



Project no. INCO-CT-2005-517644

## CORRIDOR

Working group on evaluation and synthesis of information on tree cover  
to balance productivity and biodiversity in agricultural landscapes along  
the Mesoamerican Biological Corridor

Specific Support Action

Integrating and strengthening the European Research Area  
Priority A2 Rational use of natural resources

## **Publishable executive summary**

**Period covered:** 1 Jan – 31 Oct 2006

**Date of preparation:** 30 Nov 2006

**Start date of project:** 1 Jan 2006

**Duration:** 10 months

**Project coordinator:** Fergus Sinclair

**Organisation:** University of Wales Bangor, UK

## 1. Project execution

**Background and objectives:** The main objectives of CORRIDOR were achieved. These were to co-ordinate activity and build capacity to develop a research strategy for defining thresholds for tree cover in agricultural landscapes along the Mesoamerican Biological Corridor (MBC). Specifically to:

- synthesise existing information on levels of tree cover in pasture- and coffee-dominated landscapes and their impacts on agricultural production and biodiversity from Mexico to Colombia along the MBC,
- establish common protocols for collection, storage and interpretation of data on dispersed tree cover within agricultural landscapes amongst the countries comprising the MBC and their relationship to biodiversity and farm productivity, and
- develop a strategic regional plan for research and associated development measures to define thresholds of tree cover that balance ecosystem services and agricultural productivity for different landscape contexts along the MBC.

Both contractors (University of Wales Bangor and CATIE) were fully involved throughout the project and successfully engaged key researchers from other institutions in the region to review specific aspects, principally effects of tree cover on a) pasture productivity and biodiversity (Dr Yasmin Cajas, Corpoica, Colombia and Dr Celia Harvey, Conservation International, US) and b) coffee productivity and biodiversity (Dr Lorena Soto Pinto, Ecosur, Mexico and Meybelyn Escalante, Costa Rica). The main activity of the project was focussed around three workshops which were successfully held at CATIE and well attended by key research groups from the region. The three workshops comprised one on silvopastoral systems, one on coffee systems and a final synthesis workshop. Reports on the effect of tree cover on biodiversity and productivity in pasture and coffee systems were presented and discussed at the workshops, culminating in the development of research protocols and a research and development strategy for understanding threshold levels for tree cover in the region.

**Technical approach:** The work of the project involved bringing together existing information collected by various research groups working with trees in agricultural systems in the region and collation and synthesis of this information to produce a regional research and development strategy. Delegates from key research groups formed two core working groups to collate information on tree cover on pastures and coffee, respectively, and their impacts on biodiversity and productivity. The review methodology involved systematic review of published articles in relation to preset criteria and meta analyses across studies and sites where this was possible and appropriate. Databases of literature on impacts of tree cover on both coffee and pasture system productivity and biodiversity were developed.

The collated information was discussed and refined at regional workshops on trees on pasture and trees in coffee plantations, respectively, with participation of key players from countries in the Mesoamerican region. Protocols for collecting and interpreting data on tree cover, biodiversity and productivity on pastures and in coffee were developed at the workshops and key gaps in knowledge identified. A synthesis report on tree cover in the entire agricultural matrix around remaining forest along the MBC (combining data on coffee and pastures) was prepared and discussed in a third workshop at which a regional research and development strategy to define and achieve thresholds for tree cover along the MBC was formulated.

**Achievements:** All workshops were well-attended and enjoyed active participation from key researchers in the region. Gaps in knowledge and methodological problems relating to the lack of comparability of data from previous studies were identified. Protocols for future data collection were developed to address these issues. It was recommended that research be more systematically located along the MBC and amongst taxa to develop a fuller understanding of the effectiveness of the contribution of trees in coffee systems and on pasture to habitat connectivity.

The project revealed on the one hand that trees were associated with changes in productivity and biodiversity in both coffee and pasture systems but also key constraints in defining thresholds for tree cover. There was a suggestion that low levels of tree cover (<20%) favoured productivity of animals on pastures and that in general higher levels of tree cover (>20%) favoured biodiversity of key forest taxa – in both pastures and coffee, indicating the existence of key trade-offs. Constraints in defining and exploring these trade-offs more fully included:

1. There were many individual published studies of tree cover, biodiversity and productivity for pastures and coffee systems in Central America (over 400 published articles) but they were mainly conducted in one or two countries at either end of the MBC, concentrated on a few plant and animal taxa and were rarely integrated.
2. There were virtually no measurements of pasture productivity in the region because standing biomass rather than growth was assessed and there were no discernable overall relationships between tree cover and coffee productivity because tree shade (that varies seasonally) was not comparatively measured nor were management variations controlled for.
3. Meta analyses of species responses to tree cover in pastures and coffee systems was precluded even for taxa where there were many studies because of differences in sampling methods and intensities used in different studies.
4. For both pasture and coffee systems, there were very few places where biodiversity and productivity had been measured simultaneously, allowing direct assessment of trade-offs and synergies.
5. While biodiversity measurements in coffee were often located in proximity to remaining forest cover, those in pasture were not, and so it was difficult to assess from existing information the contribution of trees to habitat connectivity in the coffee, pasture and forest land use mosaics, that presently make up the key parts of the forest corridor where connectivity is required.

These key constraints in using previously collected information to understand relationships between tree cover, productivity and biodiversity along the MBC can be effectively addressed by application of the protocols for tree inventory, shade assessment and the measurement of productivity and biodiversity developed in the project. These need to be applied together with the targeting of future studies to locations spread along the MBC, strategically located in relation to existing places where the forest corridor is actively being restored and integrated at selected sites, so that trade-off and synergies amongst impacts of tree cover on productivity and biodiversity of various taxa can be assessed.

## **2. Dissemination and use**

### **2.1 Exploitable knowledge and its Use**

Not relevant to CORRIDOR.

### **2.2 Dissemination of knowledge**

The project website (<http://corridor.bangor.ac.uk/>) has been up and running from April 2006, increasingly populated with material as the project has progressed.

Key elements of the protocols and regional strategy have also been publicised via the LEAD (Livestock Environment and Development) website [www.Fao.org/agriculture/lead](http://www.Fao.org/agriculture/lead) and as inserts in *Agroforesteria en las Americas* – a regional publication from CATIE that reaches over a thousand key research and extension locations in Latin America (<http://web.catie.ac.cr/informacion/rafa/>). Rachel Taylor presented a poster on Spatial behaviour of Neotropical birds in a Costa Rican agricultural landscape at the Center for Biodiversity and Conservation Eleventh Annual Spring Symposium at the American Museum of Natural History in New York in April, 2006.

The key intended users of the information generated in this project are researchers working along the Mesoamerican Biological Corridor and CATIE (together with the wide range of workshop participants during the project) are excellently placed to ensure that the information is disseminated and used where it most matters, in the design and implementation of research on tree cover and its relationship to productivity and biodiversity in coffee farms and pastures along the MBC.

The most critical findings of the work relate to ensuring comparability of data through the application of the protocols (Deliverables 3 and 5) and systematic targeting of research effort geographically and in relation to a range of plant and animal taxa and the connectivity of the MBC (Deliverable 6). Opportunities to publish the review material as scientific journal articles will be pursued post-project but their major value resides in informing best practice in research design within the Mesoamerican region already achieved through the dissemination activity documented above.

#### Overview table

Planned/ actual dates	Type of dissemination	Type of audience	Countries addressed	Size of audience	Partner responsible/ involved
27-28 April 06	Conference	Research	North and South America, Europe	500	UWB
From April 06 onwards as deliverables produced.	Publications (inserts in <i>Agroforesteria en las Americas</i> )	Higher education/research/extension	Central and South America	>1000	CATIE
April 06 onwards /achieved	Project website	Higher education/research/general public	Worldwide	Potentially global – likely up to 1 million	UWB
June 06 onwards / achieved	FAO LEAD website	Higher education/research/general public	Worldwide	Potentially global – likely up to 10 million	CATIE

## 2. 3 – Publishable results

Not relevant to CORRIDOR within the project period.