Comparison and development (in Grenada, Cameroon & Ghana) of tropical forest plant field guide formats with a handbook to assist production of field guides: Phase 2

Final Technical Report

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DFID project reference number:

R7367

Contents

Acronyms

ECOSYN An EU project based in Wageningen Agricultural University. Ecological synthesis. W. Hawthorne has been collaborating with them to write a large field guide for West Africa, and are in this sense project collaborators.

GAIA Grupo Autónoma de Investigaciones Ambientales, Mexico

GSBA Globally significant biodiversity Area (within the forest reserves of Ghana)

PADP Protected Area Development Project, Takoradi. An EU project based in the game and Wildlife Dept, Ghana, with whom we started collaborating, but whose funding was withdrawn by EU before we had chance to work with them to test images collected.

SERBO Sociedad para el Estudio de Recursos Bióticos de Oaxaca

VFH Virtual Field Herbarium

Executive Summary

The project purpose is: “Strategies for improved sustainable livelihoods and income generation for poor landless families developed and promoted”. The strategy in question is the promotion of field guides.

1. Field guides promote global exchange of information about plants. Field guides tailored specifically can help the flow of global information about plants to and from a grass roots level.

2. Flow of information about plants allows better informed use of plants, directly (e.g. collectors of ‘new NTFPs’, tour guides) and by reducing negative influences (burning a valuable tree on a farm).

3. Field guides might be written locally, (maybe via NGOs) for local identification or simply for sale and profit to visitors to a forest. Field guides have potential to bring benefits whether or not the guide enables accurate identification, although in most cases guides have to produce reasonably accurate answers to be of use.

Pictures are essential to good field guides, but what sort of pictures work best?

Our activities were in UK and four tropical countries:

- ➔ Surveys of field guides and methods used to make them fit for various purposes.
- ➔ Uncovering local perceptions of the need for field guides and desired formats.
- ➔ Collecting plants and information about them and producing images of these plants of the type suitable for field guides.
- ➔ Making images available for others to develop field guides.
- ➔ Testing the accuracy with which people in rural areas can first identify plants without a guide, then using various formats of guide.
- ➔ Recording what different users think of various formats in terms of ease of use, attractiveness, and their potential willingness to pay.
- ➔ Obtaining a broader insight into the resources to make various types of field guides. Analysing the process of guide production and bottlenecks in production and publishing the results and recommendations.

We have distilled our lessons into a Manual for making plant field guides; the *Cola* trials in Cameroon dealt intensively with only 19 *Cola* species, but in Grenada and Ghana the work has formed a large part of published or shortly to be published field guides to a broad range of species. Work in Mexico was suspended early on, when we shifted research to Cameroon. Data from 30,000 interactions of people with plants and a specific format of Guide have provided a wealth of information.

For difficult species groups, guides with no textual information perform poorly – allowing only 40-60% correct identification. Where the species are much more varied, from many families, averages across many people typically reach 70-80%, even with no prior knowledge and only 20 minutes explanation of how a guidelet is arranged, Widely different types of image make slight to no significant difference in accuracy, especially compared to the wide difference due to variation in species’ difficulty, but amateurs generally prefer photographs from an aesthetic point of view.

We have 6 key recommendations for Policy makers stemming from this research, in Annex 1.

Background

Because this project has evolved significanty, a summary of the history follows. In particular, note that a lot of the background, and details on the early phase of the project were submitted to DFID in 1999 as Phase 1 final report. A summary is included here for quick reference.

A brief history of the project, and how the demand for the project was identified.

Pre-project

In 1998 FRP themselves produced the following call for proposals:

Topic 2.2 - Biodiversity identification guides
The huge increase in responsibilities implied by national ratification of the e UNCED'92 Framework Convention on Biological Diversity calls for greatly expanded capacity to identify and assess current stocks of biodiversity and changes in those stocks. The assessment effort is hampered by the severe shortage of field-usable identification guides. A meeting convened by the Natural History Museum (London) in December 1997 showed that there is UK-based expertise in the development of guides which do not depend on expert taxonomic knowledge. Guides should be developed for eco-tourists and for the ranger-level people who travel with the visitors. If numerous guides are produced in huge numbers for bird-watchers and visitors to tropical marine reefs, why cannot similar techniques be used for identifying forest and woodland biota ? Research should characterise and exemplify the types of field guides which are:
a. most attractive to eco-tourists;
b. most usable by community and park rangers for eco-tourism and for management of community forest resources;
c. most helpful for staff working on the development and implementation of biodiversity action plans.
An initial project should prepare at least one new guide for each target group.

Mexico & Ghana – basic rural plant identification problems

Colin Hughes, the original senior project applicant, had more than a decade experience working in Latin America; William Hawthorne had similar experience in Ghana, with several years training tree-spotters, writing field guides and running biodiversity surveys. For both of us the demand in DFID target countries for a project like ours, and as suggested in the call for proposals, was obvious, based on this accumulated experience.

Grenada involbvement–promote ecotourist guides and CBD obligations

Whilst we were refining our proposed concept note with colleagues in the biodiversity unit and Forestry Dept. of Ghana and NGO staff in Mexico, Robert Dunn, manager of a DFID Forestry project in Grenada, drew our attention to the fact that these issues, of producing appropriate field guides, were amongst the priorities on the DFID Forestry project in Grenada. Shortly after, Rolax Frederick, Grenada Forest Dept. and responsible there for recreation, information and thereby field guides within forests, came on a MSC course in Oxford. He became our main Grenadian collaborator, until his untimely death in 2003; most of the field and herbarium work has been completed in liaison with his deputy Dean Jules, and with Alan Joseph, chief Forestry Officer. Grenada also provided an ideal third country test case as neither Hughes nor Hawthorne knew anything of its specific flora: cases where field guide creators might not be very familiar with their floras at the outset of a field guide project are quite common, and should not necessarily be a complete bar to producing a field guide in a short time frame. Grenada Forestry Dept. is responsible also for implementation of CBD obligations, and it became painfully obvious that literally no one in the whole country knew enough about plants of high conservation priority there, and were relying on outdated names from colonial publications from the 1940s to summarise what was known of their flora.

Emphasis away from simple production of published field guides

Meetings at the Natural History Museum and other discussions emphasised the need for us all to ‘characterise’ and research some constraints to guide production in proposed project areas, not particularly to produce any actual published guides as part of the project. Indeed, we were asked not to include the costs of production of published, final guides in the proposed project budget. Hence, our project became one about field guides that would stop one step short of producing

any, a feature that, frankly, continues to cause mild confusion in our collaborating countries, however many times we have explained that our remit has been research into methods of production, not production of field guides.

Collaboration with R7475
FRP project 7475 is "Developing a global methodology and manual for biodiversity guides suitable for use in rural development ".
We were strongly encouraged by FRP to collaborate with Anna Laurence, project 7475, who had also been short-listed for work on this field guide subject.

Phase 1 itself involved:

a) Clarifying links with R7475 (at that time called PM98-23), with four planning meetings/ workshops March-June 1999. At this stage we decided to make two separate, but linked manuals, and we prepared a detailed synopsis of the proposed publications.

b) Visits by Hughes to Mexico, Hawthorne to Ghana, both of us meeting NGOs and foresters to discuss guides and to specify collaborators, and to collect some initial material for recommended study areas. These meetings helped finalise the species content and type of interest group relevant to the collaborators in the three countries.

These meetings were as follows:
Ghana: March 1999 Kumasi Forestry Dept., including Community Foresters, botanists, line managers; and, Protected Areas Development Project (PADP) Staff for Ankasa, at their offices in Takoradi. We decided at this stage to concentrate on collaboration with PADP and Ghana Forestry Botany Unit. A potential synergy between the EU's Ecosyn Field Guide Project and the current one was noted, mainly in terms of potential for exchanged lessons and images.

For Mexico, the Phase 1 final report and the project memorandum details the change in plans from a Quintana Roo to a Oaxaca guide. At a planning meeting 26 –30 July, 1999 in Mexico City we established a need perceived by NGOs and GO s like SERBO and GAIA, and indeed of the FRP "CUBOS" project active at that time, to help field identification, which normally depends on specimens of most species being sent from Oaxaca to Mexico City. *Selva Baja* tree field guides were planned to support both NGOs only interested in useful plants and those, like SERBO, requiring more exhaustive coverage.

c) Start on a review of existing field guides. This is summarised in the Phase 1 final report, and the complete product below.

d) Attendance by C. Hughes at the International Botanical Congress, 1 August, Missouri USA, who attended symposia on interactive identification systems, and came across other interesting initiatives, such as the Field Museum (Chicago) programme on rapid reference collection, Micro-herbarium Guides, and Rapid Colour Guides.

Phase 2 – 1999-2004. the subject of current final report

Note that most of the project background workshops were completed before this phase. But some structural changes then occurred.

Colin Hughes and therefore Mexico leave the project
Colin Hughes left the project in 2000 to take up a longer-term post in our department. This involved some further project restructuring, as Hawthorne was not able to conduct field work in Spanish and in any case by this stage DFID no longer favoured work in Mexico.

Cameroon and Stuart Cable adopted
We started work with Limbe Botanic gardens (where Hawthorne was involved at the time setting up a biodiversity database, and the need for village-friendly field guides is acute). Stuart Cable was recruited in Jan 2001 for what was tio be 18 months to help with the work in Cameroon and with the background tasks.

Evolution of plans for Manual
Subsequently after a number of meetings with R7475 we decided to harmonise what was once to be two separate books within the same covers of one publication. So, our two projects are producing a single 'Manual to Guides Production' (see Annex 5), incorporating our differing project approaches.

Research phase
The project was now able to concentrate on the goals and activities outlined for research on formats in the current PMF (below).

Changes in planning dissemination via WWW
Because of the large amount of imagery created by the project, and the increasing reluctance of the publishers, reviewers and co-authors of the Manual to field guide production ('The Manual' for short, see Annex 5) to tolerate the large amount of material that was accumulating for the bibliography of field guides, and the glossary-related discussion of plant field characters to use in a field guide, we applied for additional funding in 2003 to prepare a web site to make interactive versions. Commercial Web image galleries (e.g. "ToadView", an Oxford University archaeology spin-off business) were too expensive for the facilities they offered, so we have taken the opportunity to develop our own new web interface for botanical imagery and have started to fill it with field related pictures derived from the project. We call this image gallery web page the 'Virtual Field Herbarium'.

Project embers
Response to pressure to convert lessons to actual Guides in Ghana and Grenada
We started by being asked to de-emphasise the publication of actual guides, and to concentrate on generic outputs. However, now the project is finishing we have been in a position –indeed under pressure from collaborators -to convert some of the lessons of the project, and the materials we used to test them, into publishable guides.

At the request of Mr. Alan Joseph, senior forest officer Grenada the DFID Grenada Forestry Project (and then the Barbados office when that DFID project terminated) subsequently took on the task of responding to user pressure to support a completed field guide to Grenadian plants.

In Ghana, the trial tree guidelet (see Annex) was in fact a fairly usable field guide, but there were only 6 copies made and we are now discussing with FRP how to finally convert it to a publication.

We are also at the time of writing discussing with FRP how we might convert the imagery collected in Ankasa (before the work of our collaborating EU project there, PADP, was suspended) into a simple published guide for this exceptionally biodiverse forest. During early collections in the forest we have stumbled across an unnamed new genus or even family of flowering plants, whose publication is being prepared, and several new species, whose publication has been delayed due to other commitments, but will hopefully occur in coming months.

What next
We discuss at the end of this report the many ways that the project outputs are living on.

Background to the research

'Field Guides' include electronic and classical paper versions, laminated cards and various other formats summarised in the bibliography and discussed extemsively in the Manual, Annex 5.

We refer below to DFID's target beneficiaries around tropical forests, poor (often landless) families, especially those living in rural areas, as 'Rural poor', or our "Target Groups".

The importance of the researchable constraints

The early background research is reviewed in the PMF. For a more up-to date discussion, giving a background to a variety of issues, see Annex 5, especially Chapter 6 of that manual, dealing with field characters, and Chapter 8 dealing with illustrative methods.

The prime question has been **how can field guide production be enhanced in a way that benefits our target groups**? Can we pinpoint the major opportunities for poverty alleviation and what are the bottlenecks to field guide production by and for local groups of people? We start from the premise that their livelihoods could be enhanced through the promotion of biodiversity guides in the following ways.

1. Field guides in general, even those targeted at technical users, promote better global exchange of information about plants, including: how plants are used, and could be used better; how they can be propagated more efficiently, and how certain species deserve to be managed more carefully, as their gene pool or whole existence is under threat; any of these aspects of increased information exchange could benefit target groups in the long run, but usage information and interesting facts for a tourist guide have potential to bring benefits in a short time frame. Before any benefits can be realised though, the core issue is that plants always have to be identifiable in the field before anything else can be learnt about them.

2. Field guides tailored specifically for rural poor people may speciifcally promote the flow of this global information about plants down to and up from a 'grass roots level'. Field guides are needed that are appropriate for all relevant sectors in society from international botanists, NGOs helping target groups, and target groups themselves, but traditionally field guides tailored to the latter groups have been very sparse. One of project activities (the annotated bibliography) has sought to quantify this dearth of field guides, and to highlight where the problem is worst.

3. Flow of information about plants allows better informed use of plants in the broadest possible sense, either directly (e.g. employment as tree-spotters, collectors or 'new NTFPs', or as tour guides), or indirectly by helping promote the sustainable use within the ecosystem. Field Guides promise to reduce costly errors (burning down a valuable tree on a farm) and to increase economic activity based on novel trade options.

4. Field guides might be written locally- not necessarily by the farmers themselves, but for instance by farmers working with local NGOs and national botanists - which are destined for use, or simply sale and profit by our target groups. Field guides produced explicitly for a local area have a marketing advantage over urban bookshops, and when sold locally will benefit specifically the local economy.

But there are various aspects to the question of whether we can expect real local socio-economic benefits by promoting field guides:

A. **Where is the evidence** that the rural people (or other groups relevant to our equation of botanical information suppliers/consumers) or paying visitors to their forests cannot identify plants adequately in the first place, or at least cannot communicate about them with the rest of the world using globally understood names?

Although the original project personnel knew this from experience to be a general fact – that most people do not know most plants and cannot find out about them - in the countries they have worked as botanists for 20 years, there are very few published statistics to substantiate it and many policy makers appear not to believe this. We therefore aimed to collect data to

demonstrate this, which is in any case essential evidence to show the 'before/after' differences of field guide accuracy in our trials.

B. Given that there are species that some people cannot identify, **is this a problem** or lost opportunity for the people? In other words, does this blind spot in any way relate to species for which..

> B1. ..There is any information, globally, that could in theory be used by people to improve their livelihoods in conjunction with the relevant species?
>
> B2. ..Ignorance, resulting from inability to identify specific plants, is leading to a loss of efficiency of usage, maybe because:
>
> > B2a. ..it is preventing efficient use of a resource because too few people can name it to harvest or grow it?
> > B2b. ..it is reducing opportunities for people to enhance their livelihood by, for instance, making users less likely to make money as an eco-tour guide

These aspects –basically economic ones - were not a main focus of the current study, but they are obviously researchable constraints around the issue of the socio-economic value of field guides, and we do give many obvious examples of the types of global information that exist in the The Manual (Annex 5) and also in the Policy Brief (Annex 1).

The fact that a lot of useful information does exist globally about many useful species is self-evident from the shelf-space in libraries of developed countries occupied by books and journals on agro-forestry, ethno-pharmacology...., as is the fact that scientific names are used to index that information. Therefore it is a reasonable assumption that some of this information is potentially useful for out target groups (point B1).

In some contexts (e.g. for CBD) the facts of biogeography and global distribution determine whether species are of global significance from a conservation point of view or not, and this sort of information is very rarely known at a village level.

C. Even if all species are known to all people local to the species, with a name that is globally understood, rural poor people might still benefit from field guides by: selling field guides to visitors to forests; using them to help educate their children or to carry the knowledge further afield; or to polish up their own knowledge.

Is there a good market for sellable guides, though, and if so will it pay for the production of a field guide (or at least justify a development or conservation-based investment)? To answer this we need an idea of the resources needed to make a guide. Again, we did not intend a full economic appraisal of this component, which has so many variables to it that a few case studies could not do justice to the question. Also, we are not economists. But, we decided to ask all individuals in our trials how much they might be prepared to pay for guides, and how much they would ever spend on any book, and in workshops certainly heard many cases amongst our target users where inability to identify plants in the field leads to frustration and loss - thereby, generating a potential market for any field guide that can be made to work at a reasonable price.

D. Is it even possible to make field guides that can enhance the identifiability of plants with rural or other users? and, related to this E. How can field guides be designed so that rural poor, and indeed others, can benefit from them?

This –can field guides be made to work for identification often where literacy levels are low- has been a major theme of our research. Having established, from early workshops, and the universal agreement of hundreds of casual conversations, that all potential users prefer picture-rich guides (we have not come across a single case of someone who prefers a small, concise plant guide but with no pictures to a larger one with pictures), and that a significant number of users are likely to be not very technically literate, this question became one of **(how) can pictorial guides be made that work for DFID's user groups, for identification purposes and/or** merely as saleable commodities or souvenirs.

F. Can we think of systems and resources that might facilitate the production of guides for, or even at a national or local level in underdeveloped countries?

We have tried to asses to what extent “modular guides “ can be made to work. This concept is summarised in the policy brief in Annex 1; and described, for instance in Chapter 5 of Annex 5, which discusses “access methods” for field guides. The main trial of this type of modular guide was in the Ghana tree Guide, described in Annex 2.

Project Purpose

The project generic purpose, stated in the FRP log frame, is “Strategies for improved sustainable livelihoods and income generation for poor landless families developed and promoted”. The strategy in question is the promotion of field guides.

We addressed this purpose this through the following major components of the project:

1. Review of the coverage of existing field guides, as a bibliographic source on our web page for people seeking other field guides in their region; or for people seeking guides from other regions as examples and inspiration.

2. Review of the use of jargon and, associated with this, of characters that are good to concentrate on in field guides. Jargon is frequently cited as a problem with the textual content of guides. We aspired to view to rationalising its use and to facilitating the early production of an **appropriate glossary as an early step** in any field guide project.

3. Noting how long various stages in field guide production take and asking **what resources are needed to make components of field guides** in three main case studies. In this context, we also decided to concentrate in one study on a key issue about packaging and potential for innovation: **Modular formats – can they work?** This is a format that allows guides to be assembled partly from publicly available parts, or species units. If they can be made to work, this approach has great potential for promoting rapid creation of field guides tailored specifically to users in small areas, even to individuals. Is this modular approach the way forward? Development agencies, extension workers and NGOs need to know, as they are in the best position to create species units (e.g. cards) for a guide once, globally, and to re-use the card in many slightly different contexts.

4. We have been trying particularly to establish, **what sorts of pictures work**? Anecdotally there is a lot of conflict between different writers and different users of field guides as to the relative merits, for instance of line drawings and photographs. This is what every field guide writer wants or at least needs to know the answer to, and what we therefore have tried to find out empirically. We have been trying out various formats of picture-based guide material with many users to see if they could be used to provide guides that were fit for the various purposes of Field Guides.

Research Activities

Some of these are closely linked to immediate outputs, and as they are now finished, are therefore discussed in the next section.

1.1 & 1.2 Review of existing field guides and associated software, & assemble compendium of existing field guides: the review of tropical plant field guides was run as a background activity for much of the project period. This has been ongoing throughout. See Outputs.

1.3 Assemble comprehensive illustrated glossary. This has been ongoing at a low rate throughout the project, although there is endless scope for refinement. The work fed into and was also fuelled by specific glossaries (see Annex 6 for the Ecosyn woody plant guide (more technical), and Spice Island Plants (less technical), both linked field guides. See also Outputs, below.

1.4 Compilation of CD-ROMs of useful images
We had planned to supply CD-ROMs with the Manual (Annex 5), but the publishers did not favour the idea, as CD-ROMS are not conveniently included as an annex to books, because the book then has to be sold with VAT, and there are other issues with general MAC/PC versions, and with book publishers handling CD publishing. We therefore intend to allow downloading images from a project website instead, as part of the illustrated glossary there. However, country

specific CDROMs of images have been supplied to all our collaborating countries (copies of most pertinent are on an FRP master disk), and other images been copied to large computer disks in Grenada (Grenada Forestry Dept. network server).

1.5 Synthesise results from user surveys and testing to draw conclusions about guide format pros and cons. Yes, this has been ongoing throughout the project. See summary of results (Annex 2), and also Annex 5, Chapter 8, on illustrations.

1.6 Write *Guide to Plant Field Guides*
This has involved a protracted period of discussion and compromise with our co-authors, as requested by FRP, and also with changes made in response to a FRP reviewer. Detailed Information has been gradually removed and simplified from early plans, to keep the bulk down and, to summarise and point to other information rather than to be comprehensive.
This manual now has the title "Plant identification, conservation and management: methods for producing user-friendly field guides": see Annex 5.

2. Preparation of actual field guides in Ghana, Grenada and Cameroon
Yes, these were all prepared in time for the project field trials See Annex 2, 8 and 9.

3 Analysis and dissemination
3.1 Analyse results of user surveys and field tests
See summary of project results, Annex 2, and the section “Contribution of outputs” below.

3.2 Analyse resources required to prepare different guide products (‘ergonomic study’).
This was part of most other activities; summarised in Annex 3.

3.3 Write scientific paper.
The main results have for the time being been incorporated as an Annex (see Annex 2) and in the Guide to Guides (Annex 5), pending final review by the Plants And People series editor, of the space for it there. A paper was prepared for the AETFAT congress, which evolve dinto Annex 2. It seems the AETFAT papers are making slow progress, to publication, and as they stipulate the research must not be published elsehwere, I am planning on withdraw the AETFAT paper and publish it elsewhere. In any case, further academic papers are planned, and a broader audience for the project results will be sought elsewhere. As a first step, a modified version of Annex 2 (to suit their house style) will now be submitted to Taxon in November 2005.
3.4 Present paper at conference. See AETFAT 2003 PowerPoint presentation, Annex 10. Two papers were presented in a row.

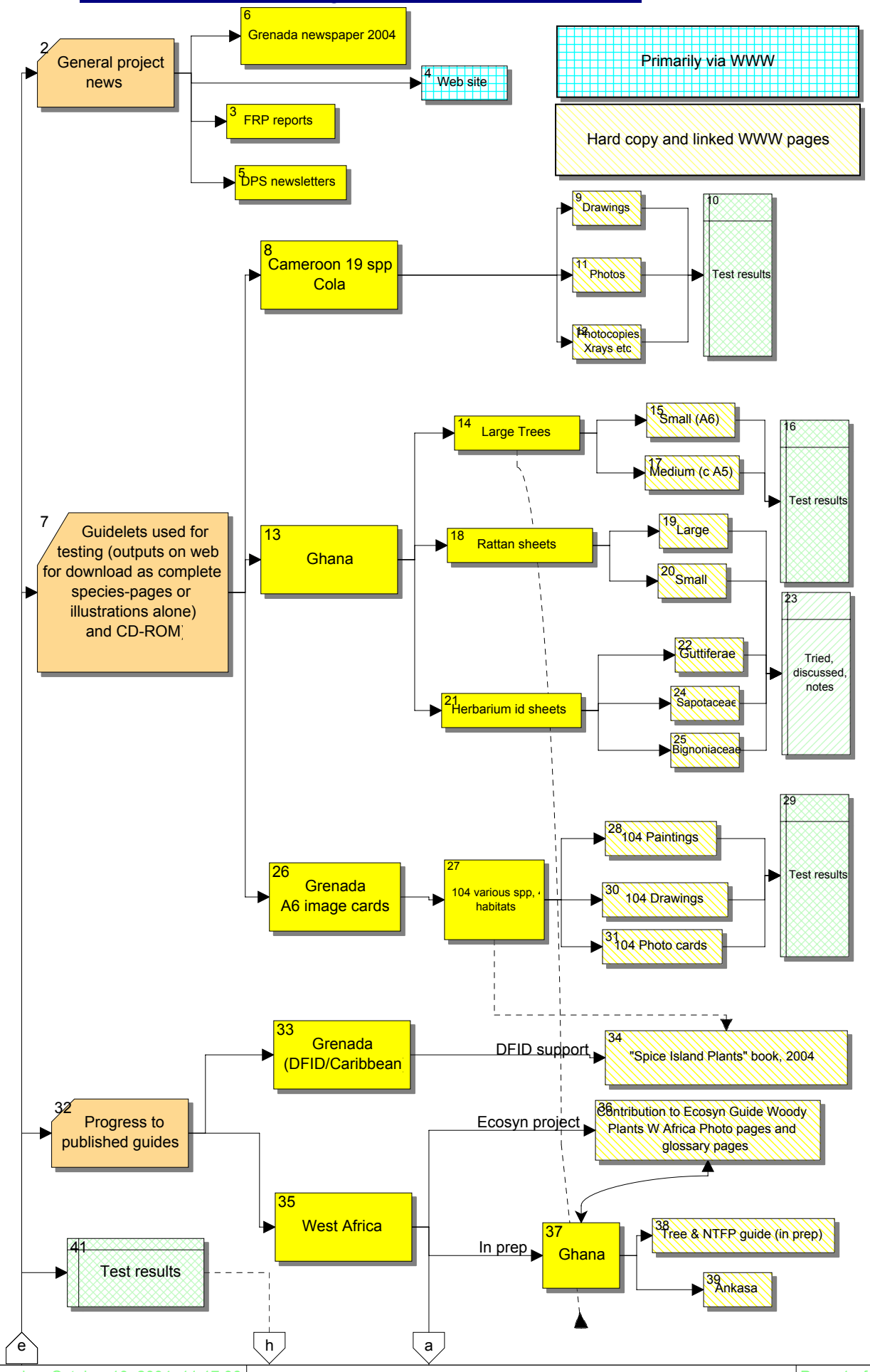
4 Web site
4.1 Contribute to general Daubeny Web site development and planning through meetings with a Web site management committee, to promote aspects dealing with field guide production and tropical plant identification. See Annex 9, wrap-up notes and technical details from a summarial FRP-related meeting for the new plant field guide web site. It seems that the new FRP web site is having the desired effect of stimulating a desire to build up the Virtual Field Herbarium, and we suspect this will be the platform for a series of grant proposals in the next few months.

4.2 Specifically create field guide Web pages integrated with the general Web site
These are available at http://herbaria/plants/ox/ac.uk. See Outputs.

5 Write Policy brief
See Annex 1.

6 Oxford Workshop
Six collaborators, from Oxford, came to UK in Aug 2003 to review project lessons and learn to make a field guide using them. See Annex 4.

Field Guide Project R7367 Outputs



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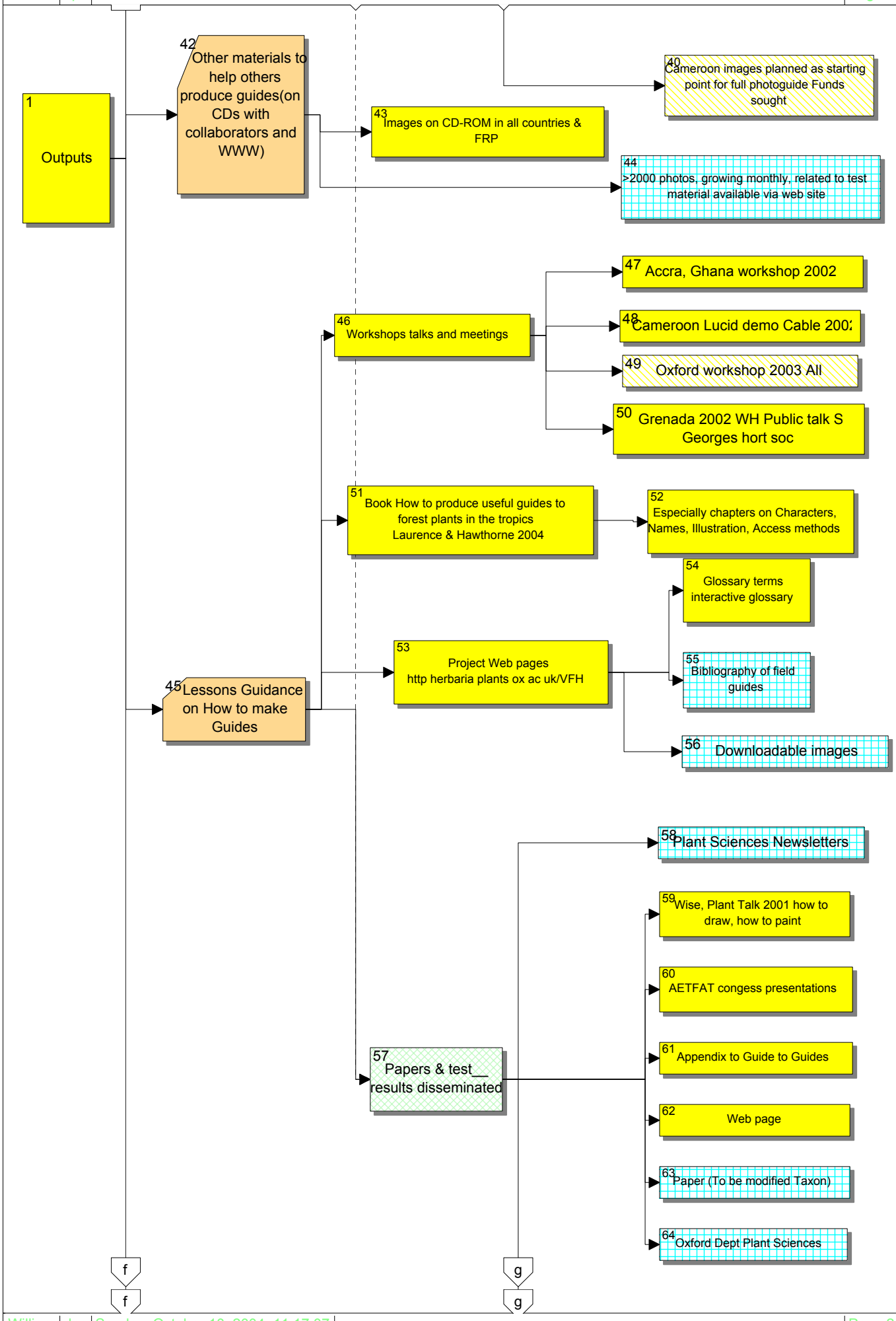

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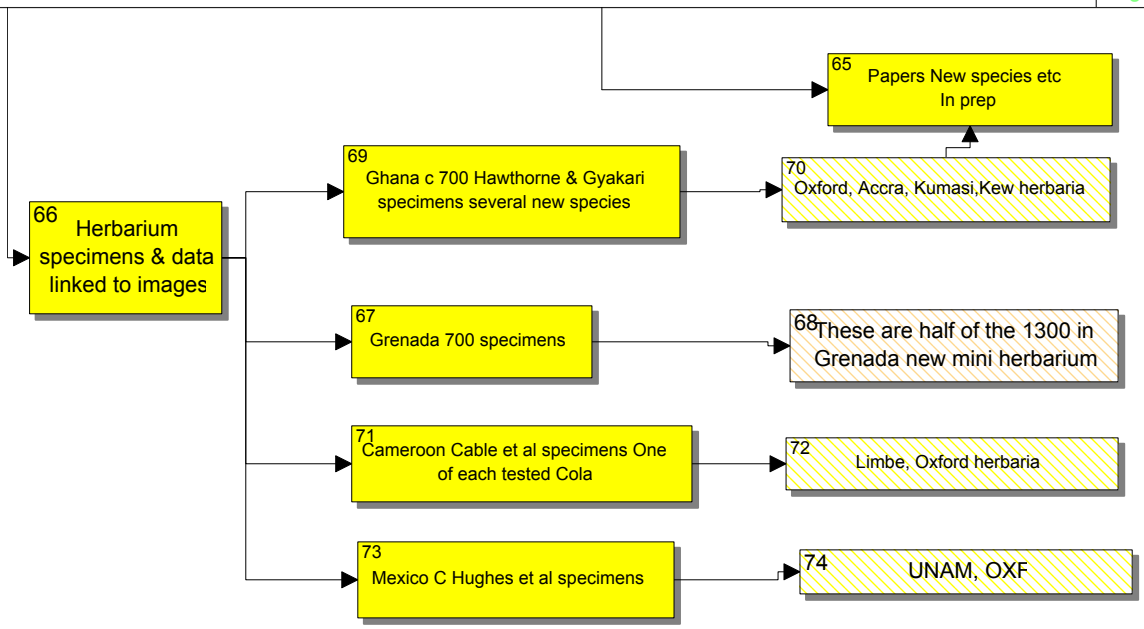

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Outputs

The outputs are summarised in a hierarchical tree chart in Output tree 1, and comments on their state of completion as follows:

1. Improved understanding of, and insights into, the usability, accuracy, efficiency and value of different field guide formats for different types of users, as well as the resources required to produce different guide products.

1.1, 1.2 Review and compendium of existing field guides and associated software:
See Annex 5, Chapter 4 and website.

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All tropical plant field guides, and many other interesting field guides in the libraries of Oxford and Kew, plus others encountered in our collaborating countries, were assembled into a bibliography database, which at the time of writing has 809 entries. Originally intended for inclusion in its entirety in the main Manual (Annex 5), the editors and reviewers decided this sort of detail was far too unwieldy for the scope of the book. A summary is therefore included there, and an interactive version placed on the FRP /Oxford herbaria web-server which allows guides to be filtered by country, region or author.

Software packages were compared (and written up for Manual, Annex 5, Chapter 5), although the software available has changed slowly but steadily over the project period. Discussions were held (W. Hawthorne, and Denis Filer) with Trevor Whiffin, CSIRO, who visited Oxford in May 2003 about how his Australian Rainforest Key could be generalised, and possibly fed with data from the BRAHMS package. This CSIRO Rainforest key is one of the best working versions of an electronic tropical rainforest key, and is technically the most interesting, being based on specimen level data. However, the work involved in coding the information for Australian rainforest plants would be very daunting (more than 10 person years) for budding key writers.

At the time of writing, the notion of producing a standard character list for all rainforest plants (an unscheduled activity), useful for compatible multi-access key databases, is still under discussion, but it is a spin-off of the review of existing guides, and we (Whiffin and Hawthorne) tentatively decided to agree and publish a list of 50 key characters which could be used to generalise tree identification in the tropics. Meanwhile some of the thought about how such data could be used has been built into the project's WWW Virtual Field herbarium, where it will continue to be developed (see Annex 9).

1.3 Assemble comprehensive illustrated glossary.

An initial version is available via the website, to run with an advisory discussion in the Manual (see Annex 5) Chapter 6.

This had been intended as annex to the Manual, maybe on a CD. However, the editors, co-authors and reviewers of the Manual encouraged the project to summarise the main aspects of plant characters (in Chapter 6 and an Annex of the Manual, see Annex 5) and to put the glossary on the web site, which we have done (see Annex 9) in way designed to be integrated with the species image gallery. We have not yet achieved the full potential of this approach, but it shows clear signs of being more useful and educational than existing glossaries, web based or otherwise, especially as for field guide writers as it has a "field character" bias.

The way we have now structured the Virtual field herbarium, using real examples from the image database (filterable by taxonomy or geography) makes the development of the glossary illustration links more arduous, but correspondingly more useful, than we had anticipated, but expect that by November, most glossary images will be linked to relevant imagery.

Different subsets of the glossary information are repeated in the Ecosyn field Guide Glossary and the Grenadian field guide glossary (see Annex 7), a process which has educated the 'difficulty levels' in the glossary,

1.4 Compilation of CD-ROMs of useful images. CDROMs were sent to to collaborating Mexican NGOs, and others were provided to FRP in April 2003. However, we soon realised that the web is a more realistic way of reaching more potential guide creators. Adding a CD-ROM to the book became unfavourable because more than one CD would be needed, and the evolution of the nature of the manual (to less technically intense, and shorter) arising from compromise with the Earthscan publishers and our R7475 co-writers made the addition of CD's inappropriate and outvoted.

1.5 Synthesise results from user surveys and trials to draw conclusions about guide format pros and cons. Yes. A summary is in the Manual Annex 5; was presented at the AETFAT congress (Annex 10). The publication of the AETFAT congress proceedings, however, has been greatly delayed, so I intend to submit an extract of the paper to Taxon. The latter reformatting not yet completed.

1.6 Write Guide to Plant Field Guides. Yes – Annex 5.

1.7 Plan publication distribution and promotion of Guide to Plant Field Guides

Earthscan/Plants and People have their own policies for publication, and FRP have an input to the list, but the final mailing list for free copies is to be discussed with FRP prior to the book being despatched. Planning / discussion meetings with AERDD/R7475 were held originally. AERDD ceased to host the project, but Anna Laurence moved with the project to Oxford. After the three initial meetings we have therefore continued to interact by email and in person, across the road.

Evaluating A modular tree photoguide, Ghana

Discussion and reporting of those aspects of our results which relate to the implementation of the CBD, have been held with representatives in our three countries. In Ghana and Grenada, the representatives of the CBD were present at the wrap-up meeting to present results, and were our collaborators. In Cameroon, we have dealt only with Limbe Botanic Gardens, who are the key implementers of the CBD in SW Cameroon.

2. Preparation of actual field guides in Ghana, Grenada and Cameroon

2.1 Preparation of different formats of guides for testing. Yes. All are available on the website, and a full set of physical samples are attached.

Photo card

2.1.1 Briefing collaborators / target institutions. Yes, both in the regional workshops or meetings and in the Oxford workshop 2003.

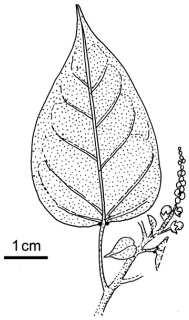
2.1.2 Identify user groups and evaluate guide demand and desires. Yes, in Grenada, these were pinpointed as Tourists, Tour Guides and Foresters and National Park workers seeking to implement the CBD. At a meeting with the

ministries there in 2002, the Minister of education emphasised the potential value of any such guide in secondary education. In Cameroon, a full Guide was never planned as part of the project, but the need in general for field guides that can be used by villagers there to facilitate their participation in biodiversity inventories was a main early reason to moving some trials to Limbe from Mexico. In Ghana we are still intending to revisit an Ankasa guide, anticipating the re-vitalisation of an EU project to boost ecotourism there, but testing related directly to this output, partly using images developed for the ECOSYN guide, was suspended and the time spent making a more comprehensive tree Guidelet.

Painting

2.1.3 Define target forest areas, species and formats.
Yes, these are obviously linked to our defined users described in 2.1.2.

2.1.4 Field collection of botanical material and assembly of local knowledge. Yes, although local knowledge even of local names proved very sparse. The 600 or so botanical collections made in Grenada have subsequently been expanded with the DFID forest botany initiative, and now forms Grenada's first herbarium (a micro-herbarium based on specimens labelled, in Ziploc laminated bags –see case study in "Guide to Guides", Chapter 8). *Cola* from Cameroon and various specimens from Ghana were produced, including in Ghana's case the first collections of some new (and very rare) species from Ankasa and environs (papers in prep., serendipitous spin-offs from the project, not directly part of it, but vital ingredients of any new guidelet for that forest). Specimens from Mexico, now in Mexican and Oxford herbaria, were also an output, permanent assets, even though this component was abandoned.



2.1.5 Work out balance of images for testing and for final products. Yes- this is implicit in the material produced. We tried a lot of artwork in Cameroon, three most obvious ones in Grenada, and one in Ghana where we were testing the concept of whether a "modular" approach to pages might work with different sizes of page.

2.1.6 Identification and organisation of botanical collections. Yes, see 2.1.4.

2.1.7 Field-based artwork and training in botanical illustration. Rosemary Wise has contributed various papers on how to draw and paint, together with a contribution to the Manual, Annex 5, Chapter 8, on illustration. However, due to illness at a critical phase in 2001-2 she was unable to come to Ghana to paint living plants, so she concentrated on paintings and drawings in Grenada where, regrettably, our main collaborator Dean Jules was in no position nor showed any inclination to be trained to draw.

Drawing

Figure 2 Grenadian trials of three formats

2.1.8 Design and make sample products for testing and potential use in final products. Yes. See formats. Annex 8.

2.2 On-site field testing of different formats of guides in Ghana, Grenada and Cameroon. Yes See Annex 2.

2.4 Plan printing, distribution and promotion of actual guide products. For Grenada this has become the role of the Forestry Dept., but they are well aware of DFID's goals and intend to satisfy them by providing books cheaply to poorer tour guides, and to schools. The tour guides will be encouraged to sell them for a profit, and to familiarise themselves with the contents to enhance their service and advance their livelihood.

In Ghana and Cameroon the desire to work towards making more guides locally was encapsulated in a Darwin proposal, which unfortunately was unsuccessful.

3.1 Analyse results of user surveys and field tests. Yes – see Annex 5

3.2 Analyse resources required to prepare different guide products ('ergonomic study'). Yes, these are dispersed in the Guide to Guides.

3.3 Write scientific paper. A paper was prepared for AETFAT, but as their proceedings are taking too long to publish, and they are not allowed to be published elsewhere, it has been modified and moved as an Annex to the Guide to Guides, where it is referred to intensively from the main text. A version is now being modified, to add more original content, and submitted to Taxon as a separate publication.

3.4 Present paper at conference. Yes, AETFAT congress 2003, two talks were presented in succession, one on the project results as a whole, and one on a neglected type of plant habit. See Annex 10.

4.1 Contribute to general Daubeny Web site development and planning through meetings with a Web site management committee, to promote aspects dealing with field guide production and tropical plant identification. Yes, but due to the very frequent travel of members of the department, almost all meetings have been more personal. See Annex 9.

The web site will continue to be developed in innovative ways, but the FRP project has given it a good and inspiring start, "Phase 1". Phase 2, is currently in play, from October 1 . 2004 until whenever a grant can be obtained to move development up a further gear. In phase 2 we will continue voluntarily supplying and codifying more images and data, and refining the software. Because of the current levels of enthusiasm for the concept, Phase 2 should involve significant, if rather irregular improvements , with limited or no extra funding.

4.2 Specifically create field guide Web pages integrated with the general Web site. See Web site summary (Annex 9)

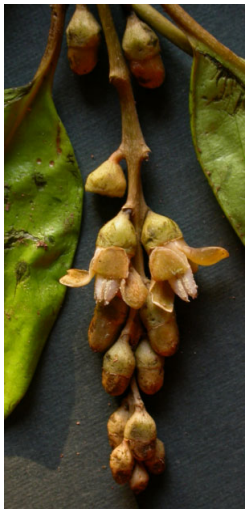
5 Write Policy brief. Attached. Annex 1.

6 Collaborators come to UK in Aug 2003 to review project lessons and learn to make a field guide using them. Yes. See workshop report. Annex 4.

Other incidental outputs

➔ The network of numbered and named trees through Ghana's forest zone GSBAs (see Annex 2), in their so-called focal areas, is a useful training resource and also a testing ground for future trials.

➔ Several new species were discovered in and around Ankasa National Park. The papers to describe these species will be an unexpected spin-off output, when I dfind time to write them. One of the species (provisionally "*Amodora anakasaconda*)"(right) is very unusual and may be a new genus or even a new family. Stephen Harris is trying to sequence its DNA at the moment, but it is proving obstinate. If a new family, this will be the first new family based on a new species in Africa for more than half a century. No new endemic genus of vascular plant has been described for Upper Guinea for a similar period (acutally, I havent yet worked out when the last time was, but it was certainly pre-Flora of West Tropical Africa).



➔ The potential is massive to use this new genus for untold publicity for for FRP and DFID in particular, the project outputs in general, and in particular the Virtual Field Herbarium, where we will in any case feature it. If we manage to obtain resources to write an Ankasa Guide, the new species will obviously feature very highly. However, until the plant is published, we are unwilling to publicise it further than this report. There will be a mention in the Ecosyn field Guide, which can also make some claim to helping discover it (because only with the Guide was it possible to work out that it was new, when we encountered it intially as a sterile specimen).

➔ The general project image library includes a number of people-with-plants images which may be of use for publicity e.g. by FRP or DFID

Contribution of Outputs

The main problems and opportunities for field guide production are outlined in our policy brief.

An updated version of the project dissemination strategy follows.

The outputs itemised, with numbers corresponding to outputs in log frame, are listed here but with an explicit statement of the role they were intended to play, or have played, in dissemination of the project lessons. This strategy has been substantially modified with the benefit of hindsight, also to reflect the evolved project framework.

Our vehicles for promotion

1. Earthscan The manual: "Plant identification, conservation and management: methods for producing user-friendly field guides"
Eds. A. Laurence & W.D. Hawthorne

In collaboration with Anna Laurence and numerous contributory authors. This is the main vehicle for the distilled lessons from the projects to reach NGOs and others who are in a position to write field guides, but perhaps lack confidence, skills, or especially knowledge of how to find information. We intend that parts of this guide will also be useful to funding agencies and policy

makers, to encourage them to promote appropriate formats. The Guide is partly out of the hands of this project. Anna Laurence is mainly dealing with the publishers. We shall certainly be promoting it on the web site when completed.

2. Actual Field Guides and guidelets, images and similar outputs
Grenada "Spice Island Plants" Guide (final conversion to full field guide and publication funded and controlled by DFID /Barbados). The guide now has references to most species recorded on the island, making it useful far beyond Grenada. Although the task or disseminations has therefore been handed over to Grenada Forestry and DFID/Barbados, the book will be distributed mostly via Grenada forestry Dept. who will provide it free or very cheap for schools and to local, poor tour guides, who will be able to learn from it and, in the latter case, sell it on for a profit. It will be sold more expensively to shops and tourist agencies, with a view to earning enough money to fund a future edition. However, this is entirely out of the hands of W. Hawthorne. The Grenada Field Guide has a potential dissemination problem following Hurricane Ivan. We won't be able to explore these fully until the Forestry workers have at least restored their homes and offices – January 2005 might be a more appropriate time to start thinking of this.

Ghana tree guide (Final publication and distribution being prepared as a late amendment to the project). This will be distributed mostly via the Ghana Forestry Commission head office, via their Community Forestry unit, RMSC, Kumasi, and through some selected NGOs. The precise policy is still under discussion between W. Hawthorne, FRP and Ghana. The Guide to Ghana trees derived from the test material (with a few new additions and book-related trim, e.g. short Introduction and Index) is being prepared. Arrangements for pricing and distribution policy will be made in early October (like the Grenada field Guide this output was not planned as a formal publication in the project document).

➔ Ghana Ankasa guide (Final publication and distribution being prepared as a late amendment to the project). This will be provided at cost price to a Darwin biodiversity training project and free (numbers of copies yet to be decided) to the Ghana Game and Wildlife Service, or the Protected Areas Development Project if that project reappears soon. We are in the process of requesting from FRP support to produce images and information from various sources into this "rapid guide" for Ankasa (Ghana), aimed at ecotourists and older school parties – simpler than the Grenadian Guide. It will also feature some of the new species found partly during the early project exploration of this forest, and allow more of W. Hawthorne's existing photo library to be classified and otherwise prepared for the Virtual Field Herbarium.

➔ Contribution to the Ecosyn West African Woody Plants Guide (Hawthorne & Jongkind in press). Images from the project have been used in this book, and the glossary and associated 'Cross-cutting keys' was prepared for mutual benefit. Although not a direct output of the project (this is a massive technical book, aimed at technically minded users but not necessarily professional botanists), some of the photos for difficult species groups have also been used within it. EU/Ecosyn and Kew will be distributing for free or cheaply via institutes in West Africa, and are seeking new routes for dispersal, possibly via the British Council. This is the responsibility of the Royal Botanic Gardens, Kew, and the EU/Ecosyn project which is funding its publication. Some FRP project images have also been used in the Linked publication by Poorter et al., 2003.
http://www.dow.wau.nl/forestry/publications/poorterbongers-book.htm

➔ CDROM of Mexican plant images. When the activities in Mexico were curtailed, when Colin Hughes left the project in 2000, all images taken so far were delivered on CD-ROM to NGO collaborators in Mexico. CDs of local images have also been supplied to Ghana Biodiversity Unit, Legon University, Ghana Forestry RMSC, Limbe botanic garden, Grenada Forestry and Grenada Ministry of Agriculture (who specifically wanted them to make T shirts for World Food Day, but did not end up doing so).

➔ Cameroon Guidelets. These were primarily used for testing, but represented the tip of the biodiversity iceberg even for Mt. Cameroon. W. Hawthorne has been seeking funding to

establish a follow-up project with Limbe, to produce rapid 'modular' photoguides with informative text, but so far these applications have not been successful.

3 International Conference talks and other publications
3a. Africa, AETFAT conference 2003 proceedings
3b. USA early in project by CH, which was more of a information gathering exercise
Dept Plant Sciences Newsletters
Paper to be submitted to Taxon, once it has been added to following changes required to fit an initial draft (Annex 2) into the Manual. (Annex 5).

Many more papers based partly on the data and specimens from this project will now start to appear, filling in details in the Guide to Guides – e.g. a recommended field Glossary. Incidentally, papers in preparation based on specimens collected in Ghana partly during FRP project time now include: Four New species of *Pavetta* from S.W. Ghana; new *Psychotria*, *Schefflerodendron, Synsepalum* and a probably new genus of as yet unknown family (S. Harris is currently attempting to sequence its DNA to establish what Order it is in).

Images from the project have many incidental uses, for instance see Poorter et al, 2003 and linked references (to individual chapters) below.

4. Web site

See Http://www.herbaria.ox.ac.uk/R7617

The project web site Visual Field Herbarium is a type of 'device' in itself, for learning tropical botany interactively, through pictures, and although its main aim is as a means of disseminating the other project lessons, the herbarium committee at a wrap-up presentation on 29 Sept 2004 were keen to adopt, and expand it, and to develop further projects around its image gallery.

Market studies. We shall obtain initial feedback from the website about visitors. The website will be promoted by many normal means (e.g. URL at base of outgoing emails), but we have one major marketing ploy we hope will draw many to the site – by mentioning the URL as a source of further images and data about new rare species about to be described.

Denis Filer and W. Hawthorne are actively developing Brahms export filters, to feed the Virtual Field Herbarium from the (numerous) other Brahms projects that have images and which Denis thinks will be keen to share their imagery. Colin Hughes is keen for instance, to integrate his old Leucaena and other collection data, but needs to find funds to scan his slide collection; and David Boshier is keen to add to his forthcoming application to DFID/FRP time in a proposed time input in his Caribbean project to add images from there. We will shortly (early 2005) add northern savanna of Ghana species, which will be useful in the new world-bank funded Sunyani community micro-herbarium and internet access point being established there. Once the images are in the tens of thousands, and if we succeed in finding Asian collaborators, the Virtual Field Herbarium will have a significant coverage of most common tropical genera at least, and with student and other projects aimed at refining the classification of images using an ever refined field glossary, there is room for optimism for heavy use of this resource in coming years. We anticipate a year or so whilst the image collections are built up, and whilst we seek funding to pay for assistants to do this.

Software Components of the web site ('VFH') that need refining in Phase 2 (possibly unfunded, short term future) are:

1. PDF download – integrate with VFH image page, and look into greater flexibility.
2. Improve glossary definitions and links
3. Ensure that every appropriate glossary term has an 'inbuilt' diagram-like image (not relying on images of particular species). At the moment, only a sample subset is available.
4. Improve selection to allow manual tagging of images. In this way, searches will be more flexible. At the moment, all searches are in a hierarchical filter, meaning character or taxonomy or geography terms can be refined to obtain fewer and fewer images (e.g. Neotropics – Caribbean-Grenada-Annandale-Plot 27 at Annandale). However, with tagging we could Tag All images from Plot 27, then expand the filter, and focus next on images from Plot 29 and tag them. Finally, retreat to the Grenada level and "show only tagged". Plot 29 and 27 would be mixed.

Similarly, species from two genera in different families could be shown together without the rest of their families.

5. Allow images to be shown for the species recorded in an area, not only for the specimens.

6.Better copyright flexibility – some could be emailed as hi-res. images after registration, and this would be encoded individually for each image.

Tasks for a VFH Phase 3 (requiring further funding):

1. Make your own Photoguides into PDFs onscreen. (Maybe even print in Oxford, laminate and post).
2. Specific projects targeted at local collaborators
3. Gear up for PDA usable field guides in 5 years time.
4. The proposals in the Darwin and Leverhulme Concept notes apply.

5 DFID quarterly reports and policy briefs

Newspaper articles Grenada 2004. These were aimed at publicising the forthcoming Grenadian Guide.

6 Output-related workshops and talks

Although the workshops and talks focused on aspects of the work in the respective countries (WH unless specified), The main concluding theme from the workshops and talks were that simple guides can be made on modest budgets and will improve biodiversity communication, and also generally publicised the project and its aims.

6a. Ghana 2001
6b. Ghana 2003
6c. Grenada 2001 horticultural society (Rosemary Wise)
6d. Grenada 2002 horticultural society
6e. Grenada 2003
6f. Cameroon 2003 (more of a meeting with staff)

The recommendation domain, and how our vehicles for recommendation will transport information to them

In the following table, the various 'orbits' of our recommendation domain are lettered, with specific targets itemised within1.

Domain	Specific recipient	Outputs (numbered above)	Comments
A. Inner circle: Collaborators	FRP ECI project on Field Guides	1	Regular meetings and shared information have strived for maximum synergy between the two projects, through a diversity of research processes, and by covering broader geographical and social coverage than would be possible with a single project
	Ghana Forest Service, & Biodiversity Unit	1,2,4,6ab	Ntim Gyakari has been using the (6) draft test guides in his role as chief trainer in tree spotting in Forestry, and the Ghacon NGO, but trainees were unable to keep the guides. The final printed version will have more species and more copies will be available.
	Protected Areas Development Project	1,2,4	(This project ceased to operate soon after the project had started to collaborate with them, so the Ankasa guide was put on hold.)
	Grenada Forest Dept	1,2,4, 6c-e	Especially Spice Island Plants book (See Annex 7), to promote
	Ministries in Grenada – some individuals	1,2, 6c-e	smaller Guides for particular areas
	NGOs in Ghana	1,2	Also Ecosyn Guide, see Annex 7, which should facilitate local production of guides
	Mexico	1,2	
	Limbe Botanic Garden staff	1,2, 6f	LBG need a sprinboard project to get started
	University of Ghana, Legon	1,2, 6ce	Patrick Ekpe helped us try out the testing protocol in test run herbarium trials of field guide and is keen to move
B. Circle 2: those interacting with collaborators	These include about 1500 interviewees/respondents on the FRP Guidelet tests	(2)	Structured interviews by collaborators, mostly gave them a chance to air their opinions on and try out various formats and to hear those of others
Special case of potential funders: DFID themselves	DFID is particularly interested in the socio-economic and policy impacts of the research.		We have not received any feedback from anyone in DFID outside FRP to suggest any interest was being taken in

[1] The metaphorical allusion to stakeholders flying in "orbits" around the project, follows the "FRP's Promotion Strategy Guidelines".

	DFID should be reading this table and earlier policy briefs in quarterly reports.		DFID.
C. Others seeking to use field guides that may arise directly from the project	Public and tourists in Grenada	2	Especially Spice Island Plants book (See Annex 7)
	Forestry workers in Ghana, and farmers seeking employment	2, 6c-e	Ecosyn Guide, and potentially Tree Guide, Ankasa Guide
	Farmers and other rural dwellers	2	potentially Tree Guide, Ankasa Guide
	St. George's University staff and students	2, 4	Especially Spice Island Plants book (See Annex 7)
	Tourists in Ghana	2	potentially Tree Guide, Ankasa Guide
D. Others aiming to write field guides in the tropics, including	Scientists, seeking to write field guides to tropical plants; African Botanists; American Botanists	1,2,3	And Ecosyn Guide as a sourcebook (See Annex 7)
	Ghana – Forestry Dept., Forig	1,2	Ecosyn Guide (See Annex 7)
	Limbe	1,3	
	Grenada, miscellaneous enthusiasts	1,2	Especially Spice Island Plants book (See Annex 7)
	NGOs	1,2	Ecosyn Guide (See Annex 7)
E. Others aiming to write useful field guides outside Floristic arena of the project		1 (2),3	
F. General users of guides	(Guidance in the field guides will influence opinions far down the river)	1->?	
G. Potential Funders and promoters of field guide production and key ministries	Global conservation and development agencies, e.g. WWF, IUCN, DFID, GTZ World Bank etc.	1	Our Poilicy Brief (Annex 1) is largely directed at these
	Ministry of Lands, Forestry & Mines in Ghana	1,(2)	
	Ministry, Grenada	1,(2)	

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