ITTO PROJECT COMPLETION REPORT ON

Handbook on Tree and Wood Identification of 100 Lesser-Used Timber Species from Tropical Africa with Notes on Ethnography, Silviculture and Uses

Hosted by

The Government of Ghana

Executed by

The Forestry Research Institute of Ghana, Kumasi

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The Council for Scientific and Industrial Research

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PROJECT NUMBER:	PD 44/98 Rev. 2(1)
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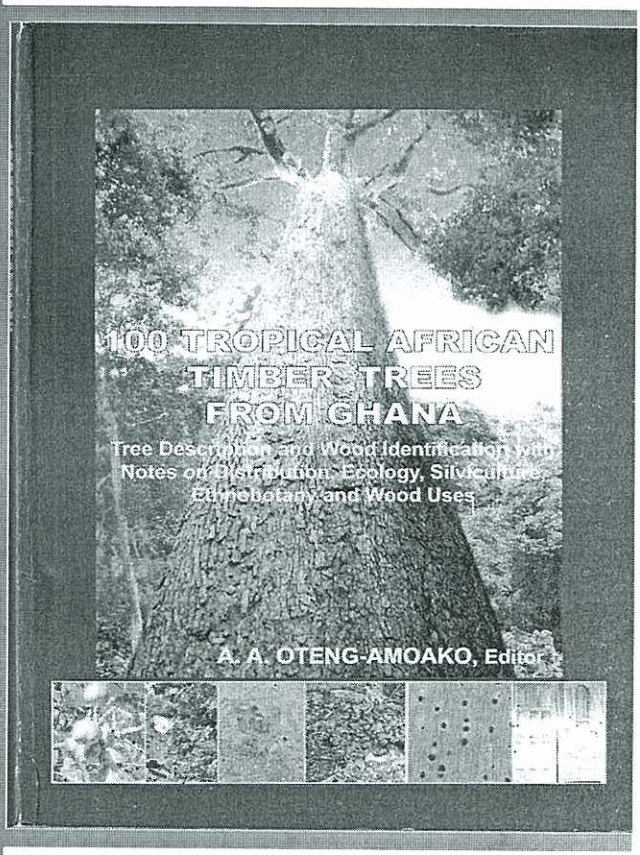

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ACRONYMS

CSIR	Council for Scientific and Industrial Research
FORIG	Forestry Research Institute of Ghana
ITTO	International Tropical Timber Organization
LUS	Lesser Used Species
LKS	Lesser Known Species
IUCN	International Union for Conservation of Nature
CSRD	Clarke Sustainable Resource Development
SFIT	Swiss Federal Institute of Technology
OMS	Organization and Management Structure
NGO	Non Governmental Organization

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EXECUTIVE SUMMARY

In tropical Africa, it is not uncommon to export as many as 100 commercial timber species from one country in a single year. This invariably results in some of the species being wrongly identified causing a major constrain in the timber industries of the exporting countries. Wrong identification of a commercial timber often results in payment of penalties worth millions of dollars by the exporting to the importing country. Therefore effective and sustainable means to reduce its occurrence is most urgent. The project sought to promote effective tree and wood identification of 100 timber species most of which are likely to form the bulk of future raw materials for the timber industries of tropical Africa.

Leaves and wood samples of 100 timber species including 24 commercial and 76 minor species were collected from Ghana's natural forests, the herbarium, arboretum and the xylarium of the Forestry Research Institute of Ghana (FORIG). All the samples were studied and data compiled with the aim of compiling their tree and wood identification features. Data was also compiled on the species distribution, silviculture; ecology, ethnobotany and the uses of the wood. The outputs were analysed, designed, formatted, edited and published into a book titled "*100 African Timber Trees from Ghana: Tree description and wood identification with notes on distribution, silviculture, ecology, ethnobotany and wood uses*". The book, a FORIG-ITTO publication with an ISBN number 9988-7943-4-7, has 304 pages in five chapters, over 100 botanical illustrations, 160 coloured macrographs, more than 200 references and a glossary of about 300 words. It is has been reviewed by four forest specialists to be of "good quality, very informative and highly relevant".

The handbook provides a quick guide to identify 100 timber tree species based on taxonomical features and bark characteristics. Identification of a wood sample of the species is based on macroscopic and physical features using a dichotomous or a computer-aided identification. The handbook gives a brief but concise account of ecological and silvicultural profiles of all the species and contains essential data on growing stock, minimum felling diameter, harvest and export volume and a conservation status based on IUCN criteria. The ethno-botanical uses of the species for food, medicine and ritual purposes are provided in addition to their numerous commercial and local uses as a timber.

The book and a CD ROM version was launched in June 2008 first in Accra and a week later in Kumasi. About 250 out of the 750 printed copies have since been distributed to ITTO,

collaborators in Switzerland and local stakeholders while some 150 copies have been sold at a cost price to the public, university students, lecturers, civil engineers, foresters, personnel of the wood industries and individuals. All monies accrued from the sale are to be used to supplement the cost of printing extra copies to ensure its future sustainability.

The handbook which is used as a general forestry reference book, is expected to impact positively on identification of timbers of commerce and is likely to reduce incidence of penalties imposed on wrong identification of commercial timbers for export. It will assist in correct identification of the 74 lesser-used and lesser-known species which are expected to form the bulk of tomorrow's raw material for the timber industry. Three officers from Timber Industry Development Division of the Forestry Commission have been trained in the use of the book for timber identification and are in turn training timber inspectors of the Division. Another major beneficiary of the book is Clarke Sustainable Resource Development (CSRD), a foreign company involved in harvesting of submerged timber trees from Ghana's Volta lake. The company has procured 15 copies of the book for its key personnel who use the book as their source of data on timber species of Ghana. The chapter on computerized wood identification has assisted in identifying commercial and minor timber species retrieved from the lake.

The original 2-year project took almost ten years to be completed because of unexpected long delays by the collaborators, consultant, sub-contractors, reviewers and the printer. However, the delay did not affect the quality of the book and the total cost because of judicious financial management of project funds. A similar project is recommended for other tropical countries especially Papua New Guinea where more than 600 timber species occur in the country's vast tropical rain forest and yet no more than 50 of them are used commercially albeit some wrongly identified.

1.0 PROJECT IDENTIFICATION

1.1 Context

The policy of Ghana's Ministry of Lands and Forestry is to advance the wood industry from the current level of sawn timber export to value-added finished products from lesser-used (LUS) and lesser-known (LKS) timber species. The objective of the project therefore emphasizes on promotion, sustainable utilization and tertiary processing of minor timber species. The implementing agency, Forestry Research Institute of Ghana (FORIG) in Kumasi, is the main Government institution established in 1961 to undertake forestry and forest related research in Ghana. FORIG works in close collaboration with the Ministry of Lands and Forestry and the Forestry Commission as the custodian of Ghana's forest estate.

1.2 Origin and Problem

Ghana's forest industry, like in most other tropical countries, is characterized by a dwindling resource; gradual extinction of the major commercial species as a result of over exploitation of the few traditional commercial timber species. The policy of the Government of Ghana and national governments of other timber exporting countries is to replace timber species which are facing possible extinction with under-utilized, lesser-used and lesser-known species which are in relative abundance. A sustainable and effective utilization of these minor species require their correct identification as a standing tree using taxonomical features, and as a timber using wood macroscopic anatomical and physical features.

2.0 PROJECT OBJECTIVES AND IMPLEMENTATION STRATEGY

2.1 Project Objectives

The original development objective was to promote sustainable utilization of 130 timber species including 100 minor species from tropical Africa through publication of tree and wood identification handbook with special notes on silviculture, ethnography, commercial and traditional uses.

The specific objectives were:

- To collect botanical and wood samples of the 130 selected species (including 100 LUS and LKS) from the natural forest to increase herbarium and xylarium collections at the Forestry Research Institute of Ghana; and to
- study and compile their botanical identification features;
- study and compile their wood identification features;
- compile data on silviculture, ethnography, traditional and commercial wood uses;
- compile all the data into a handbook which can be used to identify the standing trees and wood samples of the species;
- launch the book at a workshop and educate stakeholders on its use.

2.2 Implementation Strategy

The original plan to study 130 species was reduced to 100 including 76 LUS and LKS, and 24 commercial and premium species. This was done to reduce the volume of work and to avoid working on species which have very little or no potential use as a commercial timber. Data on utilization status, growing stock, felling diameters, annual allowable cut, production and export volume and IUCN conservation status, which were originally not included in the objectives, were additionally compiled.

Selection of botanical and wood samples were restricted to the natural forest of Ghana but eight botanical and 15 wood samples, which were not easy to locate in the natural forest, were selected from the national herbarium at the Botany Department of the University of Ghana, and from FORIG herbarium and the xylarium. The selection criteria were that a tree species should have a minimum diameter of 70 cm, found in at least one tropical African country and should have a distribution of at least one tree per square kilometer in the forests of Ghana. Collected samples were studied, data compiled and analyzed; illustrations of taxonomical features were drawn by a local illustrator and wood macrographs produced. All the data were compiled and assembled into a handbook.

2.3 Assumptions and Risks

FORIG as the Executing Agency and the collaborating institution from Switzerland, originally Wood Science Department of the Swiss Federal Institute of Technology (SFIT), agreed to use counterpart funds as supplements to the ITTO grant and therefore anticipated very minimal risk, if any, in the execution of the project. No obvious risk was expected with the printing of the book because of competitiveness of quality print houses in Ghana. The project period of two years was not readily for seen as being over ambitious.

3.0 PROJECT ELEMENT PLANNED AND IMPLEMENTED

3.1 Specific Objectives, Related Activities and Outputs

Except for the number of s selected species which was reduced to 100 from the original number of 130, all planned activities for the six specific objectives were fully implemented. The implemented activities and resultant outputs for the six specific objectives were as follows:

Objective 1: *To collect botanical and wood samples of the 130 selected species (including 100 LUS and LKS) from the natural forest to increase herbarium and xylarium collections at the Forestry Research Institute of Ghana.*

One hundred (100) instead of the original 130 species were collected. Ninety-two (92) out of the collected botanical samples were from the Moist Evergreen and Moist Semi-deciduous forests of Ghana with the remaining eight (8) from FORIG and national herbarium at the University of Ghana. Likewise, 85 wood samples were collected from the forest and the remaining 15 from FORIG herbarium. Thus, the botanical and wood samples added to FORIG herbarium and xylarium collections at the end of the project were 92 and 85 samples respectively.

Objective 2: *To study and compile their tree and botanical identification features.*

The compiled tree identification features were based on 131 diagnostic features including height and size of girth, bole shape and length, crown colour and form, branching arrangement,

bark and slash, leaf type and shape, flower, fruit and seed. The illustrations of 47 leaf diagnostic features were drawn by a local illustrator and glossary of terms compiled by the project leader.

Objective 3: *To study and compile their wood identification features.*

The compiled wood identification features were based on one hundred and twenty-five (125) wood diagnostic features. In addition, 92 coloured macroscopic and 33 physical features were also compiled.

Objective 4: *To compile data on silviculture, ethnography, traditional and commercial wood uses.*

The data compiled for each of the species included preferred soil type, topography, altitude, vegetation, precipitation and the effect of natural disturbances or hazards such as fire on growth of species. In addition, notes on phenology, methods of propagation, nursery practices and factors that enhance growth from seed and seedling to mature tree. The uses of the wood species were based on 20 major end uses. In addition data on utilization status, growing stock, felling diameter, annual allowable cut, export volume and conservation status of the species, which were originally not part of this objective, were also compiled.

Objective 5: *To compile all the data into a handbook to be used in identifying standing trees and wood samples of the species.*

The final output from this objective was the publication of a 304-page book titled "*100 tropical African timber trees from Ghana: Tree description and wood identification with notes on distribution, ecology, silviculture, ethnobotany and wood uses*". The 5-chapter book has over 150 illustrations, about 200 coloured macrographs, 200 references and a glossary of over 300 words.

Objective 6: *To launch the book at a workshop and educate stakeholders on its use.*

The book was launched in Accra on June 2008 and in Kumasi a week later. Thereafter, a series of seminars, lectures and demonstrations were held at local University centres, associations and

institutions to create awareness and educate the public on the use of the book. Copies of the book were given to selected university bookshops to sell in addition to free copies distributed to relevant stake holders and collaborators.

3.2 Schedule

Objectives 1 to 4 which include sample collection and data compilations were achieved at the end of the first year on schedule. Analysis of compiled data and formatting them into a book took an additional six months. However, the last chapter on dichotomous and computer aided identification which was undertaken by the consultant was delayed for over 12 months. Long delays were also encountered from the four reviewers and proof readers and some took over nine months to return their comments and recommendations. This resulted in a delay of more than 24 months. Printing of the book also took about ten months instead of the anticipated three months and even then books were printed without final proof reading by the editor. The launching of the book in June 2008 in Accra and Kumasi was deliberately delayed for about 12 months to coincide with ITTO international conference in Ghana. Other activities such as workshops to introduce the book in other parts of Ghana, preparation of the final account and other unscheduled activities also delayed the final completion date until December 2009. Auditing the final account was also considerably delayed.

3.3 Total Amount of Expenditure

The attached audited financial and auditors report as of 30th April, 2010 are attached with the following notes:

- The total cost of the project by the executing agency (FORIG) amounted to USD 195,493 compare to transferred budget of USD 167,200.00 approved by ITTO. The extra expenditure was financed using the accrued interest of USD 10,412 from fixed deposit investment of committed but not spent money.
- Higher monthly bank charges on the dollar account by the initial depository bank (name with held), compelled the project leader to look for a competitive bank with lower monthly charges.

- The remaining balance in the account which include book sale of USD 1,210 is to be used for paying the auditor and for future reprints. The sale of the remaining 300 books is ongoing and will be used to supplement future reprints.

4.0 PROJECT OUTCOME & INVOLVEMENT OF TARGET BENEFICIARIES

The book is a useful reference handbook for forestry students and lecturers, officers of the Ministry of Lands and Forestry, Forestry Commission, personnel of the wood industry, individuals and other stakeholders.

Three officers from Timber Industry Development Division of the Forestry Commission have been trained on how to use the book in identifying timber species and were expected to train timber inspectors of the Division. The use of the book has positively impacted on efficiency to identify an unknown timber species including retrieved wood species originally submerged in the Volta lake. However, it is too early to quantify the level of efficiency and whether it has reduced hitherto penalties associated with wrong identification of commercial timbers for export.

One of the immediate beneficiary of the book is Clarke Sustainable Resource Development (CSRD), a private company involved with harvesting of timber trees and stumps from Ghana's Volta Lake. The Company has procured 15 copies of the book to its key personnel and consultants who use the book as their main source of reference book on timbers of Ghana. Using the computerized and dichotomous identification key, the Project Leader with his team from FORIG, has successfully identified more than 120 wood species retrieved from the Volta Lake. About 70% of retrieved samples have been identified to be of high commercial value including some premium species like odum *(Milicia excelsa),* makore *(Tieghemella heckelii)* and krodua *(Pericopsis elata).* Substantial copies of the book were sold to members of Ghana Institution of Engineers after a presentation of an invited paper to the engineers by the senior author and the editor. The publication has also greatly improved assemblage of essential data

on the 76 LUS and LKS which can form the background data for future research on tomorrow's raw material for Ghana's timber industry.

5.0 ASSESSMENT AND ANALYSIS

The process of identifying the existing problem and the strategy adopted to meet the outputs from project objectives were adequately implemented inspite of the minor variation as explained in section 3. The difference between original plan to select 130 species and the 100 actually selected was deliberate and justified because of the lesser importance of the 30 species which were eventually deleted. The project duration of 24 months originally planned was inadequate and over ambitious but the justification for the prolonged delay in completing the project in ten years, however genuine, may not be enough excuse. The external influences including delays by the consultant, collaborator, reviewers and the print house were not foreseen and were beyond control of the project leader. The involvement of institutions including the Ministry of Lands and Forestry, and the Forestry Commission was satisfactory while the collaboration with the Swiss counterpart was a good example of north-south collaboration. The project beneficiaries including forestry students, lecturers, the Forestry Commission, private NGOs, Clarke Sustainable Resource Development of Canada and NGOs have from the use of the book. In spite of the long delay in completing the project, judicious management of project finances resulted in generation of extra money which was mainly used in paying for the bank charges and auditors fees originally not budgeted.

6.0 LESSONS LEARNED

6.1 Project Identification and Design

The following lessons from the project are identified as a guide for similar projects in future.

- Project identification should involve more stakeholders and should not be limited to the primary stakeholders as was done in this instance. Relevant stakeholders are needed to brainstorm to identify activities and budget needed to address specific and

developmental objectives. This approach will ensure prudent selection of species and avoid those which may later be found to be less important.

- The choice of project collaborators is very relevant and timely for successful implementation of any project and therefore requires wide consultations before the most competent ones are chosen. An incentive system to reward collaborators and partners for timely execution of project activities and realization of project outputs may be worthwhile.
- To ensure future reprint of books from similar projects and to promote post-project sustainability, sale of project outputs like books at affordable price, as was done in this project, should be permitted and encouraged.
- Short-term investment of committed but not used funds should be encouraged especially for projects which may be unduly delayed because of unforeseen circumstances. Interests accruing from short-term deposits may be used to offset high banking charges and inflation resulting from a prolonged delayed project.
- Counterpart funds pledged by project partners and collaborators should be well defined and budgeted without any ambiguity. This will forestall the situation whereby a project partner or collaborator may demand extra budget after a project has been approved as was the case for this project.

6.2 Operational Matters

There should be firm commitments from project collaborators, consultants, reviewers, subcontractors and other project partners to implement their schedule of activities on time. An effective means to monitor scheduled activities from all project partners must be evolved.

The following specific operational lessons from the project are worth noting:

- The organization and management structure (OMS) of this project was adequate but could have been better. The OMS for projects should be well considered at project preparation stage to ensure that all relevant stakeholders are considered before the final OMS and steering committee members are selected. In a situation where an

important stakeholder is over looked in the management structure, it may be important to make amends and invite him as an observer on the steering committee.

- The approved fund in three installments was released on time to carry on scheduled activities. Likewise, release of funds for project activities performed by the consultant and sub-contractors were duly and timely released by the project leader.

- Although the roles and responsibilities expected from the project partners might were thought through, additional activities identified during project period were assigned to the project consultant and collaborating institution based on their superior advantage. Compensation for such unbudgeted activity must be agreed between partners and paid from a budgeted activity.

- A project file that lists all documents on the project is well in place and needs to be emulated for all projects. The file(s) should be opened in the initial stages of the project and should be properly kept for posterity.

- The monitoring and evaluation conducted by the steering committee were found to be helpful. Periodic monitoring and evaluation by the steering committee is a must for a successful project. The steering committee should be composed of knowledgeable people in the subject area who should be able to offer constructive advice.

- In determining schedule of project activities, it is of utmost importance to identify external factors that may influence timely completion of project activities and therefore may require more time to be executed.

7.0 CONCLUSIONS AND RECOMMENDATIONS

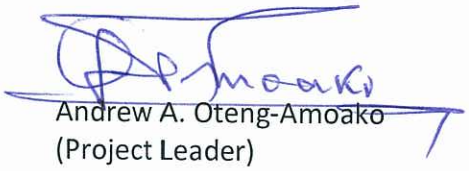
The following recommendations and conclusions are drawn for this project:

- **Identification and Design:** Only limited stakeholders were initially consulted for their inputs. Future projects should be discussed at a forum with selected relevant stakeholders and potential collaborators to fully identify the problem, objectives, activities and outputs.
- **Implementation**: Invite competent scientists and collaborators to assist in implementation of project activities. Project collaborators should constantly be reminded to deliver their schedules on time.
- **Organization and Management:** The organizational structure should clearly identify the hierarchy of project managers and partners taking into account all relevant stakeholders.
- **Collaborators:** Development of a good project proposal requires effective consultations with most stakeholders and very competent collaborators chosen from array of competent stakeholders. This ensures that concerns of all stakeholders are effectively addressed in the project proposal and implementation of activities.
- **Management of funds:** Judicious management of project funds is a must for success of a project. The interest from short term investment of committed funds as was done in this project assisted in overcoming higher expenditure due to unavoidable delays, payment of bank charges and other unforeseen expenditures as was experienced in this project.
- **Schedule of Activities:** Long delays in completing a project as experienced in this project could be avoided. This can be done by instituting a special bonus for project partners and collaborators who complete their schedules on time.

- **Sustainability:** Post-project sustainability is a must if projects are to realize lasting economic and social impact. Limited sale of project outputs like books at affordable price to the public as in this instance could be significant in meeting the cost of future reprint or revision of the book.

Projects of this nature are recommended for other tropical countries outside Africa. It is particularly recommended for a country like Papua New Guinea which has more than 600 timber species distributed in the vast tropical forest and yet barely 50 species are of commercial use. The experience and lessons gained from this project could assist in successful implementation of similar projects elsewhere.

Responsible for the Report



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Dated: 22nd May, 2010