusively to the production of seedlings for planting in the Outer Buffer Zone. As an incentive, seedlings of calliandra and other species recently introduced by the project staff are furnished free of charge. By contrast, known species such as grevillia, eucalyptus, cypress and pine seedlings are sold at 5 francs each.

A. Forest Protection and Delineation

1. Accomplishments

A major focus of the project was to circumscribe and protect the approximately 1,600 ha. of the Bururi Forest, one of the two remaining high-altitude forests in Burundi. A key element in this protection and delineation process has been the establishment of block plantations of several exotic wood species on more than 750 hectares of cleared land located inside the forest boundaries.

2. Progress and Impact

Subsequent plantings during the life of the project have reforested former areas of encroachments. A clear forest boundary delineation has been created, potentially reestablishing the integrity of the Bururi Forest. The implementation of a forest guard system helps assure the day to day protection of all tree species within the identified boundaries. The continued maintenance of project fire-breaks will help to minimize losses from possible arson or wild fires.

3. Problems and Constraints

The second project priority, stemming from protecting the natural vegetation, was to provide alternative sources of wood for the inhabitants surrounding the forest. It will take about 10 years before the new block plantings could serve this purpose. Management plans for silvicultural and long-term harvest practices and policies for block plantations have not yet been developed.

4. Conclusions and Recommendations

Block plantations are complete and the systems to protect these and the natural forest are operational. At the termination of the project on June 30, 1987 the INCN will be unable to finance the forest guard system and the maintenance of fire breaks until the next annual GRB budget, starting January of 1988. However, until very recently INCN was under the mistaken impression that USAID/Burundi might support a Bururi Forestry II program.

o It is recommended that AID Burundi consider a bridge financing plan for these crucial activities until the INCN can undertake these operational expenses through normal GOB budget sources beginning in January of 1988.

B. Inner Buffer Zone

1. Accomplishments

In order to protect the remaining natural forest and the new block plantations, an inner buffer zone composed of a partial band of black wattle trees has been completed. The original band protected only the eastern side of the forest. During the last two seasons the band was extended over 20 kilometers to include the northern and western sides of the forest as well. The southern boundary of the forest is the Siguvyaye river.

2. Progress and Impact

With the completion of the black wattle belt along the north and western sides a well defined forest boundary now is present which is legally closed to grazing, cultivation, hunting and wood gathering or cutting.

3. Problems and Constraints

Much of the wood required for local energy, agriculture, and construction still must be gathered from this belt. This will continue until such time as the outer buffer zone, farmer owned fast growing tree species, provides an alternative source. In addition, due to constant usage pressure, much of the original black wattle plantings are badly in need of rehabilitation efforts.

4. Conclusions and Recommendations

The project should continue to rehabilitate this important demarcation belt. At present this stand of trees is the only major alternative supply source to the natural forest and protected galleries. The team recommends:

- o Silvicultural practices known to rejuvenate black wattle stands, such as burning off the under growth, should be applied by the INCN.
- o The project should continue to direct seed or use seedlings as needed to complete or fill gaps in the belt.

C. Outer Buffer Zone: Private and Public Lands

Although the major focus of agroforestry extension activities has been on tree plantings by private landowners (small farmers), public lands have also been involved with respect to community woodlots and demonstration plots established by extension agents. It needs to be emphasized that tree planting which began in this zone in 1986 could not be expected to make any contribution to fuelwood supplies during the life of the project.

1. Accomplishments

Extension activities described in the Project Paper for the Outer Buffer Zone called for the distribution of seedlings for the purpose of planting trees around homes and in communal woodlots. Communal woodlots have received very limited attention because of greater concern for the involvement of private landowners. Accomplishments consist of five communal woodlots with a total planted area of approximately six hectares. A one hectare communal woodlot established in Bururi commune during the 1985/86 planting season was done at the instigation of the commune administrator and the governor as the main activity to commemorate a local observance of Arbor Day. Approximately 900 grevillia and eucalyptus were planted. In addition, the project nurseries have provided eucalyptus seedlings for the establishment of

woodlots for the military base in Bururi. These cannot be counted in terms of general wood sources in the local area, but nonetheless need to be mentioned inasmuch as their presence figures in the total fuelwood resources of the Outer Buffer Zone.

As far as private landowners are concerned, major project extension activities were only able to begin with the hiring of a Burundian full-time agroforestry extensionist in September 1985. He was able to commence work with farmers early in 1986. A dozen farmers have been identified who were willing and interested in taking part in planting trials that included boundary plantings with calliandra, planting grevillia in fields and establishment of anti-erosion bands on crop lands using a combination of grasses such as tripsicum, gervillea or calliandra. Spacings vary from 0.5 meters up to 8 meters between trees, depending upon the species used and the type of planting. Survival rates have not yet been determined, but appear to be satisfactory.

Another concern during 1986 was preparation for the establishment of field trials and demonstrations of alley cropping. At the Kiremba Primary School outside Bururi, a calliandra alley cropping and boundary plot has been established with student participation. As appropriate, the rows of calliandra are oriented east-west to minimize shading of annual food crops. In collaboration with ISABU, on land they own just south of Bururi city, trials of calliandra and leucaena planted in contour have been established to demonstrate their utility in erosion control. Calliandra growth has been somewhat slow, but survival rates are satisfactory. Six months old leucaena plants have reached 1.5 meters and appear to be healthy. There was no evidence of basal swelling, a symptom of retarded root development brought about by low soil pH and indurated sub surface soil layers.

Two farmers are prepared to receive calliandra seedlings for the first alley cropping trials on private land.

2. Progress and Impact

Given the recent start date of agroforestry extension activities, progress is more than satisfactory. Having successfully established trials on private farms, as well as demonstration plantings at a primary school and on Ministry of Agriculture land, cannot fail to have a positive impact on local interest and attitudes toward agroforestry. It is highly significant that farmers with fields of exceedingly steep slopes have contacted the project for assistance in the establishment of contour plantings of grasses and trees to reduce rates of soil erosion. Owing to the significant number of farms on excessive slopes, the agroforestry extension activities will contribute to the solution of problems that were unforeseen when the project began.

3. Problems and Constraints

Three major problem areas relate to the future success of extension activities. Firstly, because of inadequate and unreliable seed supplies, the project nurseries have been unable to meet the demand for grevillea and calliandra seedlings for farm plantings and trials. This has limited the number of farmers that can participate in tree plantings. Secondly, the project has had a continual problem of vehicle breakdowns. This is a severe staff constraint in visiting farmers on a frequent basis, as well as reaching those at more distant locations. This has also been a hindrance to timely seedling distribution. Thirdly, the technical services of a single agroforestry extension agent, aided by two assistants, places a definite constraint on the number of farmers who can be incorporated into the planting schemes of the project.

4. Conclusions and Recommendations

Despite a late start, the progress thus far in agroforestry extension activities has made a solid beginning. The gradual approach of beginning with border plantings and then moving on to alley cropping, the choice of species (calliandra and grevillea), the technical capabilities of project personnel and their interest in and dedication to the objectives, all bode very well for activities during the remainder of the AID support and subsequently. Attending to the three problem areas enumerated above will contribute to even more encouraging future results.

On the basis of field observations and discussions with farmers and project personnel, three more technical recommendations emerged as meriting attention:

o First, farmers should be strongly urged to stake the location of individual plants in border plantings and in alley cropping, or better still use 3 or 4 sticks to fashion a protective cage around the seedling. This would reduce the incidence of seedling trampling by humans and animals, or inadvertent damage during weeding operations.

o Second, the project should pursue links with the Ministry of Agriculture such that coffee could be incorporated into the agroforestry extension activities. This would serve as a complement to the fruit trees (citrus, Japanese plum, avocado) already planned for distribution under the project. Efforts to achieve this goal are worthwhile in terms of the benefits that would accrue to small farmers attempting to reduce downslope soil erosion. One impediment to this action may be the block configuration of planting mandated by the Ministry of Agriculture for purposes of easy spraying.

o Third, the project extension work would benefit from the development of an agroforestry technology package addressed specifically to the needs of farmers who wish to adopt tree planting primarily as a means of erosion control. Special concern needs to be focused on the most appropriate species or combination of species and their densities for maximum soil-holding capability.

D. Technical Assistance and Training

1. Accomplishments

The 1984 mid term evaluation called for the assignment of a full-time forestry advisor to the INCN; a PASA technician has been provided since April of 1985. The Peace Corps has given assistance to the Bururi Forest Project through the services of several professional forestry and natural resource volunteers. AID has also furnished the project with short-term technical services through the Forestry Support Program and REDSO/ESA.

Long term degree training is being given to one Burundi INCN technician, Mr. Damas Nduwumwami, and a number of short-term training experiences have been provided for Burundi Project administration and technical staff. These have included visits to India, the USA, Nigeria, and Kenya.

2. Progress and Impact

The full-time USDA technician has made major contributions to the project since his arrival and will be a key resource person in the orderly close-out of this program. The PASA advisor, assisted by Dr. Paula Williams, have developed a Bururi data base (see annex I, survey form) covering nearly 600 interviews. It is fully computerized and can output detailed information on some 50 subcategories of resource use and fuel consumption in the project area. Much of the data for this review was developed by the Bururi project information management system.

The Peace Corps plans to continue their support to the program and will have a new natural resources technician in place this month (January, 1987.) They also agreed to provide the part-time services of an audio visual specialist to assist in INCN outer buffer zone extension efforts of establishing more farmer managed tree plantings. Project staff participating in short courses, seminars and workshops felt that their training experiences were positive and had contributed to the success of the Bururi program.

3. Problems and Constraints

An Action Memorandum approving a supplement to the Project Paper was signed January 11, 1985. This Memorandum called for a no cost extension of the PACD from April 30, 1986 to June 30, 1987 except for the long-term training of one Burundian in the U.S. in agroforestry which would be authorized to be completed not later than May 30, 1988. The Memorandum went on to say that since all other activities under the Project should be completed by June 30, 1987, it recommended that the PACD as reflected in the Project Agreement be set at June 30, 1987, but that the GRB be advised by separate PIL that the PACD with regard to the long-term training be May, 1988. An amendment to the Project Agreement was executed but the subsequent PIL was not. Even given this, USAID/Burundi is uncertain as to appropriateness of establishing two separate PACD's for the project. The participant in question, Damas Nduwumwami, departed Burundi in May, 1985, completed language training and became a fully enrolled student in January, 1986. Although he

completed two academic courses in the fall of 1985, he is not expected to complete his Bachelor of Science program until December, 1988 (i.e. 3 years). USAID/Burundi has suggested that Damas's training program be shifted to AMDP if it is to exceed the PACD. This problem should be resolved as soon as possible to avoid any disruption in Damas's training program. A national workshop and seminar on agroforestry, an activity that was suggested by the mid term evaluators, has not yet been held. It is still felt that this seminar is an appropriate project activity which could also showcase the INCN's agroforestry extension achievements. The appropriate forum for this probably would be through the International Council for Research in Agroforestry (ICRAF) and its partner in Burundi, the Institute for Agricultural and Livestock Research (ISABU). ICRAF activities are funded under a centrally funded S&T project and Bururi Forest project funds could be used to supplement this for the seminar..

4. Conclusions and Recommendations

Technical assistance and training activities during the life of the project have been appropriate. Since both the project and the Burundi technical staff are young, AID should consider further training activities before and after the project completion date if sufficient funds exist in the project or in other general AID training projects. The team recommends:

- o A national agroforestry seminar be held, preferably through ISABU and ICRAF, during 1987.

- o That the INCN request the additional services of a full-time Peace Corps extension specialist to work with farmer plantations and to interact with other agencies in Burundi and Rwanda that are promoting agroforestry and communal wood lots.

- o USAID/Burundi continue in the nomination and placement of INCN staff in training activities that will assist the program, such as the IITA Alley Cropping short courses, as funding exists in current training projects.

- o USAID/Burundi assist project staff in making a field visit to agroforestry projects in Rwanda. The IITA program, the Swiss projects, and the Farming Systems FSIP project, as well as similar programs in Kenya will provide excellent information on lessons learned.

- o That INCN and the PASA advisor prepare a long term training and technical assistance plan for the Bururi Forest reserve.

IV. OUTSTANDING ISSUES

A. Management and Administration

Long-range management plans for the Bururi Forest have not been developed. The intentions of the INCN in terms of eventual harvesting of the block plantations were tentative at best when communicated to the review team by the director general. The role that the local Bururi community will play in harvesting these stands or what the sale proceeds may be used for, other than for INCN operational costs, were not clearly defined. While a management plan was not listed as a specific output for the project, it should have been developed in terms of the strengthened institutional capacity that was expected of INCN. In addition, a current

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statement of the INCN long-term goals and objectives for the Bururi Forest and project beneficiaries would be of much interest to potential donors and collaborators.

Long-range formal training plans for the project's technical staff are in absence. A formal session is planned for them on the preparation and management of private and communal nurseries. However, a series of training sessions should be planned for the local agromomes and farmers concerning the development and management of an outer buffer (agroforestry) zone.

B. Procurement and Recurrent Costs

The director of INCN and the PASA advisor are developing a list of procurement needs and an operational budget for 1987. Transport for the technical staff has been a serious constraint during this last year, replacement of the present vehicles and the stocking of adequate parts for future needs are seen as high priority items by the review team, as will be the AID assistance needed to make these purchases. Sufficient materials and supplies for the PCVs should also be included by the INCN in this USAID budget request.

C. Institutionalization

An INCN Boundaries Bill will be put before the National Assembly in April. Successful passage and a subsequent Presidential Decree will assure permanent boundary demarcations and protection for the Bururi Forest as well as six other National Parks and Natural Forest Reserves. The legalities of such a decree will do much to insure the permanent status of the INCN as the lead organization in resource management and in the insitutionalization of an official conservation philosophy in Burundi.

D. INCN Integration With Other Agencies

INCN technicians have made progress in integrating their programs with other agencies serving the Bururi area. There is still much more interaction that can take place, especially in the development of the outer buffer zone. The introduction of fruit trees and perhaps coffee into INCN agroforestry efforts will provide a more natural link with other agencies and institutions working in rural development, education and agriculture.

1. Conclusions and Recommendations

As pointed out in other sections of this review the team feels that USAID/Burundi should consider assisting the INCN with bridge funding for operational expenses, on a one time basis, for the period of July through December of 1987. Sufficient funds remain in the project for this purpose. As a condition to this no-cost PACD extension the review team strongly recommends that INCN:

- o Develop a detailed plan of work for the 1987/88 season.
- o Produce a draft Bururi forestry management plan.
- o Develop detailed procurement lists and a GRB operational budget submission for the 1987/88 season.
- o Identify long-term training and technical assistance needs.

These will serve as much needed administration and management tools and also provide a strategy for and orderly close-out of USAID participation. The team urges INCN to study the issues and problems raised in this review, resolve them if possible and communicate these findings officially to USAID Burundi within a reasonable period so that the Mission can make a decision on a six months extension of the project.

V. MISSION OPTIONS

- A. Purchase needed commodities and end all assistance at PACD.
- B. Provide the INCN with six months of bridge financing for operational expenses, purchase needed commodities, and transfer participant Damas to AMDP funding.
- C. Extend project until December, 1988 to allow the completion of the training program of participant Damas, but limit disbursements for commodities and operational expenses until December 31, 1987.

1. Conclusions and Recommendations

The INCN does not have the ability to finance Bururi operational costs, other than wages for their technical and administrative staff, during the last half of this year. The team feels that it would be inadvisable not to provide a no-cost six months PACD extension for the Bururi Forest Project. Considering the advances made during the LOP and the investments encumbered by both governments, to then allow the project to suffer without operational funds during the last six months of 1987 would be a disaster. In view of Mission wishes to provide an orderly close-out of this project we recommend:

If the INCN provides the requested documentation in a timely manner that AID provide a no cost extension of six months for the project. In addition, AID should ensure that participant Damas is allowed to complete his training program whether under Bururi Forest Project or some other training program.

BURURI FOREST

IMPLEMENTATION AGENCY: National Institute for the Conservation of Nature

COUNTRY: Burundi PROJECT TITLE: Bururi Forest END OF PROJECT: 30 June 87

BACKGROUND

The Bururi Forestry Project Grant Agreement was signed on 24 June 1982. The project became fully operational with the signing of the first Project Implementation Letter on 20 September 1982.

The goal of the project is to protect the 1,600 ha. Bururi forest, one of two remaining high-altitude natural forests in Burundi. The Bururi Forest is important for its watershed protection values, protection of biological diversity, and traditional uses such as gathering of medicinal-plant species. The protection of the forest was to be achieved by developing alternate sources of firewood and construction wood for the inhabitants in the project area. These materials were formerly gathered in the forest and adjacent forest galleries.

As originally designed, the project was to develop these alternate wood resources through the planting of fast growing exotic tree species, such as Eucalyptus spp., Pinus patula, Cupressus lusitanica, and Callitris calcarata on the open slopes surrounding the forest. Any extra seedlings were to be made available to the local population for their individual needs. The project paper called for 1,100 ha. of exotic species in block plantations, 100 ha. of local species plantings, and 300 ha. of individual/communal woodlots.

In 1983, a socio-ecological survey of the project area was undertaken. The USAID consultants (Bill Weber and Amy Vedder) recommended that the project be adapted to minimize conflicts between the needs of local residents and the project goal of preserving the remaining forest area.

During the project evaluation in July 1984, the evaluation team proposed that the project focus shift away from block plantings around the forest towards developing an agroforestry and extension program. The rationale for this was that most of the available areas had, by then, been planted. (A total of 760 ha. had been planted in block plantations, which will be managed by the INCN.)

Since then, efforts have focused on developing an agroforestry and extension program. This program seeks to provide tree seedlings and appropriate tree and land management techniques to local inhabitants. The agroforestry program seeks to help landowners develop their own sources of wood, while reducing soil erosion, enhancing soil fertility through the beneficial effects of nitrogen-fixing tree and shrub species, and other benefits that result from an increase in vegetative cover.

Several related activities have also been undertaken by the project. Among these are preliminary studies on nursery requirements of several indigenous tree species, nursery and field trials of nitrogen-fixing trees and shrubs, initial trials of several species of fruit trees, as well as delimitation of the natural forest and completion of the black wattle (Acacia mearnsii) belt around the forest proper.

Presently the Bururi Forest Project is unique among the larger forestry projects currently in Burundi. Traditionally, most projects have identified large tracts of land that are subsequently planted with pines and eucalyptus. These plantations are then closed to traditional land uses such as grazing or agriculture. While the original activities under the Bururi Forestry Project were similar, the project staff is now attempting to provide trees to individual households, for their own needs. (See tables, page 6.)

LOCAL SPECIES TRIALS

In 1985 nursery trials were begun on 15 local species. These trials were initiated to identify techniques needed to raise local species in the nursery, for use in reforesting the abandoned homestead sites within the forest, and to try to provide the local inhabitants with seedlings of valued local species. The following species were among those in the initial trials:

<u>Aqauria salicifolia</u>	<u>Ficus</u> sp.
<u>Albizia gummifera</u>	<u>Myrianthus holstii</u>
<u>Anthocleista grandiflora</u>	<u>Newtonia buchananii</u>
<u>Bersama abyssinica</u>	<u>Pittosporum</u> sp.
<u>Bridelia brideliifolia</u>	<u>Polyscias fulva</u>
<u>Chrysophyllum gorungosanum</u>	<u>Schrebera alata</u>
<u>Dodonaea viscosa</u>	<u>Trema orientalis</u>
<u>Dombeya goetzenii</u>	

NITROGEN-FIXING SPECIES TRIALS

Trials with nitrogen-fixing trees and shrubs were begun in 1983 when the following species were tried:

<u>Alnus rubra</u> *	<u>Prosopis chilensis</u> *
<u>Calliandra calothyrsus</u>	<u>Robinia pseudoacacia</u> *
<u>Gleditsia triacanthos</u> *	<u>Sesbania grandiflora</u> *
<u>Leucaena leucocephala</u> *	

The following species were tried in 1985:

<u>Acacia auriculiformis</u>	<u>L. leucocephala</u> K-28*, K-67*
<u>A. melanoxylon</u>	<u>Maesopsis eminii</u> *@
<u>Calliandra calothyrsus</u>	<u>Prosopis chilensis</u> *
<u>Casuarina equisetifolia</u>	<u>Robinia pseudoacacia</u> *
<u>Leucaena diversifolia</u> K-156*	<u>Sesbania grandiflora</u> *

The following species were tried in 1986:

<u>Acrocardus frascinifolius</u> @	<u>Mimosa scabrella</u>
<u>Calodendrum capeuse</u> @	<u>Sesbania sesban</u> *
<u>Combretum</u> spp.*@	<u>Vitex keniensis</u> *@
<u>Cordia abyssinica</u> *@	
<u>L. diversifolia</u> K-156	
<u>L. pulverulenta</u> x <u>L. leucocephala</u> K-75	
<u>L. diversifolia</u> x <u>L. leucocephala</u> K-743	

FRUIT TREES

Over 50 fruit trees (11 species, 13 varieties) have been planted in the nursery since 1985. These trees were planted to see how well they will grow in the Bururi area. They will also serve as sources of seed and grafting materials for future activities, as well as demonstration trees.

Citrus trees; three varieties of oranges, two varieties of mandarins, two varieties of lemon, and one variety of grapefruit	
Mountain papaya var. Solo Kapoho*	
Avocado; two varieties	Guava
Walnut spp.*	Japanese plum
Macadamia sp.	Cherry

(A * indicates the species either failed in the nursery or following outplanting. A @ indicates a species that does not fix nitrogen, but has been found to be of value in agroforestry activities elsewhere.)

FOREST DELIMITATION

A band of black wattle trees exists along the eastern and northeastern sides of the forest. This belt, established about 25 years ago, serves as a delimitation line for the forest along its eastern boundary. The project paper called for completion of this black wattle belt along the northwestern and western sides of the forest. This would provide a clearly-defined boundary for the forest zone, which is legally closed to grazing, cultivation, hunting and wood cutting.

Approximately 20 kilometers of black wattle belt were direct seeded during the 1985/1986 rainy season. A combination of direct seeding and planting will be used during the 1986/1987 rainy season to fill in those areas where the direct seeding may have failed, and to reconstitute those areas in the existing black wattle belt that have been heavily degraded in the past. A formal survey of the forest boundary and the plantations is programmed for 1987.

EXTENSION ACTIVITIES

During the 1984 dry season, eight high school students were hired to interview inhabitants of the project area, to make them more aware of the project and its activities, and to identify local problems and needs. In the summer of 1985, eleven students were employed as interviewers. In September 1985 a Burundian forester was assigned to the project to serve as a full-time extension/agroforestry agent. In the summer of 1986 eleven more interviewers were employed. Two of these people were hired as full-time extension assistants in September 1986.

The students contacted approximately 114 families during the first season, 1984. A total of 396 families were contacted in 1985, and 590 families were contacted in 1986. Based upon recent census figures, it is estimated that, to date, approximately 17% of the families living in the project area have been contacted during the project's extension efforts. Some initial results from the 1986 interviews are given below.

15x

- 401 out of the 590 families were contacted for the first time in 1986;
- 132 families were unaware of the project or its activities;
- 434 families planted trees in 1985;
- 88 families have planted local species;
- 452 families indicated that they wanted trees from the project;
- 320 families said that they collect medicinal plants;
- 338 families had at least one member of the family who had attended a colline meeting concerning the project;
- 66 families requested technical assistance from the project;
- 57 families said they had already received technical assistance.

Following the arrival of the extension forester, initial extension efforts centered around group meetings and contacts with individual farmers. These activities aimed to make people aware of the project and its activities, advise them of the various tree species available from the project and their uses, and to identify individuals who would like to participate more closely with the project staff, either as demonstration farmers or as recipients of more technical assistance.

Because full-time extension efforts were only recently initiated, during the 1985/1986 planting season, the activities proposed required only minimal effort on the part of potential participants. By limiting initial activities to those which require a minimum of effort, and a limited amount of risk, participation may be more enthusiastic. Activities during the 1985/1986 planting season included the planting of private woodlots, planting of appropriate tree species along anti-erosion bands in fields, planting around property perimeters, along roadsides and trails, and the use of trees and shrubs for live fencing.

As confidence increases over time, the project staff will seek to initiate activities that require greater individual and group efforts, and entail greater risks on the part of the participants. The activities for 1986/1987 include pilot demonstrations of alley-cropping, the laying out and planting of anti-erosion bands (composed of trees and grasses) in fields, contour planting of trees, the distribution of fruit trees, and other activities.

PARTICIPANT TRAINING

The project manager took part in a study tour of agroforestry activities in India in late 1983. Upon his return to Africa he stopped in Kenya to consult with ICRAF (the International Council for Research in Agroforestry) and to visit the USAID/Kenya-funded Kenya Renewable Energy Development Project.

One project technician has been sent to the United States for long-term training. He is currently studying towards a bachelor of science degree in

forestry. The Director General of the National Institute for the Conservation of Nature participated in the 18th International Workshop on National Parks, hosted by the U.S. National Park Service in June 1984. Three project technicians participated in a three day herbicide utilization and pesticide safety training course, conducted by the REDSO/ESA Regional Weed and Pest Management Advisor in April 1986. One nursery worker had three weeks of intensive on-the-job training in fruit tree grafting techniques.

The agroforestry/extension forester attended a workshop on Alley-Cropping, held at the IITA (International Institute for Tropical Agriculture) training center in Nigeria, in May 1986. He and the project's head nursery technician will also visit the Nyabisindu Agrosylvopastoral Project and other agroforestry projects in Rwanda in 1987.

TECHNICAL ASSISTANCE

Initially, technical assistance to the project was provided through a PASA agreement between USAID and the US Forest Service. A forester with the US Forest Service would periodically visit the project site on TDY. A full-time forestry advisor was assigned to the project in April 1985.

In 1983, a socio-ecological survey of the project area was undertaken. This report provided information on the scientific and social values of the Bururi forest and made recommendations for the implementation of the project.

Peace Corps assigned a professional forester/volunteer to the project in late 1983. He assisted the project staff with numerous project activities. A professional wildlife biologist/volunteer was assigned to the project in January 1986, to provide technical input relating to wildlife for the Bururi Forest and the nearby Rumonge Forest Reserve. This person was medically terminated in August 1986. A second wildlife volunteer has been assigned to the Bururi Forest, and will begin working with the project in January/February 1987. A Peace Corps conservation education specialist will begin working part-time with the project on developing extension and conservation education materials in February 1987.

Throughout the life of the project, periodic visits have been made by the REDSO/ESA Regional Forestry Advisor. In January 1986 the Forestry Support Program's agroforestry specialist and an agriculture specialist with REDSO/ESA visited the project. They examined past and current activities, and provided recommendations for ways to improve project activities.

ADDITIONAL PROJECT DOCUMENTATION

Bururi Forest Project Paper

Trip reports prepared by Ed Olson, Bururi Forest Consultant

Socio-ecological Survey of the Bururi Forest Project Area by A.W. Weiler and A. Vedder, October 1983

Activity reports prepared by Peace Corps forester Rob Clausen

Activity reports prepared by Peace Corps wildlife biologist Tim Rash

ANNUAL SEEDLING PRODUCTION AND DISTRIBUTION

Season	Total Seedling Production	Number of Trees Planted by INCN	Number of Trees Distributed to Institutions	Number of Trees Distributed to Individuals	Total Kilometers of Direct Seeding
1982/1983	15,000				
1983/1984	699,000	442,000		12,500	
1984/1985	416,000	281,000	6,200	18,000	
1985/1986	77,000	10,000	5,600	36,660	20 kilometers
1986/1987			1,000	17,436	

SEEDLING DISTRIBUTION TO INDIVIDUAL HOUSEHOLDS

Season	Number of Families Taking Trees	Number of Progressive and Demo Site Participants	Number of Trees Distributed by Species					
			Eucalyptus	Grevillea	Pines	Casuarina Callitris Cyprus	Calliandra	Acacias
1982/1983								
1983/1984	73		5,885	3,424	2,665	520		
1984/1985	29	2	14,974	8,850	40	1,372		
1985/1986	504	5	13,191	7,656		4,222	7,045	4,550
1986/1987	305	20	5,798	5,173	320	4,008	2,940	197

The above figures are estimates. Complete data for 1986/1987 is not yet available. INCN plantings include block plantations, experimental plantations, black wattle belt, road stabilization, etc.

INTERVIEWING AND PUBLIC INFORMATION CAMPAIGN - July to September 1986

From July to mid-September 1986, eleven interviewers contacted farmers living in areas adjacent to the Bururi Forest. The objectives of this public contact were:

- 1) to gain a better understanding of public perceptions of the Project and to identify local needs which the Project might address (survey), and
- 2) to better educate the public about Project objectives (public information).

The major goal of this work was to contact as many local families as possible. Consequently, interviewers were instructed to talk to as many families as they could locate in a given area on a given day. Thus the survey was not administered to a structured sample of the population, but was used as a tool in contacting the maximum number of families possible. Therefore, results obtained from the survey cannot be used to generalize to the entire population, but only can be taken to represent the views of those actually contacted.

A baseline socio-economic survey of a systematic sample of 360 people living around the Bururi Forest had been conducted under the supervision of a consulting sociologist, Dr. A. William Weber, in 1983.

This type of preliminary extension work had been conducted during the dry seasons of 1984 and 1985. The first two years, interviewers were given a general list of questions to ask local residents, and notebooks in which to record their answers. Due to the difficulty in collating and analyzing the information so recorded, the use of survey forms was adopted in 1986. Although the forms were written and filled out in French, actual interviews were conducted in Kirundi.

The interviewers' first week of work was spent on pre-testing the survey form and being trained in how to contact local residents. Unclear questions were either reformulated or discarded. Interviewers worked in teams of two to three people.

During a period of 9 weeks, 590 families were contacted.

The interviewing team worked for one week on coding data from open-ended questions. Data coding and analysis is still in progress.

INTERVIEWER'S INFORMATION SHEET

Explain what you do - INCN (National Institute for the Conservation of Nature) and the Project

It's the law: One can no longer exploit the Natural Forest of Bururi

It's forbidden: to cut trees, shrubs, or other materials, live or dead, in the interior of the forest or the surrounding galleries
to graze animals
to cultivate in the forest
to start fires
to hunt

One can collect medicinal plants, if one does not destroy the plants

Objectives of the project: preserve and protect the Forest of Bururi

develop alternative sources for firewood, construction wood, and other materials that one can no longer take from the Bururi Forest

identify people who want to participate in the project, whether as someone who wants to plant some trees, whether as someone who wants to develop a demonstration site or model farm. One does not risk losing one's fields if one participates as a progressive (farmer).

develop an agroforestry project and show people new techniques

help people who are far from our nurseries to produce their own trees in communal nurseries

furnish trees to people. Some species are sold, some species are free.

Why plant trees? Water, combat erosion, firewood, construction wood, poles (beans, bananas), improve soil, fruits, obtain money

Why protect the forest? Water, diverse species, erosion

Tree species available from the project:

Calliantra Grevillea Eucalyptus Casuarina Sesbania

Other agroforestry species are available:

Acacia/black wattle Japanese plum Guava

Avocados and citrus trees are reserved for progressive farmers (farmers who participate with the project staff in developing on-farm activities).

BURURI FOREST PROJECT: Survey Form

Dry Season 1986

1. Team _____ 2. Recorder _____ 3. Date _____ 4. Sheet _____ Page #1
5. Hill _____ 6. Other specifications on location: _____
7. Enough trees on their hill? Yes ___ No ___ 8. Enough on their own land? Yes ___ No ___
9. Importance of trees? _____
10. What happens if they don't have trees? _____
11. Do they know the project? Yes ___ No ___
12. If yes, what are the values of the project? _____

Sources of resources (1=most important; 2=2nd importance)

Resources	Their Own		Neighbors	Galleries	Forest	Purchase	Other (specify)	Not Used
	Fields	Plantations						
13. Firewood	_____	_____	_____	_____	_____	_____	_____	_____
14. Charcoal	_____	_____	_____	_____	_____	_____	_____	_____
15. Construction wood	_____	_____	_____	_____	_____	_____	_____	_____
16. Bean poles	_____	_____	_____	_____	_____	_____	_____	_____
17. Banana poles	_____	_____	_____	_____	_____	_____	_____	_____
18. Forage	_____	_____	_____	_____	_____	_____	_____	_____

Who in the family is responsible for, or assists with: (1=responsible; 2=aide or assistance)	(under 16 years)				No one/ Not Used	Other (specify)
	Men	Women	Boys	Girls		
19. Firewood: cutting live trees	_____	_____	_____	_____	_____	_____
20. Firewood: cutting branches	_____	_____	_____	_____	_____	_____
21. Firewood: searching dead wood	_____	_____	_____	_____	_____	_____
22. Transporting firewood	_____	_____	_____	_____	_____	_____
23. Construction wood	_____	_____	_____	_____	_____	_____
24. Poles (beans, bananas, etc.)	_____	_____	_____	_____	_____	_____
25. Forage	_____	_____	_____	_____	_____	_____
26. Traditional medicines	_____	_____	_____	_____	_____	_____
27. Other forest resources (specify) _____	_____	_____	_____	_____	_____	_____

28. Tree species that are most important for the respondent(s), whether in the natural forest or elsewhere:

Species (Name in KIRUNDI)	Use(s)	Source(s)
a. _____	_____	_____
b. _____	_____	_____
c. _____	_____	_____
d. _____	_____	_____
e. _____	_____	_____

29. Do they collect medicines from trees or plants? Yes ___ No ___

Medicinal species (Name in KIRUNDI)	Use(s)/disease(s) (in KIRUNDI)	Part of tree or plant used
a. _____	_____	_____
b. _____	_____	_____
c. _____	_____	_____
d. _____	_____	_____
e. _____	_____	_____

BURURI FOREST PROJECT: Survey Form

Dry Season 1986

Team _____ Recorder _____ Date _____ Sheet _____ Page #2
 Hill _____ Other specifications on location: _____

31. Ever planted trees? Yes ___ No ___ 32. Ever left trees on fields? Yes ___ No ___
 33. Planted last year? Yes ___ No ___
 34. If not, why not? Enough trees ___ No interest ___ Lack of space ___ Lack of time ___ Lack of plants ___
 Desired species unavailable (specify species) _____ Other (specify) _____

35. Trees planted last year, including fruit trees:

ANSWER KEY: Number P=few B=many T=all N=none/no

Use: BF=firewood BC=construction wood BO=woodworking/tools FR=fruit FO=forage

S=improve soil E=anti-erosion D=boundary H=fence BV=windbreaks M=medicines

X=family use Y=sale A=other (specify)

Source: 1=project nursery 2=own nursery 3=other nursery 4=natural regeneration 5=wildling
 6=cutting 7=direct seeding 8=market 9=other (specify)

Species	Number Planted	Number Dead	Intended Use	Source	Problems Noted
a. _____	_____	_____	_____	_____	_____
b. _____	_____	_____	_____	_____	_____
c. _____	_____	_____	_____	_____	_____
d. _____	_____	_____	_____	_____	_____
e. _____	_____	_____	_____	_____	_____

36. Trees wanted next season, including fruit trees: (SAME ANSWER KEY)

Species	Number	Intended Use	Intended Source
a. _____	_____	_____	_____
b. _____	_____	_____	_____
c. _____	_____	_____	_____
d. _____	_____	_____	_____
e. _____	_____	_____	_____

Who in the family:

	Men	Women	(under 16 years)		No One	Other (specify)
			Boys	Girls		
37. Planted trees?	_____	_____	_____	_____	_____	_____
38. Assisted in planting?	_____	_____	_____	_____	_____	_____
39. Wants to plant?	_____	_____	_____	_____	_____	_____

40. Someone in the family attended extension sessions on the hill? Yes ___ No ___

41. The family received technical assistance? Yes ___ No ___

42. The family has already spoken with someone from the project? Yes ___ No ___ 43. Who? _____

44. When? This year ___ Last year ___ Two years ago ___ Before ___

45. Assistance desired of project? Technical assistance ___ Trees ___ Other (specify) _____

46. Family head - name: _____ Sex: M ___ F ___

47. Principal respondent: Sex: M ___ F ___ Age (approx.): _____

Family head ___ Spouse of head ___ Child of head ___ Other (specify) _____

48. Others who participated in interview: _____

49. Family: No. of Men ___ No. of women ___ No. of Boys (<16 yrs.) ___ No. of Girls (<16 yrs.) ___

50. What are the big family problems? (NOTE: 1=most important; 2=2nd most important)

a. Lack of money ___ b. Lack of land ___ c. Poor productivity of land ___ d. Soil erosion ___

e. Lack of food ___ f. Lack of firewood ___ g. Lack of construction wood ___

h. Lack of technical training ___ i. Lack of forage ___ j. Provision in water difficult ___

k. Difficult to educate children ___ l. Health problems ___

m. Other (specify) _____ n. No Problems ___

51. Question of respondent for team? _____

ANNEX II. REVIEW OF 1984 RECOMMENDATION LIST

Note: The following is a list of 1984 recommendation items not completed or not able to be completed, see pages 4 through 8 of the mid term evaluation. The status as of January 1987, follows each recommendation.

Nursery Establishment/Operations

(3) Project staff must ensure that germination tests are conducted on all seedlots at least 4-6 weeks prior to sowing. Status: Germination tests are performed whenever possible, however timely seed availability has been a major constraint, periodically resulting in the sowing of untested seed.

(4) OAR/B must assist INCN in providing additional fast-growing multi-purpose tree seed. Status: This assistance is in progress.

(5) The PCV should assemble and translate relevant technical information on fast-growing, multi-purpose trees and prepare monographs on each species for use by project staff and other interested parties. Status: Yet to be accomplished.

Exotic Species Block Plantations

(2) Project staff must ensure that nursery operations are geared to planting schedules and biological rhythms. Status: Timely access to seed as well as quantity and quality are still a problem.

(5) Project staff must ensure better training, organization and supervision of the labor force. Status: There is still a serious lack of administration and management skills at the field level.

Commune/Individual Plantings

(1) - develop an extension plan detailing how and where to carry out extension activities. Status: Excellent survey data and analyzed information is available, INCN has not developed an extension plan.

Local Species Plantings

(3) Project staff must conduct and document direct seeding trials on local species. Status: Nursery information is available but direct seeding analysis has not been attempted, INCN should undertake this task.

(4) Project staff must experiment with and document various silvicultural methods. Status: The only work that has been done is with pines, and not as expected with native species.

Demarcation of the Bururi Forest

(3) Project staff should, where necessary, reconstitute or rehabilitate the Black Wattle Belt along its original length. Status: High priority yet to be accomplished.

(7) Establish a 50 meter wide strip buffer. Status: N/A, would invade private lands.

(8) INCN must provide indemnities for those required to move out of the Forest. Status: Not complete, still in process.

Wood Production on the Bururi Forest

(1) INCN must make every effort to rationalize and officialize its dual roles of protection and production. Status: Still a major issue to be addressed.

(2) INCN must carefully think out any future production scheme taking full account of the needs of the local people. Status: Continues to be an issue to define.

Administrative, Managerial and Financial Aspects

(3) OAR/B must give the Project the attention it merits at all levels. Status: USAID/Burundi is behind schedule in some procurement actions.

(7) OAR/B and INCN should seek the services of a qualified financial management consultant. Status: Not completed.

(9) INCN should review its financial commitments to the project. Status: Appears to still be a problem in terms of operational funds.

(11) INCN must integrate the PCVs more fully into the project. Status: A much better job could be done in this area.

Participant Training

(1) OAR/B stress the possibility of future participant training. Status: Some provided, but there is still a valid need for more training.

(2) OAR/B should provide two Master's level fellowships. Status: Not accomplished and also not provided for in the project.

(3) OAR/B and INCN should fund a National Agroforestry Seminar. Status: Still a valid activity that should take place in 1987.

BURURI FOREST 1987 BUDGET

Annex III.A

Government of Burundi Contribution**(Annual) Burundi Fr.**

INCN Administrative Office Director General and Staff	6,880,000.00
Bururi Technical Staff	
Project Manager	300,000.00
Nursery Foreman	250,000.00
Extension Officer	180,000.00
Bururi Project Compound Operations	?
<u>Sub Total (partial)</u>	7,610,000.00

USAID Project Funding Requested for 1987

Bururi Forestry Operations	
Nursery Operations	
Fire Break Maintenance	
Planting Crews	
Extension Assistance, (2)	3,600,000.00
Forest Guards, (13)	1,248,000.00
Special Activities	
Survey Bururi Boundaries	3,000,000.00
Capital Investment	
Transport, 4x4 Jeep	2,500,000.00
3 motos	900,000.00
Furniture, 2 Apt. sets	300,000.00
Equipment, garage	120,000.00
forestry tools	100,000.00
Materials and Supplies	
PCVs	?
Office	?
Parts, vehicle	1,000,000.00
motos	360,000.00
tractor tires	600,000.00
Maintenance and operation of Equipment	
Insurance, gas, oil etc.	3,500,000.00
Office roads and compound area	100,000.00
10% Contingency on INCN request	1,732,800.00
<u>Sub Total (partial)</u>	17,328,000.00
<u>Grand Total</u>	

Nl Réf :
 Vl Réf :
 Objet :

EVALUATION DES DEPENSES RELATIVES AU
 PROJET "PROTECTION DE LA FORET DE
 BURURI" DURANT LA PERIODE DE JANVIER-
 DECEMBRE 1987 (en Francs Bu).-

1).	13 Gardes forestiers à 8.000 FBu/garde	:	1.248.000 FBu
2).	Equipement des bureaux et des 2 studios	:	300.000 "
3).	Pépinières (création de 100.000 plants) :)	
	- Entretien des plantations existantes,	(3.600.000 "
	- Entretien des pares-feux,	(
	- Plantation (Novembre-Décembre 87),	(
4).	Achat d'une Jeep MITSUBISHI ou Jeep Land Cruiser 4 x 4	:	2.500.000 "
5).	Achat de trois motos HONDA 185 CC	:	900.000 "
6).	Pièces de rechange pour les motos	:	360.000 "
7).	Pièces de rechange pour les véhicules du Projet	:	1.000.000 "
8).	Pneus de rechange Tracteur	:	600.000 "
9).	Equipement garage	:	120.000 "
10).	Relevés topographiques du massif forestier et des plantations réalisées	:	3.000.000 "
11).	Assurance, Carburant + Entretien des véhicules et motos	:	3.500.000 "
12).	Achat de :		
	- 30 scies d'élagages,)	
	- 20 sécateurs,	(100.000 "
	- 20 machettes,)	
	- 20 haches,	(
13).	Entretien de la piste d'accès au Bureau et Aménagement du site Bureau	:	100.000 "
	<u>Total partiel</u>	:	17.328.000 FBu
	+ 10% Imprévus monétaires	:	1.732.800 FBu

- LACS DCU items
 - " Extra items
 - MATERIALS

19.060.800 FBu

15 2480 =

50,000 ±

For materials