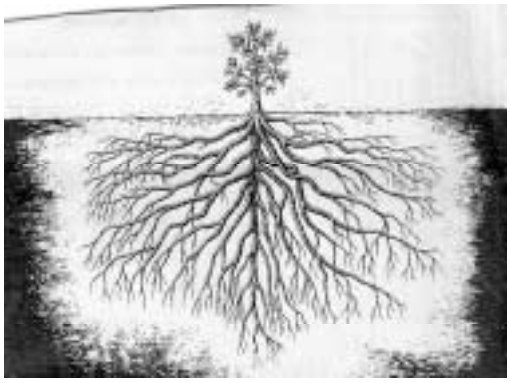

SILVOARABLE AGROFORESTRY IN EUROPE

SAFE LAUNCH MEETING REPORT

MONTPELLIER 21 - 23 September 2001

Programme

Thursday 20 September

Afternoon

Welcome address: Christian Dupraz

Presentation of partners and their institutes

A 15 minute informal presentation by each partner (institute, participants and subcontractors) with a focus on the expertise relevant for SAFE

SAFE objectives and final target

Reminder of the project objectives: What is the current situation of AF in Europe and what is SAFE about?
The idea of SAFE: Christian Dupraz (INRA)

Friday 21 September

Morning

Field tour 1

Departure by cars for the Restinclières site, where we will see silvoarable fields with different tree species intercroped with cereals or vineyards.

Afternoon

Field tour 2

Continuation by car for the Castries site, where we will see walnut trees integrated into a perennial fodder crop.

Work package presentation

European silvoarable knowledge base: WP2: Pierluigi Paris (CNR)
Discussion on WP2 and on general issues to achieve the SAFE aims.
Chair: Lynton Incoll (UNIVLEEDS)

Work package 6: Martina Mayus (WU)
Work package 3: David Pilbeam (UNIVLEEDS)
Work package 4: Hervé Sinoquet (INRA)
Work package 5: Nick Jackson (NERC)
Discussion WP 3 – WP6 in concurrent sessions (two groups)
Synthesis of the concurrent sessions: Chair: Gerardo Moreno (UEX)

Saturday 22 September

Work package presentation (continued)

Work package 7: Paul Burgess (CRAN)
Work package 8: Felix Herzog (FAL)
Discussion WP 7 – WP 8 in concurrent sessions (two groups)
Synthesis of the concurrent sessions: Chair: Terry Thomas (UWB – CRAN)

Discussion groups of the interdisciplinary tasks in groups

Presentation and discussion of the results: Chair: Vasilios Papanastasis (AUTH)

European guidelines for policy documentation:

Work package 9: Gerry Lawson (NERC)
Discussion of WP 9***:*** Chair :André Gavaland (INRA)

Implementation of WP2 – WP6

Description of specific tasks and identification of crucial gaps or problems in small specialist groups.

Implementation of WP7 – WP9

Description of specific tasks and identification of crucial gaps or problems in small specialist groups.

Common modelling strategy

WP1: Computer scientist (INRA)
What do we mind by a Modelling platform
What methodology for choosing models and submodels
What interface for linking the biophysical and economic model

Project management

Reset time schedule and details of the project management based on Fig.2 and 3, Table 2 and 9.

Sunday 23 September

Tour in the Languedoc back-country to discover roman architecture, nice rivers, and some agroforestry plots…(9-16:00)

Participants of the launch meeting:

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Sessions' minutes

(after Anil Graves)

Most computer presentations are available on the SAFE archives. They are indicated by .

Thursday 20 September, Christian Dupraz opened the SAFE meeting:

Christian welcomed the SAFE partners. He stressed that he is glad to meet everyone after the long project planning and writing phase done by emails and phone calls, only.

Presentation

The presentation of each partner institute and their major participants was done by all participants of the meetings. A brief description of the institutes and the partners " SAFE Partner description" is available on the SAFE archives.

SAFE objectives and final targets

Christian presented the objectives and the idea of SAFE.

Friday 21 September, after a field trip to Restinclière and Castries

WP 2 - European silvoarable knowledge

Work package 2 was presented by Pierluigi Paris

Issues raised:

- Question of APCA involvement in WP2 (no time allocation in Table 3 of SAFE technical annex)
- Imbalance in work between northern (16 man months) and southern (30 man months) Europe.
- How to collect data for Paulownia-wheat system in China?
- Should data be collected on current systems as well as on experimental plots?
- Official statistics for Italy don't include agroforestry.

Future actions:

- Develop data template and type of data required with WP8 leader and modellers.
- Understand/develop links with partners.
- Determine how to collect data for Paulownia system in China.

Discussion:

Terry Thomas suggested that Piero should consult BOISTERRA **(Was this not WATERA?)**, the result of an EU concertive action with a database of farm forestry systems with about 20 partners in Europe.

Action – **Piero** to obtain web address and consult BOISTERRA. **Terry Thomas** to pass web address to Piero

Lynton Incoll suggested using a relational database such as ACCESS for the database that Piero Paris needs to develop. This could be done through JISCMAIL.

Gerrry Lawson stated that with reference to traditional systems in countries, no single person has enough knowledge. An advertisement approach/direct contact approach could be tried. Perhaps Forest Officers could send approximate information on agroforestry systems. **Piero** expressed concern that survey forms would be difficult to get back through such an approach.

Christian Dupraz clarified that the aim was not to get statistics on silvoarable systems, but to document them.

- There are 94 chambers of agriculture (in France). Have they got new information?
- There are 3,000 ha of cereals and olive trees in Italy. This could be documented.
- The main need is to do monographs and document systems. This could also include systems that are outside the contracted countries.
- Even small silvoarable systems could be included as they may be of interest to the EU.

Lynton noted that there could be a possible conflict with WP3, and that WP2 should not try to develop statistics on silvoarable systems, but to describe them. He suggested that the ACCESS survey template from the UK could provide a template for the WP2 database, but would need to be modified. **Terry Thomas** suggested that the BOISTERRA approach could also be used as a database. It has graphs, pictures, text.

Paul Burgess asked how EU reports could be obtained as it was very difficult to browse the EU website. **Gerry Lawson** stated that it was important to browse the website (CORDIS) as very important data on silvoarable systems was available on it.

Action: **Piero Paris** to browse CORDIS for EU documentation.

Piero requested that people who are aware of EU projects could send him abstracts.

Action: **All** to send abstract of known EU projects to Piero Paris.

Christian Dupraz noted that Greek farmers must have various silvoarable systems that could be documented. He noted that there are several man months allocated for the Greek partners for this.

Action: **Vasilios Papanastatsis**.

Robert Bunce noted that a table from a recent book documenting various ecosystems in Spain included information on agroforestry systems. If systems with vineyards-fruit trees/olive trees are included this is a lot of land (2m ha). Prof. Romanio Roseo of Polytechnic of Madrid could be contacted. He has information on a 2 km^{-2} land cover map developed by stratified random sampling. Silovoarable systems could be determined from this.

Action: **Piero Paris** to obtain the table (or reference for table) and contact Robert Bunce. **Piero** to contact Romanio Roseo with RB?

Lynton Incoll suggested that for the 6 month report still living silvoarable systems in the EU should be identified. **Vasilios Papanastasis** stated that there are so may still living silvoarable systems that it would be difficult to document them all. Perhaps it would be best to document the most important in an area.

Martina Mayus suggested that silvoarable systems that are being modified or experimented with should be included as they could still be important for EU policy makers.

Vasilios Papanastasis wondered how silvoarable systems should be classified. How generic could the structure be? For example to what extent would it be necessary to document sub-divisions within the tree-cereal systems?

Christian Dupraz suggested that in the first 6 months, Piero should focus on finding silvoarable systems in Europe. Piero should describe through a literature review the Paolownia system in China (possible contact: Steve Newman) and the North American systems (possible contact: Andrew Gordan).

Action: **Piero** to contact Steve Newman and Andrew Gordan.

Piero Paris stated he would do the China and North American review, but that the partners from the different countries could do the literature review for their own countries.

Action: **Piero** to review literature for Paolownia and N. American systems.

Paul Burgess however noted that this would not include many countries.**Christian** however said that not all of Europe could be documented

Lynton Incoll suggested that the partners of WP2 needed to establish a plan for WP2 in their own time.

Action: **WP 2** partners to start planning for WP 2.

Piero asked how he should do the database. **Lynton** suggested a relational database would be best and asked that all the most recent documents should always be posted on JISCMAIL.

Action: **Piero** to develop database in ACCESS?

WP 3 - Silvoarable experimental network

Work package 3 was presented by David Pilbeam 

Issues raised:

- David suggested that all interaction with partners should be through JISCMail.
- Suggested that messages relating to particular work packages could be pre-fixed with the work package code for identification

Future actions:

Establishment of protocols for experiments, measurements, data collection

Discussion:

Vasilios Papanastasis stated that in Greece there were no silvoarable experimental sites, only traditional systems.

David Pilbeam suggested that it might be necessary to suggest changes in measurement protocol to other work packages and that return flows and changes of information flow might be necessary between the modules. **Terry Thomas** stated that the protocols should be established at the first meeting.

Lynton Incoll stated that it could be difficult to obtain standardised measurements.

David added that how and which equipment was used was important. Proper procedures were important - for example how are measurements taken if a tree is leaning? **Terry** suggested that establishing such protocols would be difficult during the session. **Lynton** noted that there are many different protocols for tree measurements and than many more for crop measurements. He suggested that protocols established for their own silvoarable research could serve as a basis.
Terry added that it would be good to establish protocols using existing protocols from other projects. **David** suggested that existing protocols for the different partners could be collected.

Action: **WP 3 partners** to document existing measurement protocols.

Lynton Incoll added that measurement protocols would have to be evaluated and the differences and/or inconstancies determined.

Action: **David Pilbeam and Lynton Incoll** to determine and evaluate measurement protocol inconistancies/differences?

Vasilios Papanastasis said that for Greece it would be necessary to decide on and establish measurement protocols.

Action: **David Pilbeam,** Lynton Incoll **and VP** to decide measurement protocols for Greek sites?

Christian Dupraz stated that it was necessary to decide what measurements would be needed to evaluate the project products. Perhaps the Greek site could be used for validating existing models.

Action: **All** to develop measurement protocol for (long-term?) evaluation of project products?

Lynton Incoll noted that protocols might have to be different between experimental sites and traditional systems.

Action: **All (?)** To establish whether different measurement protocols between experimental sites and traditional sites are required and to establish what these might be?.

Christian expressed concern that a common protocol could necessitate changing well-established measurement systems. **David Pilbeam** agreed that this might be problematic.

Vasilios wanted to know what measurements should be made for traditional systems.
David noted that models suggested in North Europe, light was limiting, whereas in the South Europe, it tended to be the water. **Paul Burgess** noted that it was essential to have the extremes of data for pure forestry and pure agriculture. This would be important for validating models.

Action: **All (?)** to establish measurements for pure systems?

Lynton Incoll noted that the Greeks might not have sufficient funds. What could they measure with their funds? **Chrsitian Dupraz** suggested things like walnuts and prunes.

Guido Bongi noted that inputs into natural systems were very heterogenous. How could very local rainfall be quantified from existing data? The very local agrometeorology needed to be known. The question was one of methodology - how to get the data.

WP 4 - Above ground interactions

Work package 4 was presented by Herve Sinoquet 

Issues:

- Task 1: (Canopy Architecture). This requires tree measurements, fisheye photographs, measurement frequency, etc. Need protocols for measuring data.
- Task 2: (Resource Partitioning). Accompanied a list of questions that need resolution. Partners need to select/adapt a model for light partitioning, transpiration, rain interception
- Task 3: (Canopy microclimate). Necessitates selection of within canopy microclimate model. Only the NERC team is involved.
- Task 4: (Plant Responses) are a big problem. How to convert carbon aquisition into effects such as the dynamics of the canopy. Could use empirical relationships. Probably most likely as it is not possible to do all the tree and crop biology.
- How will light interception relate to plant responses such as branching. This is important if the model has to supply information of the economic value of timber.
- What are the effects of pruning on canopy architecture.
- Crops have not been mentioned in WP 4 , but a large range of crops also need to be modelled. Is it possible to model this range? For example, vineyard models don't exist.
- It may be necessary to do a survey of existing crop simulation models.

Future Actions:

Definition of measurement protocols with WP 3 for canopy structure measurements, model evaluation, microclimate, sapflow, soil water content (WP 5).

Need to develop a framework for modelling resource partitioning and canopy microclimate.

Need to define a strategy for modelling plant responses.

Discussion:

Christian Dupraz noted that vineyards were not in the SAFE technical annex as a crop that needed to be modelled.

Paul Burgess observed that some silvoarable components have three types of interacting cover - tree, crop as well as tree row.

Lynton Incoll wanted to know what the procedure for taking hemispherical photos would be. Would a person be sent to do them or would the instrument be sent instead? **David Pilbeam** said that Cranfield and Leeds were not down in WP4 so who was going to do the measurements at these sites? **Herve Sinoquet** said that people on the station would need to do the measurements. **David** said that this than became part of WP3. **Nick Jackson** said that WP5 would also have to get involved.

Paul Burgess asked if the equipment would come from INRA. **Christian Dupraz** said yes.

David observed that protocols would have to be arranged for measurements to ensure comparability.

Action: **WP 3,4,5,6** to establish whether/which/how equipment is to be sent for field measurements and to establish protocol for standardisation of these measurements.

Christian Dupraz said that the travel budget included money not only for meetings, but also for travel outside the meeting times, for example to go to other places and see other field sites. There was a need to get involved in other people's fieldwork.

Gerry Lawson asked if partitioning of C between above and below ground would be the responsibility of WP 4 or WP 5. The loss of C from the ground was very important. **Herve Sinoquet** suggested it might be the responsibility of WP 6.
David Pilbeam said the break was artificial and that the biophysical work had to be done together.

Gerry Lawson stated that Shuttleworth Wallace didn't consider the reduction in windspeed within agroforestry systems. **Herve** said this was difficult and that they would use a wind profile and assume a homogenous canopy. Stomatal conductance was much lower in trees than in understorey components, so maybe the wind effect wouldn't be that important. **Christian Dupraz** said that this was one reason to decide on a modelling strategy. What would be the point of having very accurate models in one area if other bits were very empirical? How homogenous should the model be?

Lynton Incoll asked if catastrophic events could be included in the uncertainty analysis. **Karel Keesman** said that the modelling approach would have to depend on the model requirement.

Terry Thomas said that decisions would have to be made about trade-offs between scientific insights and practical data.

Paul Burgess asked if the 5 tree species were also for the economic analysis.

Andre Gavaland said that as there were different sites and different conditions, a mechanistic model is needed. Details could be changed on the models to simplify them if necessary.

Lynton Incoll asked how it would be possible to validate the models for economic purposes. Wouldn't it be necessary to model species where data was available?

WP 5 - Below ground interactions

Work package 5 was presented by Nicholas Jackson

Issues:

- Competition, but also complementarity needs modelling.
- Need to design simple models, because not enough data or money is available
- Need to understand how robust a model is if data/parameters are left out. Therefore need to address the uncertainties.

Future Actions:

Implement field experiments by month 9. Equipment has to be on site by this time.

Discussion:

Gerry Lawson noted that soil texture and pedo-transfer functions were essential information for WP 5. However, collection of this appeared to be in WP 2. Perhaps it should be included in WP 5?**Piero Paris** agreed that this might make better sense.

Action: **Piero Paris, Nick Jackson, Christian Dupraz,** to decide who should collect this data?

Lynton Incoll noted that it was critical to prepare things for trees coming into leaf. The critical periods for harvesting, full crop cover would vary from place to place and would limit certain measurements. For example, the fisheye photos would be limited to after harvest. Thus there was a temporal aspect to this measurement due to the crop. **David Pilbeam** suggested that WP 3 might need to organise this.

Action: **All (?)** to timetable measurements

Christian Dupraz said that common measurements, such as the fisheye photos, on experimental sites were needed and would have to be organised as soon as possible. Should a coring machine for root measurements also be purchased? **Nick Jackson** stated that getting cores was easy with the machine, but that the analysis of the cores was extremely expensive and time consuming. Who would do it?

Christian said that durable equipment needs to be bought as soon as possible.

Action: **Christian Dupraz, Nick Jackson, Herve Sinoquet, Gerry Lawson, Lynton Incoll, David Pilbema (?)** to list required measurements and durable equipment for these measurements?

Gerardo Moreno stated that is Spain, measurements would have to start before month 9. **Nick Jackson** said that month 9 was only a milestone and that people were free to start measurements before than. **Gerardo** stated that for Spain, he would probably need the protocols for measurement within 2 months.

Lynton Incoll stated that some measurements, such as the fisheye photos, crops, soil coring measurements were more urgent than others. Above and below ground interaction groups (WP 4 and WP 5) should rank the importance of the measurements and let David Pilbeam know which ones should be done first.

Action: David Pilbeam, Nick Jackson, Herve Sinoquet to establish protocols for measurement; ranking of importance of measurements and provided to Gerardo Moreno within 2 months.

Robert Bunce stated that in the sensitivity analysis, it would be important to look at different levels within the model, to see which were important - which were the critical factors. For example, discount rate could be more critical in determining the benefit of a system than the productivity of timber.

Herve Sinoquet stated that he would need a list of available plots and to know on each site which measurements people were willing to do.

Action: **All** list of sites and measurements options on experimental sites

Lynton Incoll stated that such a list exists at least for the UK.

Action: Lynton Incoll to forward list to Herve Sinoquet?

Martina Mayus wanted to know how the different models would be fitted together.

WP 6 - Biophysical integrated plot modelling

Work package 6 was presented by Martina Mayus

Issues:

- Challenge is the range of years over which the system needs to be modelled (1:50 years time scale).
- Tree crop interactions are complex.
- How do tree crop interactions behave over this period?
- How do tree/crop interactions occur in different climates of Europe
- What about economic outputs?
- Need to quantify how correct/incorrect the above are.
- Need to make good choices with regards to systems components, processes and boundaries, growth resources.
- Which growth resources are important, where how and why?

- Certain resources are more important than others and need to be measured with a high degree of accuracy.
- Uncertainty modelling will be related to the difficulty of measuring inputs.

Discussion:

Karel Kessman said that to reduce uncertainty, data was needed. In biophysical modelling there were various sources of uncertainty, such as inputs, the model structure, the model strategy. With a complex model and limited data, a model-based monitoring system would be necessary. Also **Karl** would prefer to see the use of differential and algebraic equations, rather than computer code.

Martina Mayus said that there would be a need to determine resolution of input data. This would depend on the required resolution for predictions.

Christian Dupraz said that this was very important, as the challenge was to model the trees growing over a number of years. The model should be process-based.

Action: **All (?)** to determination of resolution of output predictions for establishment of resolution of input data.

Martina said that there are various levels involved in uncertainty modelling.

WP 7 - Economic modelling at the plot scale

Work package 7 was presented by Paul Burgess

Issues:

- The need for the model to be able to deal with pure crop cover and pure forest cover to be able to make comparisons.
- At present, it appears that the biophysical model may be separate from the economic model. However, there is a need for the economic module to be able to feed back into the biophysical module.
- How would forest controls be selected, as there could be many different controls with different spacing for example.
- In the UK, the profitability of silvoarable systems appeared to be primarily dependent on grants.
- Will also need to look at sensitivity of systems.

Future Actions:

Initiation of plan of activities for technical report completion in month 18.
All to pass on relevant literature if they have any on financial analysis of agroforestry, forestry and agriculture. .
WP 7 partners to decide who will be responsible for final reports.

Understanding of grants and tax structure.
Understanding of whether the economic and biophysical modules should function separately or not.

Discussion:

Gerardo Moreno asked what exactly was meant by a template. Various people replied that it was a generic structure for organising and entering data. **Terry Thomas** noted that there were 2 types of template, closed templates, where entries are pre-defined, and open templates where entries are specified by users.

Lynton Incoll suggested that Paul Burgess scheduling tables could provide a good way of drafting work plans for all Work Packages.

Action: **All WP leaders** to draft wok plans using the Paul Burgess method?

Andre Gavaland stated that information on poplar is available, but walnut was more important in France.

Terry Thomas stated that the crucial thing was collecting information for different spacing over the rotation of the system, as these would change. **Paul Burgess** added that information on timber price curves, labour, cost were also needed.

Piero Paris asked how different tree species with different outputs to timber and wood would be modelled, for example oak gives acorns. **Paul** stated that this would need model development, but that models already existed that modelled such tree outputs - for example the BEAM coconut model could be modified.

Terry Thomas said that there was already a template for combining 1 perennial, 2 biennials, and 6 annuals for the tropics. But templates were needed for temperate areas and schedules had to be identified, and inputs and outputs quantified.

Action: identification, scheduling and quantification of inputs and outputs. (**All with useful information to pass on**?)

Christian Dupraz observed that such data doesn't always exist, for example, for cherries and some of the other trees. Therefore it will be necessary to determine reasonable figures. However, through the project, it should be possible to improve the figures, hopefully with biophysical data. But sensitivity analysis will be needed.

Paul Burgess emphasised that data for pure systems (agriculture and forestry) would still be needed. **Gerry Lawson** asked what the forestry comparison was going to be, as there are many different options and this would need to be considered.

Terry Thomas said that it would be important to be practical about the systems. In certain areas, people might simply not consider the option of certain species.

Nick Jackson suggested that they might be able to contribute to expert opinion using Baysean Belief Network.

Terry Thomas suggested that the economic model ought to than be able to quantify this.

Christian Dupraz said that one key issue was to be able to present the results with and without grants and that this would be needed for the policy makers.

Action: **Anil Graves, Paul Burgess, Felix Herzog** to ensure that such economic/financial options can be modelled?

Gerry Lawson suggested that it might be interesting to try out different grant systems in different countries. For example how would the French grant system affect profitability in the UK and vice versa.

Saturday 22 September

The notes of WP8, 9 and 1 are missing.

WP8 – Upscaling to the farm and the region scales

Work package 8 was presented by Felix Herzog

WP 9 – Developing European guidelines for policy implementation

Work package 9 was presented by Gerry Lawson.

Discussions

Discussion on WP2 and 3

(after David Pilbeam)

Workpackage 2 will involve drawing up an *inventory of European Agroforestry* whereas WP3 will involve setting up and maintaining a *database of results* from trials and experiments of consortium members.

For WP2 a complete record of agroforestry in Europe, not just experimental and trial plots, will be required, whereas for WP3 data and details of experimental design will be needed from selected sites to be identified. These data will be forwarded to WP6 (Biophysical Integrated Plot Modelling) and WP7 (Economic Modelling at the Plot Scale). There will be a requirement for WP3 to identify sites that can be used to validate the models arising from WP6 and WP7.

It was agreed that the tree species to be used in WP6 and WP7 (and hence the tree species for which data will be required in WP3) will be poplar (*Prunus* spp.), walnut (*Juglans spp.*), cherry (*Prunus avium*) and oak (*Quercus* , data only available for mature trees). Possible crops are wheat, lucerne,

There will be a series of measurements required. These can be broken down into **basic** (tree height, diameter at breast height, yield of nuts, crop yield), **biophysical** (WP4 and WP5 to stipulate what is required), **ergonomic** and **economic** (WP7 to stipulate).

Some of the information for the ergonomic and economic data can be found from the management operations on the sites used for WP3. The workpackage leader will request management protocols (if available) from each site to be used, and will subsequently request any additional information that will be required. The workpackage leader will also obtain details of the data required in WP4, WP5 and WP7. This initial stage must be completed by April 2002, before the first crop harvest occurs in the Spanish sites.

Discussion on WP 4-6: modelling approach

(after ?)

Martina Mayus: It is not too important that there may be differences between systems where there is temporal separation between crops and trees and spatial separation as both situations will have to be modelled. There will have to be a good model describing rooting patterns.

Guido Bongi: It is difficult to include movement of nitrogen in the model.
Gerry Lawson: The HyPar model has both N and P in it, and in as many cells as the modeller wants. Models of root distribution are difficult as we do not properly understand the biology involved (e.g. the three patterns of tree

rooting we saw in the field visit). With rooting at different depths being modelled you need to know more about soil hydrology.

Terry Thomas: How important is this for the overall project? Understanding is important, but knowing what the outcome is going to be is crucial.

Paul Burgess: If we separate biophysical from economic, the workpackage leader of WP7 needs to be able to run the biophysical model so that if you decide crop production is no longer commercially viable, what would happen to tree growth if you were to stop cropping. Use HyPar as a starting point. **Martina Mayus**: We do have a contractual obligation to produce a biophysical model, it is not purely a tool for the economic model.

Terry Thomas: It is still sensible to make early decisions on how much time/money we allocate to understanding what is going on, and how much to making models that underwrite the economic models. Chair WP7 (Terry Thomas?): should start with one model, the sensitivity analysis will then lead to a refined version of that model.
Christian Dupraz: We need a short-term, rudimentary model. Model development goes on throughout the project.

Guido Bongi: Look at one site in detail, especially if using sap flow gauges, stable isotopes etc which are difficult to use. **Gerry Lawson:** There is much we can do; it is best to use a simple model and refine it. We have a considerable amount of information on poplar, regarding spacing, temperature, evapotranspiration etc based on simple linear regression.

Paul Burgess: You have data on tree yields, crop yields etc over many years. You know the current agricultural and forestry statistics. From these two sets of information you will have a rough idea of what will happen under a variety of different circumstances. Produce broad figures at the outset.

Terry Thomas: The Poplars for Farmers database has yield tables for different sites. This gives range of sites x planting density x thinning regimes, but does not go up to 10, 12, 14 metre spacings. **Paul (?):** Let us compare the different poplar systems (agroforestry, forestry). **Terry :** This is what WP7 will do.

(Additional notes after Guido Bongi)

Karel Keesman needs the mathematical formulations to get an idea about the type of uncertainty analysis possible and needed.

Guido Bongi: The assumptions about exchange biology in interactive systems need some confined experiment to ascertain competition issues even if it is not the main objective of this project (i.e. sympathy or allelopathy could be better studied in conditions of controlled environment).
The general use of mathematical links among vegetation progress should consider spatial and temporal heterogeneity as a major issue. Trees under water constraints when young, cease to compete after attaining a critical size.

Tree size is heterogeneous more when trees are small. So any rule should include evolution of heterogeneous forms (J.J. Landsberg R. McMurtrie, Water use by isolated trees, Agric. Water management, 8(1984) 223-, Elsevier).

DISCUSSION on WP9

(after Vasilios Papanastasis):

Lynton Incoll asked Gerry Lawson what kindof interactions are needed for the implementation of the WP9. Gerry answered that the first to be done will be collating existing subsidy policies in the partner countries but also in Germany.

Christian Dupraz explained that by "social experiments", he means establishment of real cases in the field by providing grants for agroforestry to farmers interested in this type of activity.

Martina Mayus said that she does not know of any agroforestry rules in Germany by she assured that Germans have relevant experiences.

Paul Burgess suggested that agricultural subsidies should be considered.

Christian suggested that SAFE members – at least one from each partner – to attend the Agroforestry meeting in Paris on November 22, 2001. He also said that the European Commission has no objection for agroforestry to become a European policy.

List of future actions

For WP 2 European silvoarable knowledge:

- Develop data template and type of data required with WP8 leader and modellers.
- Understand/develop links with partners.
- Determine how to collect data for Paulownia system in China.
- **Piero** to obtain web address and consult BOISTERRA. **Terry Thomas** to pass web address to Piero
- **Piero** to browse CORDIS for EU documentation on silvoarable systems.
- **Piero** to develop database in ACCESS?
- **Piero** to review literature for Paolownia and N. American systems, for this he could contact Steve Newman and Andrew Gordan.
- **WP 2** partners to start planning for WP 2.
- **All** to send abstract of known EU projects to Piero Paris.

For WP 3 Silvoarable experimental network:

- Establishment of protocols for experiments, measurements, data collection
- **WP 3 partners** to document existing measurement protocols.
- **David Pilbeam and Lynton Incoll** to determine and evaluate measurement protocol inconistancies/differences?
- **David Pilbeam,** Lynton Incoll **and VP** to decide measurement protocols for Greek sites?
- **All** to develop measurement protocol for (long-term?) evaluation of project products?
- **All (?)** To establish whether different measurement protocols between experimental sites and traditional sites are required and to establish what these might be?
- **All (?)** to establish measurements for pure forestry and pure agricultural systems?
- WP3 partners have to identify sites that can be used to validate the biophysical and economic models
- **All (?)** to timetable measurements

For WP 4 - Above ground interactions

- Definition of measurement protocols with WP 3 for canopy structure measurements, model evaluation, microclimate, sapflow, soil water content (WP 5).
- Need to develop a framework for modelling resource partitioning and canopy microclimate.
- Need to define a strategy for modelling plant responses.

- **WP 3,4,5,6** to establish whether/which/how equipment is to be sent for field measurements and to establish protocol for standardisation of these measurements.

For WP 5 – Below-ground interactions

- Implement field experiments by month 9.
- Equipment has to be on site by this time.
- **Christian Dupraz, Nick Jackson, Herve Sinoquet, Gerry Lawson, Lynton Incoll, David Pilbema (?)** to list required measurements and durable equipment for these measurements?
- David Pilbeam, Nick Jackson, Herve Sinoquet to establish protocols for measurement; ranking of importance of measurements and provided to Gerardo Moreno within 2 months.
- **All** list of sites and measurements options on experimental sites
- Lynton Incoll to forward this type list of UK to Herve Sinoquet?

For WP 6 – Biophysical integrated plot modelling

- **All (?)** to determination of resolution of output predictions for establishment of resolution of input data.
- **Modellers** to provide examples of mathematical equations of above and below ground models to Karel Keesman for a first check of possibilities and needs of uncertainty analysis
- **Martina Mayus** to list key processes of agroforestry systems
- **Martina** to search for plant strategies, classes or simple rules that can be used to generalise plant (growth) behaviours and to simplify certain model process descriptions

For WP 7 – Economic modelling at the plot scale

- Initiation of plan of activities for technical report completion in month 18.
- **All** to pass on relevant literature if they have any on financial analysis of agroforestry, forestry and agriculture. .
- **WP 7** partners to decide who will be responsible for final reports.
- Understanding of grants and tax structure.
- Understanding of whether the economic and biophysical modules should function separately or not.
- **All WP leaders** to draft wok plans using the Paul Burgess method?
- Identification, scheduling and quantification of inputs and outputs. (**All with useful information to pass on**?)
- **Anil Graves, Paul Burgess, Felix Herzog** to ensure that such economic/financial options can be modelled?

Conclusions and decisions

The first step to build up a team spirit was successful. However, the description of the work packages lacks sufficient detail to set up concrete work plans. Many decisions on methods have still to be taken. At the end of the meeting, the working groups got their face and a list of tasks for each work package was defined and distributed among the work package members.