Role **O**f **B**iodiversity **I**n climate change mitigatio**N**

Third Periodic Report
01 Nov 2014 to 31 October 2015

Grant Agreement number: **283093**
Project acronym: **ROBIN**
Project title: **Role of biodiversity in climate change mitigation**
Funding Scheme: **FP7-ENV-2011.2.1.4-1**

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SEVENTH FRAMEWORK
PROGRAMME

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Publishable summary:

Summary description of the project context and the main objectives

Tropical forest ecosystems are hotspots for biodiversity and provide one of the biggest stores of terrestrial carbon making their role in climate change mitigation programmes such as "Reducing Emissions from Deforestation and Forest Degradation" (REDD+) increasingly important. REDD+ aims to enhance the role of forests as carbon pools by supporting the conservation, sustainable management and restoration of degraded forests. It also includes social and environmental safeguards that should ensure co-benefits for communities and biodiversity. The implementation of REDD+ will be based on "payment by results" so policy makers and resource managers will need simple tools to assess the likely outcomes of management and policy options. Effective methods for monitoring, reporting and verifying (MRV) carbon stocks and co-benefits at community and national levels will also be needed.

Currently we still do not know how much biodiversity or what kinds of biodiversity are needed to sustain the ecosystem processes and ecosystem services needed for climate change mitigation or the delivery of social and environmental co-benefits. Working within the tropical rainforests of the Latin American region, the main objectives of ROBIN were to: (i) evaluate the socio-ecological consequences of changes in biodiversity and ecosystem services under climate change; (ii) quantify the role of biodiversity in tropical forest ecosystems in mitigating climate change; (iii) analyse the impacts of alternative land-use scenarios (and other mitigation options) on carbon stores and other ecosystem services; and (iv) provide guidance on land-use planning and other climate change mitigation options with the aim of increasing carbon stores and avoiding undesirable ecological and socio-economic effects.

At the regional scale we used data from remote sensing to improve on existing techniques for MRV of carbon stocks, biodiversity and ecosystem services. In addition, we used large scale regional modelling approaches to examine how different climate and socio-economic scenarios and land-use options could affect carbon storage and biodiversity in the longer term. We used a suite of models to examine the effects of land use change scenarios (CLUE, DINAMICA), on ecosystem processes (LPJmL), land surface/atmosphere interactions (JULES-ED) and biodiversity (GLOBIO-3). The models were used within an assessment framework to evaluate synergies and trade-offs between biodiversity, climate change mitigation and other key ecosystem services such as water supply, disease regulation and non-timber forest products.

Local case studies were an important part of ROBIN. They covered multi-functional landscape-scale sites across a climatic gradient of tropical forest areas. These sites were rich sources of data for testing biodiversity/carbon storage relationships but they also provided living laboratories for investigating more complex trade-offs between biodiversity, climate change mitigation options and other ecosystem services. Through our participatory work with stakeholders, some of these sites were also used to provide stakeholder perspectives on the drivers of change and barriers affecting uptake of mitigation options. Our work will inform the management of multi-functional landscapes delivering, for example, conservation, agriculture and forestry objectives. In these landscapes there are considerable

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opportunities to maintain and increase biodiversity and carbon stocks while simultaneously delivering a wider range of other ecosystem services to communities.

More information can be found on our web-site at www.robinproject.info. Our spatial data warehouse for project data and ROBIN products is at www.conabio.gob.mx/robin

Description of the work performed since the beginning of the project and the main results achieved so far.

In relation to our key objective *to understand the socio-ecological consequences of land use and climate change in relation to biodiversity and mitigation options* we developed a whole systems framework linking indicators of policy and management responses, drivers of change (land use & climate), biodiversity and ecosystem processes, ecosystems services and human well-being. A set of indicator factsheets were produced together with a process for estimating sustainability limits for indicators based on policy targets, system thresholds, legislative commitments and social thresholds.

We made progress in *quantifying the role of biodiversity in terrestrial ecosystems in climate change mitigation (CCM)*. Biodiversity indicators were divided into four categories: taxonomic, functional, structural and landscape and combined into a single measure of "ecosystem integrity" representing the overall "health" of the ecosystem. We analysed relationships between biodiversity indicators and carbon storage in old-growth and secondary forests using data from field sites across a latitudinal gradient Latin America. Results indicate that biodiversity has a direct positive effect on carbon stocks and should be considered as a key part of mitigation policies such as REDD+ rather than just a co-benefit. Remote sensing products were developed as possible proxies for diversity (e.g. maps of land cover, phenology, vegetation, structural diversity and ecosystem integrity) to inform the development of practical techniques for monitoring biodiversity.

ROBIN *analysed the impacts of alternative land-use scenarios on carbon stores and ecosystem services.* We modelled future patterns of land use using scenarios from the new IPCC climate forcing and socio-economic pathways and linked these to dynamic vegetation models to assess implications for ecosystems. We incorporated a range of plant functional traits into our models to understand the role that biodiversity may play in enhancing the resilience of ecosystems to climate change. Our models indicate that forests in the Amazon region will be dramatically reduced in the worst case scenario under strong climate forcing (RCP 8.5). Under low climate forcing (RCP 2.6) vegetation carbon is projected to remain stable across Latin America and even to increase in the Amazon region. The models also indicated that evergreen species in moist rainforests could be gradually replaced by dry-deciduous species better adapted to reduced rainfall. We explored the implications of these changes to ecosystem services and human well-being using a tool called QUICKScan to visualise data, test bundles of indicators in relation to sustainability limits, compare policy combinations; and assess trade-offs between ecosystem services.

As part of our work *to provide guidance on land-use planning and other climate change mitigation options* we completed workshops in Bolivia, Brazil and Mexico using methods described in a ROBIN "handbook for the participatory process". Results from the first round of workshops indicate that biodiversity loss and deforestation are likely to continue in the near future but that the implementation of adequate agricultural policies, jointly with good

coordination of policies and institutions, could lead to less negative environmental consequences. From the 2nd and 3rd set of SH workshops and a state-of-the-art review on current approaches to CCM in Latin America we are identifying options for delivering favourable outcomes. These options can be explored in a decision support toolkit developed by ROBIN called OPTamos (Options for Participatory Transformation and Management of Sustainable land use).

In summary, ROBIN provided research evidence and products to support the following key messages:

- in relation to the role of biodiversity: biodiversity matters - biodiverse forests store more carbon and are more resilient to climate change than less biodiverse forests.
- in relation to policies and management options: managing logged and secondary forests for biodiversity will help increase carbon storage and resilience.
- in relation to ecosystem functions: functional diversity and ecosystem integrity are linked to carbon storage, biodiversity and other forest benefits and can be easily monitored as part of a systematic approach to environmental management.
- in relation to climate change mitigation and other ecosystem services: spatial trade-offs among services change across spatial scales and contexts and ROBIN developed two decision-support tools to help assess options that are relevant to local or national situations.
- in relation to decoupling economic growth from environmental degradation: there may be creative opportunities for win-wins across bundles of services although the extent to which these are constrained by biophysical rather than socio-economic factors needs to be taken into account.
- in relation to benefits and human well-being associated with biodiversity: payments for ecosystem services and REDD+ schemes should be linked to agricultural policies targeted at smallholders.

Description of expected final results and their potential impacts and use

ROBIN has provided policy relevant messages that address a set of key issues or questions. For example:

- Will forests with more biodiversity store more carbon than less biodiverse forests in the future and what are the implications for issues such as resilience, sustainability and climate change adaptation?
- What are the main trade-offs at national and local scales between biodiversity, carbon storage and other ecosystem services under different CCM options?
- How can we down-scale future policies to the local context to make policy instruments more effective and improve human well-being?
- What options are there for better integration of policies for economic development, agriculture and nature conservation to deliver benefits linked to both biodiversity and climate change mitigation objectives?

In addition, ROBIN has produced some key products to aid the implementation of climate change mitigation policies and options including:

- improved information on baselines for biodiversity and carbon accounting;
- improved methods for monitoring carbon and biodiversity indicators (e.g. through the use of remote sensing and ecosystem integrity);

- maps showing the current distribution of some key biodiversity indicators (e.g. ecosystem integrity);
- maps showing the potential contribution of biodiversity to CCM under future climate change, land use change and policy (REDD+) scenarios;
- decision support tools for local and national implementation of REDD+ or similar "Payment for Ecosystem Services" (PES) schemes and implications for commitments under the Convention in Biological Diversity (CBD);
- the identification of options for using biodiversity and ecosystems for CCM taking into account trade-offs with other ecosystem services.

To ensure the uptake and use of the results in ways that achieve CCM and biodiversity objectives we worked with local and national stakeholders. We expect the main impacts of the work to be realised over future years in the form of improved outcomes from CCM and biodiversity protection measures, decreased rates of biodiversity loss and improved design and implementation of REDD+ and similar PES schemes in Latin America to ensure increased storage of carbon in forests and multi-functional landscapes. The work will also inform the implementation of the CBD, particularly in relation to reporting on some CBD indicators. There are plans for some of ROBIN's work to be used at the next CBD COP in 2016 in Mexico.

ROBIN presented its work at an EC side-events at meetings of the UNFCCC and the CBD. At the UNFFCC/COP17 meeting in Durban in 2011, we presented ROBIN at a side-event organised by the EC on the "non-carbon benefits of REDD+". The discussion confirmed the urgent need for developing methods for monitoring, reporting and verification tools for use at national and local levels, including assessments of biodiversity and other ecosystem services. In 2012, ROBIN co-organised a side-event with the EC at the CBD/COP 11 in Hyderabad, India on "Mechanisms for delivering biodiversity benefits from REDD+". We discussed the monitoring and governance systems required for REDD+ implementation at local and national levels and explored options for operational indicators relevant to CBD 2020 particularly Aichi Target 14 on restoring and safeguarding ecosystems and Target 15 on enhancing the resilience of ecosystems and the contribution of biodiversity to carbon stocks. During 2015, our final year, we contributed to a stand at the EC's Green week in Brussels and in October organised a science-policy-society dialogue meeting at the European Parliament on "Forest Landscapes: solutions for climate change mitigation". ROBIN also led a side event at UNFCC/COP21 in Paris in November 2015 on "REDD+ Safeguards, Ecosystems and Peoples".

Building on our work on ecosystem integrity, ROBIN's Mexican partners have worked on "National Biodiversity and Ecosystem Degradation Monitoring" programme as part of its approach to implementing the REDD+ mechanism. ROBIN is now adapting this for use in other countries, initially Brazil and Bolivia whilst at the same time Mexican project partners have worked successfully to get the method adopted across the other countries of the Pacific Alliance.

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1. Project objectives

ROBIN will deliver the knowledge and tools required to inform large-scale policy and local resource use decisions for the delivery of multiple ecosystem services under future scenarios for socio-economic and climate change. Its objectives will be to:

1. Quantify the role of biodiversity in terrestrial ecosystems in South and Mesoamerica in mitigating climate change;
2. Quantify local and regional interactions between biodiversity, land use and climate change mitigation potential and the delivery of other key ecosystem services;
3. Evaluate the socio-ecological consequences of changes in biodiversity and ecosystem services under climate change;
4. Evaluate the effects of current climate change mitigation policies and actions on ecological and socio-economic conditions;
5. Analyse the impacts of alternative land-use scenarios (and other mitigation options) aimed at maximising climate mitigation potential while minimising loss of biodiversity and ecosystem services and avoiding undesirable ecological and socio-economic effects; and
6. Provide guidance on land-use planning and other climate change mitigation options such as low carbon strategies and bio-fuel production.

2. Work progress and achievements during the reporting period

2.1 Work Package reports

WP1.1 Relationship between biodiversity and climate change mitigation

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In this period we have produced the final WP deliverable describing the contributions of biodiversity and ecosystems to climate change mitigation based on analyses using datasets from remote sensing. We reported on several study cases in which different approaches were used for the scaling up by combining field data and remotely sensed data. These studies covered issues such as the development of tools to detect forest changes due to land use change (i.e., logging and slash-and-burn agriculture) and the development of proxies of biodiversity (e.g., Hants phenology).

During this period we have continued with the work on the relationship between biodiversity and climate change mitigation using field data. This effort has resulted in 5 published scientific articles, 10 manuscripts under review or in preparation, and over 10 oral presentations at international conferences. Based on the results obtained and on their implications we have prepared two factsheets (no. 2 & 11).

Finally, based on these results and on the literature we have written a review paper on the relationship between biodiversity and carbon stocks and sequestration using different approaches (field data, remote sensing and modelling). This manuscript answers, therefore, one of the main questions of the project and provides the scientific evidence of underpinning our policy recommendations.

Task 1.1.1: Data collation and assessment of possible biodiversity indicators for use in the other modules (WU (lead), NERC, ALTERRA, CONABIO, EMBRAPA, IBIF, INECOL, UNAM, GFC)

Our work on developing a biodiversity indicator, namely ecosystem integrity, have continued during this period. We have taken two different approaches in this regard. One approach is the one being developed in Mexico (activities being led by CONABIO) in which field data from the National Forest Inventory (2004-2013), remote sensing products (derived from MODIS), and environmental data (e.g., slope, total precipitation) are used to construct a map of ecosystem integrity for the whole country. The other approach is being developed in Brazil (EMBRAPA) in which only remote sensing products are used to determine ecosystem integrity for the Brazilian Amazon. This is a useful approach for countries with low field data availability. The approach being used has been presented in several national and international conferences.

More information on the development of ecosystem integrity is provided in WP1.2.

Task 1.1.2: Biodiversity and climate change mitigation potential along environmental gradients: quantify relationships between biodiversity and carbon (WU (lead), NERC, ALTERRA, CONABIO, EMBRAPA, IBIF, INECOL, UNAM, GFC)

The activities related to this task are mainly related to the data analysis, preparation and publication of manuscripts. Below we list the main activities that have been carried out this year regarding the manuscripts dealing with the relation between biodiversity and carbon stocks in mature forests along environmental gradients:
  - WU has coordinated a manuscript (Poorter et al. 2015 Global Ecology and Biogeography) on the effect of biodiversity attributes (species richness and vegetation structure) and environmental conditions (soil and rainfall) on biomass stocks across 59 Neotropical forests. Key result is that species richness has an independent and positive effect on biomass stocks. Many of the ROBIN sites and partners (IBIF, EMBRAPA, GFC, UNAM, Alterra, CEH, PIK, WU) are co-authors of this paper (with a total of 65 co-authors).
  - WU has led a publication (van der Sande et al. 2015 Oecologia) on traits that drive biomass growth of individual canopy trees in Bolivia). We show that mainly the sapwood area, which is needed for water transport and storage, determines the growth of large canopy trees.
  - WU has coordinated a cross-ROBIN manuscript (Van der Sande et al, Frontiers in Ecology and Environment submitted), in which we review the role of biodiversity on carbon stocks and dynamics in tropical forests, focusing on empirical studies, remote sensing studies, modelling studies, and providing policy implications. The review shows that the three research approaches provide complementary information, and that 81% of the empirical studies and 100% of the remote sensing studies show that there is a significant positive effect of biodiversity on carbon stocks and dynamics. Many of the ROBIN partners have participated in this effort (Alterra, CEH, CONABIO, EMBRAPA, IBIF,UNAM).
  - WU and PIK are preparing a manuscript (van der Sande et al.) evaluating the long-term effect of functional diversity on biomass storage, productivity, and stability in response

to annual climatic fluctuation. The study is done for a dry and a wet tropical forest, using the model LPJmL-FIT.

The results and their policy implications have been summarized in ROBIN Factsheet #2 entitled "Biodiversity has a positive effect on carbon stocks and carbon sequestration".

Task 1.1.3: Biodiversity and climate change mitigation potential across a gradient in land use intensity: quantify relationships between biodiversity and carbon (WU (lead), NERC, ALTERRA, CONABIO, EMBRAPA, IBIF, INECOL, UNAM, GFC)

Below we list the main activities that led to the manuscripts that looked at the relation between biodiversity and carbon stocks along a land use intensity gradient:
  - WU coordinated three manuscripts that evaluate how biodiversity attributes (species diversity, functional trait composition, and forest structure) and environmental conditions (soil properties and light availability) explain biomass stocks and dynamics within disturbed forests. One manuscript (van der Sande et al., in review at Journal of Ecology, in collaboration with Alterra and IBIF) was based on the IBIF research site in a moist forest in Bolivia. The second manuscript was based on the GFC research site in a wet forest in Guyana (van der Sande et al., New Phytologist, in collaboration with Alterra). Both manuscripts are under review. They show that within the nutrient-poor wet forest of Guyana soil phosphorus and functional composition drive biomass dynamics, whereas within the fertile but drier moist forest of Bolivia, vegetation structure and soil water availability drive biomass dynamics. The third manuscript focuses on Brazilian dry forest (Prado-Junior et al. Journal of Ecology revision submitted), and shows that initial stand biomass was the best predictor of all three biomass demographic processes, providing strong support for the vegetation quantity hypothesis. In these dry forests a dominance of conservative species, rather than of acquisitive species, is associated with high biomass growth and storage, probably because their low SLA and high wood density allows them to keep on functioning during drought stress. Paradoxically, high soil fertility (Ca) led to low biomass productivity, probably because of nutrient imbalance.
  - WU and EMBRAPA are participating in a manuscript on the role of biodiversity attributes (species diversity, functional trait diversity, and vegetation structure) on the biomass recovery of tropical forests after logging in Tapajós, Brazil. A manuscript is in preparation.
  - WU has coordinating a large effort to compile and calculate data on biodiversity attributes (species diversity, community mean trait values, and vegetation structure), environmental conditions (soil, climate, light) and biomass dynamics (recruitment, growth, mortality and net biomass change) and stocks for 24 forest sites across the Neotropics. Preliminary results show that species diversity and functional composition have a positive effect on biomass stocks and dynamics. A manuscript is in preparation (Peña-Claros et al.). Many ROBIN partners participate in this effort (Alterra, CEH, EMBRAPA, GFC, IBIF, UNAM).
  - WU together with IBIF have published a manuscript (Carreño-Rocabado et al. 2015 Ecological Applications) on the effect of land use intensification (mature forest, logged forest, secondary forest, agricultural field, pasture) on functional diversity in Bolivia. Functional variation peaked at intermediate land use intensity, which included secondary forest and also (unexpectedly) agricultural land which is an intensely

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managed system. The high functional variation of these systems is due to intermediate environmental conditions, and due to management practices that introduce a range of exotic species and their trait values into the local species pool.

- WU has participated on an article (Rutishauser et al. 2015, Current Biology, in collaboration with IBIF, EMBRAPA and many other organizations) on the recovery rate of carbon stocks in logged forests in the Amazon. The study shows that the recovery rate is high and mainly dependent on the percentage of carbon lost due to logging.

These results and their policy implications have been summarized in the ROBIN Factsheet #11 entitled "The potential of human impacted forests".

Task 1.1.4: Scale up to multifunctional landscapes (i.e. site level) and the region (Brazil to Mexico) using remote sensing and models (WU/CONABIO (co-lead), NERC, ALTERRA, CONABIO, EMBRAPA, IBIF, INECOL, UNAM, GFC).

The deliverable report (D1.1.3) entitled "Current contributions of biodiversity and ecosystems to climate change mitigation-an analysis using remote sensing datasets" was written. This report is based on a series of studies in which we have developed and applied remote sensing (RS) data and methods to upscale interactions between biodiversity and potential climate mitigation from plot level to landscape level to regional and continental scale.

In the report we present an approach to explore the increasing amount of available remote sensing products through an empirical multivariate methodology to develop spatial models for prediction of quantitative forest variables (Dutrieux et al. in prep.). Finally, as part of this report several remote sensing products (e.g., Hants phenology indicators, leaf phenology, landscape diversity) have been developed at several scale levels. These products can serve as a representation of the state of a tropical forest system and as such are spatial explicit indicators in addition to the available forest plot observations. Below a more detailed description of the studies used in the for this deliverable (D1.1.3):

- In a case study for Brazil (Dutrieux et al. in review at International Journal of Applied Earth Observation and Geoinformation) we explored remote sensing based time-series approaches to identify land use intensity in low intensity slash and burn agricultural systems. The approach allowed the characterization of the number and duration of the cycles as quantitative measure of changing intensity of land use (Jakovac et al., in prep).
- In a large-scale fieldwork study in Guyana, the opportunities of innovative collection techniques like Terrestrial Laser Scanning (TLS) and Unmanned Aerial Vehicle (UAV based) sensing to assess the tropical forest environment was evaluated. The use of these technologies can have two main advantages: a more quantitative characterization of the forest structure (e.g., detailed vertical 3D tree profiles) and diversity (e.g., leaf biochemistry traits).
- The relation between carbon stocks and different biodiversity measures (e.g., ecosystem integrity) was evaluated for Mexico at the national scale using a combination of plot level data, remote sensing, model outputs and auxiliary variables. As expected, the carbon storage index is positively correlated with structural attributes

like, the number of individuals and average diameter at breast height. Additionally, tree species richness was found to positively related to carbon.

WP1.2 Interactions between biodiversity and measures of climate change mitigation over time

Good progress in all tasks in the Description of Work has been achieved:

We have advanced our work on the assessment of biodiversity through further development of the concept of ecosystem integrity (EI) and the preparation of a high profile publication. We have produced a time series of maps of EI for Mexico by refining methodologies regarding accuracy of input variables and probabilistic modelling using several levels of variables including field and remote sensing data. Brazil demonstrated that this approach also has practical potential in countries with restricted data availability by using remote sensing data sets on their own.

The conceptual and mechanistic scheme of EI is being applied in Mexico to assess biodiversity on a federal agency level at national scale. The derived national biodiversity monitoring system is in its implementation phase and first results are being analysed. EI has also been proposed as a tool for the Experimental Ecosystem Accounting being developed in several pilot countries like Mexico and Brazil in the framework of the United Nations System of Environmental-Economic Accounting under the Statistical Department.

Preliminary analyses of dose-response-relationships using the time series of EI and a time series of provisioning services for Mexico on a national scale have been shown to be useful for assessing trade-offs between ecosystem services and biodiversity.

Task 1.2.1.: Assess the temporal changes in biodiversity resulting from land use change impacts (WU/CONABIO(Joint lead), NERC, EMBRAPA, IBIF, INECOL, PIK, UNAM, ALTERRA, WU, GFC)

CONABIO/INECOL

Ecosystem integrity (EI) time series have been produced after the input variables have been re-processed to achieve higher accuracies (see Task 1.1.1). To create the EI Model, a Bayesian network (BN) approach was applied, since it is not only an inference mechanism but a predictive model in itself. The general structure of the network is composed by four tiers: precondition, hidden, instrumental, and contextual. This structure resembles those used in medical diagnostics arranged by preconditions, diseases, symptoms, along with a layer of reference values. In this case, preconditions are represented by the proportion of natural vegetation per pixel, the hidden tier is representation of the magnitude of difference between natural and actual land cover, the instrumental tier are the core variables that indicate ecological integrity and the contextual tier is a reference framework for the model to adjust to topographic and climatic circumstances. Mexico is an extremely beta-diverse country due to its biogeophysical heterogeneity. Thus a hidden variable was introduced to be able to stratify model fitting according to those ecological differences. Based on this preliminary analysis we selected the combination of hidden variable Holdridge life zones of 31 categories and nodes discretized into 10 levels.

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With this basic setting we conducted a step-wise search of a BN to minimize the total error rate using a scoring learning algorithm. Once a satisfactory Bayesian Network model was fitted, input variables for this structure were created to study EI trends in time. The Final Bayesian Network is then used as a predictive model to generate a new EI map for each time step (2004-2013) which are then used for trend analysis.

A visual comparison of the resulting maps of EI with other available data sets on the condition of ecosystems on a national scale show a very good correlation of the general pattern. Most severe degradation can be seen in and around major cities, while in Central Mexico and the Gulf of Mexico coastal plain the historical patterns of land use are clearly apparent. Additionally, the EI map shows patterns of integrity of natural vegetation, that has not been revealed by other products, because of the before not available data sets. A sensitivity analysis of the effect of different variables in the model revealed that land use and roads are very important drivers for EI dynamics.

Given the broad conceptual and dynamic structure, the indicators and variables for EI that we have developed can be seen as a very useful tool to evaluate and interpret data in a very accessible form for many diverse stakeholder groups and for the public in general.

PIK has contributed on the writing and revision of the Poorter et al. paper published in GEB.

Embrapa has produced a map of EI for the whole Brazilian Legal Amazon based on remote sensing products. In Brazil and other Latin American countries, where there is low field data availability – an alternative approach has been developed that uses only remotely sensed (RS) data. The RS approach allows, not only monitoring of temporal variations of EI, but also spatial variations, using smaller or larger spatial resolutions. The methodological approach of this work consisted in the generation of an "ecosystem biodiversity loss" spatial model based on probability distribution of evidence parameters (Bayesian theory). The modelling was based on learning process (data-driven model) using the Expectation Maximization algorithm. Bayesian network has been established from an expert conceptual model that related different spatial data (Thematic maps and Remote Sensing data: (i) EVI; (ii) LAI- Leaf Area Index (MODIS/ USGS – NASA); (iii) Tree Cover (MODIS/ USGS – NASA); (iv) GPP- Gross Primary Productivity (MODIS/ USGS – NASA) (Figure 17). In order to decrease the environmental heterogeneity, a phyto-ecological landscape zoning was introduced. For the validation of this probabilistic model, an evaluation was carried out in controlled areas with field observation and comparison with the IE model based on expert knowledge.

Outcomes obtained from the Ecosystem Integrity Modelling (carried out in collaboration with CONABIO/INECOL and WU) at Environnement et géomatique: approches comparées France-Brésil. Rennes, 12-15 Novembre 2014, 4th International Conference on Earth Science & Climate Change. OMICS International. Monday, June 15, Alicante, Spain and Cuarto Congreso Internacional de Servicios Ecosistémicos en los Neotrópicos: 30 de septiembre al 3 de octubre 2015, Mar del Plata.

The Embrapa team collaborated on a set of papers on: "Evidence of ecological resilience clusters using climate typology in the Amazon Rainforest: a methodological proposal" identifies the resilience capacity of different areas in the Brazilian Amazon. It is based on biophysical data to assess the temporal response of vegetation in order to express the effects of seasonal conditions and variations in weather and climate. Different data sources (climate: MODIS altitude: TOPODATA) were evaluated for their degree of

correlation. The study shows that the response of biophysical variables from satellite information combined with typological climate conditions allows to differentiate a certain diversity in the Amazon's ecological resilience capacity. As a complement to the previous research, a case study in the Tapajós National Forest (Flona Tapajós) "Multi-temporal cover patterns using Landsat TM in the Tapajós National Forest and its surroundings: a case study" was carried out. The spatial patterns of land use and cover change using data from spatio-temporal remote sensing sources have been mapped. Results show that between 1989 and 2005 deforestation was higher than from 2005 to 2009. The data indicate that the area still has an extensive forest cover but, within the analysed period, it became obvious that human pressures, especially activities related to agriculture and livestock were considerably changing the landscape in the study area. Reductions in deforestation showed the effects of management actions by the Chico Mendes Institute for Biodiversity Conservation (iCMBio) to ensure the sustainable use of the Flona Tapajós, since 2007.

Task 1.2.2: Quantify temporal changes in biodiversity using indicators and functional composition with land-use change over the three project scales. (UNAM/NERC (Joint lead), CONABIO, ALTERRA, EMBRAPA, IBIF, INECOL, PIK, WU, GFC)

WU coordinated preparation of a manuscript on evaluating temporal changes (10-30 yr) in species and trait composition across five old-growth neotropical forests. They found consistent changes over time in the composition of some of the traits, which most likely means that these forests are not pristine but recovering from some historical disturbances (such as drought events or anthropogenic disturbances). This manuscript is under review.

PIK has conducted factorial experiments in which changes in functional trait data have been simulated for the Amazon rainforest. These data were used by WU for analysing biodiversity effects on carbon storage. A publication describing the results is in preparation together with WU. Fires pose a threat to tropical rainforests in the Amazon accelerating the impact of deforestation and degradation. Analysis of high-resolution data on land-cover forest degradation and area burnt has shown that fires escaping from managed pastures contribute substantially to forest fires which are occurring in close proximity to managed land. Results are described in a publication in JGR-Biogeosciences.

Embrapa carried out two studies to provide a description of changes over time and to point out future trends that were used to identify higher-pressure areas. "Scenario Analysis of the Main Drivers forces threatening the conservation of the Tapajos National Forest, Brazilian Amazon" addresses efforts to investigate landscape changes in the Flona Tapajós and its surroundings by considering road infrastructure, municipal administrative units, land tenure (settlements, Conservation Units and Indigenous Lands) and localities. The biophysical elements included climate variables such as rainfall and annual water deficit, altimetry and slope. Data were spatialized by using geostatistical analysis; modelling and scenario generation were carried out in DINAMICA-EGO. Future trends and scenarios were also generated for another case study in the Amazon: "Future scenarios for the north of Amapá state considering REDD+ as a conservation tool", which assessed how the provision and maintenance of ecosystem services can contribute to local and regional sustainable development. This study allowed creating three future scenarios of deforestation considering different levels of forest governance for the northern region of Amapá until

2030. Further, the opportunity cost of avoiding forest conversion was estimated using information of the net present value (NPV) of four land use activities (forest, cattle ranching, and gold mining) and the average carbon stock values of these land uses. The main result is a graphical representation of the differences derived from the returns of forest and those land uses that will replace it. By showing differences in carbon stocks and avoided emissions by not converting the forest to other uses, the results contribute to the discussion of a policy to subsidize programs aiming at reduction of emissions from deforestation and degradation (REDD) and payment for ecosystem services (PES) implementation.

Task 1.2.3.: Modelling the dose response relations (DRR) between land-use change and climate change and biodiversity, ecosystem integrity and ecosystem services indicators (CONABIO/ALTERRA (Joint lead), NERC, EMBRAPA, IBIF, INECOL, PIK, UNAM, WU, GFC)

CONABIO has generated time series on ecosystem services on a national scale for their use in modelling dose-response relations, focusing on land use and related provisioning services, namely agricultural production including the most important crops and life stock. Preliminary results generated in the probabilistic modelling framework used for ecological integrity show that for most crops production is related with intermediate levels of ecosystem integrity.

PIK has conducted simulation experiments and provided data simulated by the LPJmL DGVM model to compute ecosystem integrity for Mexico and the Brazilian Amazon.

Embrapa:
Preliminary results on the topic "Impacts of Biodiversity Loss in the Carbon Stock and Evapotranspiration Fluxes Regulation in Brazilian Amazon" have been presented at the "Our Common Future Under Climate Change International Scientific Conference" on 7-10 July 2015 Paris, France.

WP2.1 Framework for analyses of impacts of land use change on social-ecological systems

During the period from 01 Nov 2014 to 31 October 2015, The Framework for Analyses of Impacts of Land use change on social-ecological systems has been successfully accomplished by the following activities:
   (1) Assessment of the use of the ROBIN indicator framework by the different WPs in the project (as reported in D2.1.1 and D2.1.2) by using a Survey Monkey questionnaire; results presented in the Final Science Conference in Brussels on 19th October 2015.
   (2) Application of the Water Footprint methodology based on Globally available datasets, as indicator for Agricultural expansion in the ROBIN indicator Framework in the Tapajos River basin (Brazil case study); results disseminated in two conferences and in a peer-review paper to be submitted in Dec 2015.
   (3) Development of concepts for implementing the sustainability limits into the QUICKScan software tool and created a variety of visualisations as examples.

(4) Linking Bayesian Belief Networks and GIS to assess the Ecosystem Integrity in the Brazilian Amazon with the QUICKScansoftware.

Task 2.1.1: ROBIN indicator framework (EMBRAPA/ALTERRA (co-leads), NERC, IBIF, UNI-KLU, PIK, WU, UPM, GFC)

This task was accomplished in the first reporting period.

Task 2.1.2: Indicator development for assessment of social-ecological interactions for different land use types at different scales (ALTERRA (lead), NERC, EMBRAPA, IBIF, UNI-KLU, PIK, WU, UPM, GFC)

This task was nearly accomplished in the second reporting period.
Additional work was done regarding:
- Preparation of a Survey Monkey questionnaire to assess the use of the ROBIN Indicator Framework in the ROBIN research. Specifically 1) the use of the ROBIN Indicator Framework in the outcomes delivered by the project; 2) the usefulness of the outcomes to answer to the six main research questions.
  Analysis of the questionnaire results, preparation of a report and presentation of the findings in the Final science conference in Brussels in October 2015.
- Application of Water Footprint methodology based on Globally available datasets, as indicator for Ecosystem Services in the ROBIN indicator Framework linked to Agricultural expansion in Tapajos River basin; starting the application for Guarayos case study in Bolivia, which will be finalised in 2016.
- Writing manuscript on "Impact of soybean expansion on Water Footprint in the Amazon under climate change scenarios" to be submitted to Science of the Total Environment in December 2015.
- Further development of local indicators to characterise the Tapajos areas in Brazil.

Task 2.1.3: Identification of regional specific 'sustainability limits' (thresholds or similar references) for each indicator (NERC (lead), ALTERRA, EMBRAPA, IBIF, UNI-KLU, PIK, WU, UPM, GFC)

- Developed concepts for: (1) standardizing and putting regional specific sustainability limits on ordinal and quantitative indicators, (2) creating composite indicators, (3) developing the sustainability limits into composite sustainability limits and, (4) spatially aggregating indicator values and their distance from the sustainability limits.
- Implemented the concepts into the QUICKScan software and created a variety of visualisations for it (including transparency backtracking tools).
- We co-developed the concept of ecosystem integrity for Brazil with Embrapa aiming at the use of satellite data and Bayesian statistics. The concept has been implemented in the QUICKScan software that makes it possible to use a Bayesian Belief Network with spatial data. The software provides backtracking tools for transparency and enables understanding of why a mapped location has a certain probability distribution. The work was published in Verweij et al., 2014, Linking Bayesian Belief Networks and GIS to assess the Ecosystem Integrity in the Brazilian Amazon.

WP2.2 Integrated framework for modelling interactions and trade-offs at local to regional scales

With the future climate change simulation experiments completed by NERC in 2015, Tasks 2.2.1 and Task 2.2.2 were accomplished. The work has been successful as the vegetation scenarios were made available for quantification of ecosystem integrity and future changes in ecosystem service provision, trade-offs and tipping points in WP2.3. Data requirements and transfer were quite often organized and disseminated bilaterally. Detailed work on local land-use scenarios was very demanding, but provided the chance to integrate stakeholder opinion in the scenario development.
All deliverables and milestones had been achieved and completed largely on schedule.

It is encouraging that collaboration and cross-cutting activities which integrate outcome from WP2.2 are still being pursued after the project has ended. This is truly a result of the integrative nature of collaboration within ROBIN.

Task 2.2.1: Evaluate CLUE++ land use model to deliver future land use change scenarios (WU lead)

CONABIO: To meet the need to provide spatial scenarios for the landscape scale work on the Mexican case study for the Southern Coast of Jalisco, a land use and cover change (LUCC) model based on historic LUCC patterns has been integrated. It simulated the main change processes deforestation, forest degradation, and regeneration. A multi-model approach was chosen to integrate data in the pattern driven LUCC simulation: Econometric models, participatory process models (fuzzy cognitive maps) and perceptions from local stakeholders were used to parametrize the simulation model in order to overcome the problems related to prospective analysis based on data driven approaches alone. This way, the desired and not-desired scenarios were constructed based on local process models and data driven extrapolations of historic LUCC trends, under the influence of climate change and macroeconomic scenarios. This work will be considered as one of the main inputs to discuss with local stakeholders how this set of models can be translated into policies and regulations that could help to realize the desired scenario established in participatory workshops. The cconceptual framework and methodological approach have been presented at the World Forestry Congress (WFC) organized by FAO (September 2015, Durban, South Africa).

INECOL: During this period, some strategies were explored to assess ecosystem integrity under scenarios of climate and land use changes. In this sense, we tried to build a Bayesian network using some of the variables produced by LPJmL and Jules. As a first step, we explored if the variables used to calculate the ecosystem integrity index in present time matched the output variables from LPJmL and Jules. Some exercises were done for both models using the following variables for Jules (broadleaf trees, needle-leaf trees, C3 (temperate) grasses, C4 (tropical) grasses, shrubs, urban, open water, bare soil and permanent land ice) and LPJmL (Fractional cover of natural vegetation, Fractional cover of crops, Total runoff, Litter carbon, Soil carbon, Heterotrophic respiration, Gross primary production, Net primary production). During the exploration of variables, we found that

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the LPJmL-FIT model provides an additional set of output variables that could be more useful than the output from the standard LPJmL. However, their production and processing requires more time than the programmed within the ROBIN project. In these circumstances and given the academic interest to assess ecosystem integrity under climate change scenarios, we intend in the near future, to explore this analysis in collaboration with the group from the Potsdam Institute for Climate Impact Research.

PIK finalized continental-scale simulations to describe biome shifts and biome degradation caused by land-use and climate change for Latin America. These were based on continental-scale land-use scenarios provided by ALTERRA. A publication describing respective anthrome (human biomes) formation and relative importance of impacts arising from land-use vs. climate change is currently in revision.
PIK finalized an in-depth analysis on the role of functional diversity on biomass resilience in the Amazon basin, showing that plant trait diversity enables tropical forest to recover its biomass to nearly pre-impact levels under severe climate change. A publication describing these results is currently under revision.

NERC imported the CLUE++ land use changes into JULES which required new code development, simulation experiments were conducted for current climate and with and without land-use, respectively. Simulation experiments with future climate scenarios from 2 GCMs and 3 emission scenarios were conducted as well, each testing the difference of the land-use impact. Results were delivered in August 2015.
In addition, a future climate (only 1 GCM and one scenario) but with no change in CO_2 was carried out in September 2015. The results showed that the model was very sensitive to the increase in CO_2 that is part of the future climate scenarios, with increased vegetation growth even when the rainfall decreased. Also the results are sensitive to the radiation amounts in the region. The results were presented at the final ROBIN science meeting in Brussels in October 2015.

UNAM and PIK collaborated on preparing and interpreting vegetation scenarios for carbon-related ecosystem services. A joint publication describing the changes in provision and valuation of the ecosystem services is currently being finalized.

ALTERRA analysed the CLUE conceptual model, the statistical method and the black box implementation of the core of the allocation algorithm. It fully incorporated the conceptual model in a single software package based on the findings of the analysis and tested the new implementation for Costa Rica and Mexico. Results indicate that the model is performing as it should with the advantage of model transparency and the possibility to do multiple model runs in a short time. The outcome are being described in a scientific paper.

Task 2.2.2: Evaluate dynamic vegetation and generic ecosystem models to simulate ecosystem functions (NPP & soil respiration) and functional diversity data gained in Module 1 (PIK lead, NERC)

NERC: The dynamic vegetation model was evaluated against land-cover maps, flux data and soil carbon data. The model was tuned to ensure a good match with the carbon fluxes from the flux stations of evergreen trees. The dry-season phenology parameters were

tuned to simulate the observed (NDVI data) changes in leaf area index response to the modelled soil moisture. The new parameterisation was then tested with the dynamic vegetation model and the results showed that the functional diversity (the difference between dry-deciduous and evergreen trees) as compared to the land cover maps was well represented.

PIK had completed its work on vegetation scenarios in the previous reporting period.

Task 2.2.3: Provide joint land use and vegetation change output for indicator framework, scenario applications and indicator response functions (WU lead, PIK)

NERC: Modelled water and carbon budgets as a result of land-use and climate change were provided to the ROBIN partners responsible for the indicator framework in August 2015.

PIK contributed its vegetation scenario data for the indicator framework, indicator response function, incl. sustainability limits, ecosystem service analysis and valuation in WP2.3, biodiversity assessment in WP1.1, ecosystem integrity work in WP1.1 and for the Geoportal in WP4.3 (here including meta-data description following the standardized protocol). This work has been completed in time and questions by other partners using these scenarios have been solved.

ALTERRA contribution to this task has ended in the previous reporting period.

WP2.3 Exploring trade-offs between biodiversity, ecosystem services and climate change mitigation

Work in this workpackage has had a large number of dependencies, relying on data provided by other components of the project. This has required some flexibility in the scope of the analysis undertaken but the integration of data and approaches has produced some very interesting results, which are currently the focus of six papers in development. During the period from 01 Nov 2014 to 31 October 2015, the work exploring trade-offs between biodiversity, ecosystem services and climate change mitigation has involved three subcomponents (for more detail see sections below):

1) Finalising the quantitative evaluation framework for multiple indicators using the QUICKScan tool. This tool is now populated with ROBIN data and with sustainability thresholds, and is producing a paper on application to the ROBIN countries and scenarios.
2) Exploring trade-offs within and across case study areas. This integrated analysis has looked at relationships among and across biophysical variables, biodiversity, ecosystem services and human wellbeing. Several papers are in development from the results of the integrated analysis, with a further two papers in development from the individual ecosystem service modelling components.
3) Exploring Ecosystem resilience and tipping points. This work included theoretical modelling components as well as an overview of tipping points in Latin America.

The work is producing a paper combining these aspects, together with more focused analysis of potential impacts on jaguar & sloth.

Task 2.3.1: Scenario development (NERC (lead), ALTERRA, CONABIO, EMBRAPA, IBIF, UNI-KLU, INECOL, PIK, UNAM, WU, UPM, GFC)

completed during first reporting period
The scenarios are being applied in the trade-offs analysis in Task 2.3.3, and in WP2.1, Task 2.1.3.

Task 2.3.2: Develop and test quantitative evaluation framework for multiple indicators (NERC (lead), ALTERRA, CONABIO, EMBRAPA, IBIF, UNI-KLU, INECOL, UNAM, GFC)

The QUICKScan tool has been populated with ROBIN data from multiple indicators from the ROBIN indicator framework. The indicator data are available for current day and for 3 main scenario combinations (Task 2.3.1) from the ecosystem service and biodiversity models. Where relevant, the indicators are also available in different data forms (absolute data, or density data) depending on the type of analysis required, and are available either at 10x10km resolution, or aggregated to Municipality level, depending on the scale of analysis and reporting required. Normalisation ranges have been set for each indicator for visualisation purposes, and sustainability thresholds are defined (see WP2.1, Task 2.1.3) which allow sustainability analysis under the ROBIN scenarios.

The tool was highlighted at a Green week in Brussels, 3 to 5 June 2015, and is the focus of one of the ROBIN factsheets. A paper is being prepared, in conjunction with WP2.1, Task 2.1.3, applying the tool in the ROBIN study area, and using the future scenarios.

Task 2.3.3: Exploration of trade-offs in case study areas (NERC, ALTERRA, CONABIO, EMBRAPA, IBIF, UNI-KLU, INECOL, UNAM (lead), WU, UPM, GFC)

Trade-offs at the local study case are being assessed for the services for which models are available: carbon (stocks and carbon uptake), water, crops (maize, soya), cattle. Trade-offs between biodiversity, ecosystem services and human well-being are being assessed using two different approaches.

The first approach is to explore the biophysical and societal drivers that underpin these trade-offs using multivariate techniques. This approach also allows for the identification of bundles of ecosystem services, mapping them, and quantifying the inter-relationships between biodiversity, ecosystem services and wellbeing.

The second approach is the use of efficiency frontiers. This tool allows to assess the maximum possible values for a pair of variables, i.e. biodiversity, ecosystem services or human well-being indicators. We analysed our data at the municipality level. We found that there are opportunities for increasing services such as cattle provision with relatively low decreases in biodiversity. We also found that trade-offs between carbon stocks and human well-being can be very acute in dry areas of Mexico but allow for win-win opportunities in the more heterogeneous areas in southwestern Mexico. We also found that future scenarios, specifically those associated with strong land use changes in favour

of agricultural production, will lead to sharper trade-offs between cattle ranching and biodiversity conservation. We are now assessing which policies could allow for fostering win-win conditions taking into account the specific biophysical and societal context of the different municipalities. These results will be published in a manuscript: "Policies for addressing trade-offs between biodiversity, ecosystem services and human well-being".

These findings will be summarised in three planned papers: "Temporal trends in ecosystem services provisioning due to climate and land use change"; "Spatial patterns of multiple ecosystem services in scenarios climate change"; "Changes in crop production due to climate and land-use change".

The links between biodiversity, ecosystem services and human well-being are also being explored at the state scale both using governmental statistics, data from stakeholder workshops and interviews. We have found that increases in indicators of well-being such as Gross Domestic Product are positively related with deforestation, which show only the short term links. Yet, in stakeholder workshops and interviews we found contrasting perspectives on these links. Rural producers that are at least 60 years old, with low education only emphasize the short term benefits from transformation of biodiversity in forests. Instead, younger and more educated stakeholders are aware of the role of biodiversity in ecosystem resilience, appreciate a wider range of ecosystem services associated to conserved forests, and attribute intrinsic value to biodiversity. These results will be published in a manuscript on "Biodiversity, ecosystem services, and human well-being: interactions and implications".

We have also applied the models and scenarios for a small region of one of the study areas, the coast of Jalisco. We are in the process of incorporating information from stakeholder workshops and fine scale land use change data into the modelling of biodiversity and ecosystem services into future scenarios. Multivariate analyses and bundles of ecosystem services will be described for current and future scenarios for this region, which will also result in an ISI paper.

Task 2.3.4: Ecosystem resilience and tipping points (NERC, ALTERRA (lead), CONABIO, EMBRAPA, IBIF, UNI-KLU, INECOL, PIK, UNAM, WU (co-lead), UPM, GFC)

WP leader's Task report:
- A first version of the report on resilience, tipping points, and early warning signals (ROBIN deliverable D2.3.4: Resilience and tipping-points) was finalized, based on published literature and ROBIN results.
- For this purpose, new simulations were performed combining knowledge developed within ROBIN with knowledge from the AMAZALERT project and elsewhere, bringing together scientists from Wageningen University, Alterra, CEH and Amsterdam Free University.
- The results were presented in Paris at the conference Our Common Future under Climate Change (CFCC): http://www.commonfuture-paris2015.org/ (July 2015)
- The contents of the report are being adapted for publishing as a cross-cutting ROBIN paper in a scientific journal (on tipping points in neotropical forest ecosystems) (to be submitted December 2015)
- Modelling connectivity was finalized for jaguar and sloth under current land use and future land use change.

- The content of the connectivity report and other connectivity modelling for Jaguar and Sloth is being adapted for publishing in a scientific journal. (to be submitted December 2015)

WP3.1 Stakeholder-driven scenarios and options for biodiversity based climate change mitigation

WP Leader's summary of progress for the WP as a whole:

In the final year of ROBIN, WP3.1 has completed all the outstanding tasks, milestones and deliverables according to the Work Plan. The main achievements during this period have been: (i) the completion of the second FCM workshop in Mexico (Task 3.1.4) and mathematical analysis of FCMs for the cases of Bolivia and Brazil; (ii) the completion of the third and final round of stakeholder workshops in Bolivia and Brazil in which have been applied innovative multi-criteria techniques (Analytical Network Process and Voting) (Task 3.1.5); (iii) the completion of the cross-scale (local, provincial, national) and cross-module analysis for identifying options for integrating biodiversity conservation and climate change mitigation (Task 3.1.5); and (iv) dissemination of the WP3.1 results through the development of scientific papers and the participation in national and international science-policy events (related to all tasks).

(i)   The second FCM workshop of Mexico was delayed until November 2014, where it was performed in Villa Purificación.

Further, complex system analysis was performed upon FCMs developed in previous workshops of Bolivia and Brazil. A Python based model was developed to apply complex system analysis and using parameters associated with such analyses to contribute to a systematic analysis of the FCMs, whilst providing further insights to their complexity.

(ii)   The WP activities have focussed on the preparation, development and processing of the 3rd round of stakeholder workshops in Bolivia and Brazil. The following methods were developed and implemented during the 3rd SHWs for selecting, characterising and prioritising societal and policy-relevant options for integrating biodiversity in climate change mitigation:
   1. Analytic Network Process (ANP) was used to prioritise the options derived from the FCMs developed during the second round of workshops using the positive future scenarios.
   2. Discussions during plenary to select additional options, with a division into focus groups to further discuss and characterise each option in terms of who will benefit from its implementation, who should be responsible for its implementation, when should it be implemented, what level of financial resources does it require, is it compatible with present, laws, policies and programmes, does it require technical assistance and what level of social acceptance would it receive.
   3. Voting to prioritise all options in function of their socio-economical and environmental benefits, and their ease of application, with different stakeholder groups differentiated.

The third and final round of workshops (Task 3.1.5) was completed during this reporting period in August 2015, following the completion of the final Brazilian workshop held in Belem, with the Bolivian workshop performed in Santa Cruz de la Sierra in July 2015. A number of documents were produced before and after the meetings with the intention to guide local teams in the implementation and reporting of the participatory process, and in the processing and analysis of the results obtained from the workshops. All these documents are available on iShare.

(iii)   WP 3.1 has continued its multi-scale analysis at provincial and national level.
- At the provincial scale, WP 3.1 continued and completed the field-work in Brazil where 71 interviews were performed covering 3 municipalities surrounding the Flona Tapajós (Belterra, Placas and Rurópolis). The processing of the information gathered has been completed, with current developments focussing upon formulating a bio-economic model similar to that made for Bolivia. In Bolivia, the bio-economic model based upon the field-work completed during the previous reporting period has been improved and refined along with the results. The results of which have been analysed to identify the trade-offs between socio-economic development and environmental protection from simulations of the efficacy of potential policy options within the model.
- At the national level econometric modelling has been used to analyse and characterise deforestation patterns across Latin America and the Caribbean from 2000-2010.

In this final reporting period of ROBIN, WP3.1 has continued to develop and implement cross-module integration, with WP3.1 further developing integrated relationships, especially with module 2. WP3.1 has continued in its collaborations with WP2.1, in particular Task 2.1.1 (ALTERRA), with contributions made to the 'ROBIN questionnaire on the use of the indicator framework'. Further collaborations between WP3.1 and WP2.1 have seen developments of a cross cutting paper, applying the ROBIN Indicator Framework at local/ provincial level in Guarayos (Bolivia) and Flona Tapajós (Brazil). Also, and in collaboration with WP2.3 (UNAM), contributions have been made to D2.3.3, in particular the section relating to trade-offs and the development of the cross cutting paper 8b 'Trade-offs between biodiversity, climate change mitigation, ecosystem services, and livelihoods: frontiers, future scenarios, and the role of policies'. Within model 3, members of WP3.1 have attended, as observers a stakeholder meeting of WP3.2, whilst members of WP3.2 have observed WP3.1 meetings too. WP3.1 has also contributed to WP4.2 with a considerable number of communication and dissemination products (see below, section iv). The WP integration has continued since the previous reporting period, and has been able to successfully link the results and the work developed from the stakeholder workshops with other modules and has contributed to the multi-scale, whole systems approach so successfully applied within ROBIN.

(iv)   WP3.1 has made considerable contributions to the dissemination of results, 1) contributions have been made to the 5th ROBIN e-newsletter, 2) conference papers have been presented at the General Assembly 2015 of the European Geosciences Union (EGU) in Vienna (Austria) in 12-17 April 2015, the 11th International

Conference of the European Society for Ecological Economics (ESEE) in Leeds (UK) in 30th June- 3rd July 2015 and the 10th Conference of the Spanish Association of Agricultural Economics in Cordoba (Spain) in 9-11th September 2015, 3) presentations made at international workshops; WINS (Workshop of Institutional Analysis of Social-Ecological Systems). Department of Agricultural and Resource Economics - IRI-THESYS (Integrative Research Institute on Transformations of Human-Environment Systems). Humboldt University. Berlin; 4) The ROBIN Final Scientific Meeting held in Brussels (Belgium) 19-20 October, 2015; 5) the presentation made to the European Parliament (Belgium) by Leon Braat (WU) 21st October 2015; 6) Delivery of a number of ROBIN factsheets, and 7) Development of cross-cutting papers.

In summary, no major deviations have been made from activities and deliverables planned for this reporting period.

1. D3.1.4 'Identifying options for integrating biodiversity conservation and climate change mitigation: A multi-scale perspective', was finalised and submitted and is available on iShare. This is the last WP3.1 Deliverable. It covers (i) the local level analysis correspondent to the 3rd SHW in Bolivia and Brazil for the identification, selection and prioritization of options for BD and CC mitigation, (ii) the provincial level analysis and related field work in Bolivia and Brazil and (iii) the national level econometric analysis.

2. Addenda to D.3.1.3 'Methods and Results from the first and second round of local stakeholder meetings: Case Study of Chamela-Cuitzmala, Mexico'. This report has been done by the Mexican teams (UNAM and INECOL) following the same methodology that was applied in Bolivia and Brazil for developing FCM for future scenarios (D3.1.3) adapted for the Mexico case study. The contents of this report correspond to D3.1.3 and therefore were included in a separate document as addenda to D3.1.3. This report is also available on iShare.

Task 3.1.1: Review and classify current approaches to climate change mitigation in Latin America according to scale of application (EMBRAPA, IBIF, UNI-KLU (lead), INECOL, UNAM, WU, UPM)
Completed in the first reporting period (D3.1.1) "Current Approaches to Climate Change Mitigation in Latin America", available on iShare.

Task 3.1.2: Map institutional and decision making contexts that characterize the different scales of application at regional and pilot area levels; Organize stakeholder groups at case study sites to identify future and creative options for climate change mitigation EMBRAPA, IBIF, UNI-KLU, INECOL, UNAM, WU (lead), UPM
Completed in the second reporting period (D3.1.2) "A handbook for the participatory process in ROBIN: Development of methods for local stakeholder meetings." Available on iShare and participant portal

Task 3.1.3: organize the first SH workshop and development of the methodology on participatory scenario development (EMBRAPA, IBIF, UNI-KLU, INECOL, UNAM, WU (lead), UPM)

Completed in the second reporting period (D 3.1.3) "Methods and Results from the first and second round of local stakeholder meetings". Available on iShare.

In addition, during this period collaborations have been made with the Department of Mathematics at UPM to further analyse, using complex systems analysis, the functioning of the participatory FCMs developed in Bolivia and Brazil from the first round of ROBIN stakeholder workshops. The results of this analysis have been included in (D3.1.4) 'Identifying options for integrating biodiversity conservation and climate change mitigation: A multi-scale perspective'. The results of this analysis were presented at the European Geosciences Union General Assembly 2015, Vienna (Austria), 12-17th April, 2015. 'Interpreting Fuzzy Cognitive Maps as complex networks in the social-ecological systems of the Amazonian forests'.

Task 3.1.4: (Alterra, EMBRAPA, IBIF, UNI-KLU, INECOL, UNAM, WU, UPM (lead)) Second SH workshop centred on SH-driven and models (WP2.2 and WP2.3).

This task was largely completed in the second reporting period in Bolivia and Brazil (D3.1.3) "Methods and Results from the first and second round of local stakeholder meetings".

In Mexico, due to unexpected delays in the preparation of the 3rd stakeholder workshop by the Mexican teams, the 3rd stakeholder workshop was not performed in the previous reporting period and was completed in this reporting period. It took place on November 21, 2014 in Villa Purificación and followed the same methodology applied in Bolivia and Brazil for developing FCMs for future scenarios (D3.1.3), but adapted for the Mexico case study. The workshop was developed by the Mexican teams (UNAM and INECOL). UPM supported both UNAM and INECOL in the preparation of the workshop by providing an extensive array of documentation to assist in the planning and implementation of the workshop (see UPM 3rd Periodic Reporting for more details)

A report detailing the participatory process and results of the workshop was delivered by INECOL and UNAM on the 6th October 2015. This report corresponds entirely to D.3.1.3 and as such has been included as an addenda to D3.1.3 'Addenda to D.3.1.3 'Methods and Results from the first and second round of local stakeholder meetings: Case Study of Chamela-Cuitzmala, Mexico'. It is available on iShare.

Task 3.1.5: (EMBRAPA, IBIF, UNI-KLU, INECOL, UNAM, WU, UPM (lead))
Third SH workshop based on second round of the results of the models and indicators developed in Module 2 etc.

WP leader's Task report:

During this reporting period, UPM coordinated with both IBIF and EMBRAPA in the organisation of the 3rd and final round of stakeholder workshops in both Bolivia and Brazil. The third round of workshops was developed to select, characterise and prioritise societal and policy-relevant options for integrating biodiversity in climate change mitigation.

In both the Bolivian and Brazilian case studies, UPM supplied both IBIF and EMBRAPA with several documents to aid in the development of the workshops including;

- A detailed guide for the implementation of the workshop
- Summary of the ANP technique supported by a selection of papers
- An example of a ANP's application in Super Decisions
- A list of potential options selected using the results of the previous SH workshops
- ROBIN Key messages and fieldwork
- Template for option selection and characterisation
    - Template for voting
    - Voting simulation exercise
    - Mood-o-meters
    - Feedback questionnaire
    - Observation guide
    - Report template on the on the participatory process

1. **Bolivia 3rd stakeholder workshop**. UPM collaborated with IBIF in the organisation and development of this workshop performed on the 1st July 2015 in Santa Cruz de la Sierra, with a greater emphasis placed upon the participation of policy and decision makers. The workshop was attended by representatives of EMBRAPA to expose them to the methodology applied and format of the workshop before the 3rd Brazilian workshop.

    As part of the planning and development of the workshop, UPM provided extensive technical assistance to IBIF in developing the methodology (implementation of Analytic Network Process (ANP) based on FCMs, selection and characterisation of options and voting for prioritisation of options) for stakeholder based selection and prioritisation of options.

    IBIF supplied UPM during the period 9th - 26th September 2015 a number of documents containing the results of the workshops that have been processed and analysed by UPM and included with D3.1.4, however no report following the guidelines previously agreed upon, detailing the participatory process of the workshop was delivered by IBIF to UPM.

    A selection of the results from this work was presented by UPM at the 10th Conference of the Spanish Association of Agricultural Economics, Cordoba (Spain), 9-11th September, 2015. 'Analyzing the future of the agro-forestry systems in the Bolivian Amazon using participatory tools (FCM & ANP).

2. **Brazil 3rd stakeholder workshop**. UPM collaborated with EMBRAPA in the organisation and development of the 3rd and final Brazilian workshop performed on 3rd August 2015 in Belém. Like in Bolivia, this 3rd workshop placed similar emphasis upon the attendance of policy and decision makers.

    UPM provided EMBRAPA with technical assistance in developing the methodology (implementation of Analytic Network Process (ANP) based on FCMs, selection and characterisation of options and voting for prioritisation of options) for stakeholder

based selection and prioritisation of options. Further, stakeholders were invited to validate the results from the first and second workshops performed in Brazil.

A report detailing the participatory process of the workshop and the results was developed by EMBRAPA and delivered to UPM on the 3rd September 2015, with UPM providing feedback. The processing and analysis of the results from the workshop was performed by UPM and is available in D3.1.4 'Identifying options for integrating biodiversity conservation and climate change mitigation: A multi-scale perspective'

As part of the multi-scale approach adopted in this workpackage, D3.1.4 included analyses not only at the local scale (see above) but also at the provincial and national scales. The general aim was to develop a suite of options that incorporate biodiversity and ecosystems to help achieve climate change mitigation objectives. The results of this multi-scale approach were presented in the ROBIN Final Scientific Meeting in Brussels (Belgium), 19th-20th of October, 2015, as well as in the presentation performed at the European Parliament, Brussels (Belgium), 21st October, 2015.

1. **Provincial Scale (Bio-economic Modelling).**

   In Bolivia, UPM improved the bio-economic model (based upon field-work data collected in collaboration with IBIF in the province of Guarayos, as reported in the second reporting period) for the analysis of trade-offs between ecosystem services linked to agro-forestry systems.,

   In Brazil, UPM in collaboration with EMBRAPA, continued and completed the fieldwork activities described in the second reporting period with two further periods (November 2014 and March/April 2015) of interviews. A report was provided by EMBRAPA on the 15th April 2015, outlining the field-work activities across three municipalities (Belterra, Placas and Ruropolis) surrounding the Flona Tapajós. The field-work will allow for further characterisation of the agricultural sector described in the FCMs and for the analysis of the trade-offs between ecosystem services linked to agro-forestry systems.

   A meeting was held in Madrid (12th-16th October, 2015) between UPM and EMBRAPA to complete the processing of the field-work data. A bio-economic model is in development (similar to that of Bolivia) based upon the field-work and will be completed in upcoming months.

   The results from the model developed for Bolivia, and some preliminary results of the field-work in Brazil are found in D.3.1.4. Further, the work developed for Bolivia has been presented at the 11th International Conference of the European Society for Ecological Economics 2015, Leeds (UK), 30th June- 3rd July, 2015 'Balancing agricultural development and forest conservation in Amazonia: Can ecosystem degradation be reversed?

2. **National Scale (Econometric Analysis).** UPM completed its econometric analysis of the drivers of deforestation and patterns of deforestation at the national scale

across Latin America and the Caribbean. The results of this analysis are fully explored in D3.1.4, and were also presented at the 11th International Conference of the European Society for Ecological Economics 2015, Leeds (UK), 30th June- 3rd July, 2015 'Analysis of current patterns of deforestation in Latin America and the Caribbean'.

As noted earlier, WP3.1 has continued its cross-module integration, evident from its contributions to Task 2.1.1 with responses made to the use of the ROBIN indicator framework questionnaire. Further integrations have been developed through the testing of the ROBIN Indicator Framework at local level in Guarayos (Bolivia) and Tapajós (Brazil), thus linking Module 1 and Module 3 (see task 2.1). This cross-module integration is continuing with UPM-ALTERRA leading the development of a cross cutting paper, applying the ROBIN Indicator Framework at local/ provincial level in Guarayos (Bolivia) and Flona Tapajós (Brazil).

WP3.1 has also contributed to D2.3.3, section 6 'Trade-offs between biodiversity, ecosystem services and well-being at local scales' based upon the case studies of Bolivia and Brazil. WP3.1 is also presently working on the cross-cutting paper 8b 'Trade-offs between biodiversity, climate change mitigation, ecosystem services, and livelihoods: frontiers, future scenarios, and the role of policies', which has been presented at the 8th Ecosystem Services Partnership (ESP) World Conference held in Stellenbosch (South Africa) in November 9-13, 2015, under the title 'Present and future trade-offs between biodiversity, ecosystem services and human well-being in tropical Latin America'.

WP3.1 has also worked to link the stakeholder-driven scenarios developed in WP3.1 with the results of the models and indicators developed in Module 1 and Module 2. Contributions have been made to a poster 'Participatory prospective analysis for integrating forests and other land uses: A multi-model approach for the Southern Coast of Jalisco (Western Mexico)' presented by Melanie Kolb (CONABIO) to the XIV World Forestry Congress in Durban (South Africa), September 2015, that integrates data (pattern driven LUCC simulation) and econometric models from Module 2 and participatory process models (fuzzy cognitive maps) from Module 3. UPM is also collaborating with Margareth Simoes (EMBRAPA) to link the results of the CLUE model on land use changes applied to the Amazonia in Brazil (Module 2) with the results of the field work and bio-economic model that is being developed by UPM in the surroundings of the Flona Tapajós (Module 3). In the framework of this collaboration (EMBRAPA-UPM), it is expected that a workshop on participatory modelling will be co-organised and held in Rio de Janeiro in March 2016.

WP3.2 Decision support and knowledge transfer for natural resource and land-use management

Progress of WP 3.2 has been achieved as per the DoW. In the third reporting period, the WP finalised and submitted the two deliverables (3.2.1 and 3.2.2) after several rounds of review within the project team and with the coordinator.
D.3.2.1 outlines the state-of-the-art of SMCE, followed by a detailed description of the development of the decision support tool developed by the WP, called 'OPTamos'. D.3.2.2 further describes the workshops, the approach taken and the application of OPTamos to

real settings. In order to achieve this, the WP participated in 3 stakeholder workshops in the third reporting period: Mexico in November 2014 and February 2015, and Brazil in August 2015.

In the third reporting period, the WP participated and presented at 6 science conferences, the last one in Brussels (October 2015) hosted by the EU Parliament. Details of these conferences and other dissemination activities are listed in D.3.2.2 (chapter 5).

A major achievement of the WP is the development and launch of the decision support software, OPTamos. It is the first online tool with an easy to use interface to be used by individuals and groups with little or no knowledge of multi-criteria analysis. Land managers, decision makers, consultants, and researchers working at local and sub-national level may benefit from its use. Results from OPTamos can be used by stakeholders in order to enable discussion, promote participation, and enhance the acceptance of measures. As part of the dissemination activity of OPTamos, the WP prepared a factsheet and animated video including a step-by-step guide. Further dissemination in media and to user groups is in progress.

Task 3.2.1 (led by UPM): Develop stakeholder matrix and typologies

This task was completed in the second reporting period.

Task 3.2.2 (led by UNI-KLU): Develop Societal Multi-Criteria Evaluation (SMCE) toolkit based on the scientific inputs coming in from WP 2.1, 2.2 and 3.1.

This task began in the second period of the project and was completed and a final deliverable submitted (3.2.1) in the third reporting period. Tasks included in this were: a state-of-the-art literature review on SMCE and its applications (chapter 2). After a review of existing tools currently available, it was felt that none of them actually fulfilled the ROBIN needs to the extent required. It was therefore felt necessary to develop a new tool (OPTamos) and write a code well suited for ROBIN needs (chapter 3). Since the tool is designed for land management decisions in Latin America, the task undertook an in depth study of eight prominent Payment for Ecosystem Services (PES) cases in Brazil, Bolivia and Mexico – countries where ROBIN stakeholder workshops were conducted. The reviewed cases strongly indicated the lack of an effective stakeholder process and a software/tool to support decisions that help reach acceptable outcomes (chapter 4).

Task 3.2.3 (led by UNI-KLU): Implement the SMCE with stakeholders at regional and national scales via two workshops and provide guidance towards decisions

This task was achieved and a final deliverable submitted as D.3.2.2. In this report, the implementation of SMCE procedure together with newly developed online tool (OPTamos) is described. SMCE (together with OPTamos) was implemented in the Mexican case study of ROBIN (via 2 workshops) in the Cuitzmala watershed. Information on stakeholders' problem perception and goals as well as on their decision guiding criteria were derived from workshops (by WP 3.1 "Stakeholder-driven scenarios and options for biodiversity based climate change mitigation" *within the Module 3. "Options and solutions for using biodiversity and ecosystems for climate change mitigation" of the ROBIN project"*) using

Fuzzy Cognitive Maps (FCM) method. The relative importance of optional pathways and criteria were introduced and discussed in following workshops. WP 3.2 participated as observer in the FCM workshops prior to implementing the SMCE procedure.

Task 3.2.4 (led by UNI-KLU): Organise knowledge transfer and dissemination on the overall outcomes of the SMCE process to stakeholders, policy, project partners, as well as to the relevant scientific community.

The planning of this task began in the second reporting period, and the WP made big steps towards further dissemination in the third reporting period. Systematic sharing and learning from our study results requires a well-designed dissemination and communication strategies tailor made to address the different target groups. The summary of our dissemination activities is presented in the Table below (and detailed in Chapter 5 of D.3.2.2). We categorized the different types of deliverables (i.e. reports, papers, scientific presentation, SMCE toolkit and public outreach), specified the dissemination medium (e.g. journal, conference, web-based, etc.) for each of these products and defined the specific target groups (such as the EU, scientific community, policy makers, research organisations, NGOs/implementation agencies, etc.).

Type	Description	Medium	EU policy	Scientific community	Policy makers	Research organisations / NGOs / implementation agencies	Local land users / managers	Media
Project Reports	3.1.1. REDD+	deliverable	x	x	x	x		
	3.2.1. SMCE Toolkit	deliverable	x	x	x	x		
	3.2.2. SMCE Implementation	deliverable	x	x	x	x		
Scientific publications	papers	journal	x	x				
	chapters	other	x	x				
Scientific presentations	talks	conferences	x	x		x		
	poster	conferences	x	x		x		
SMCE toolkit	manual	web	x	x	x	x	x	x
	examples	web	x	x	x	x	x	x
	promotion video	web	x	x	x	x	x	x
	interface to tool	web	x	x	x	x	x	x
Public outreach	media work	press release	x		x			x
	public presentations	Green Week	x		x	x		x
	print material	Flyer en/sp/br	x		x	x	x	
	key messages	Newsletter	x	x	x	x		

Within the third reporting period, in terms of scientific outreach, the WP produced 6 papers (2 accepted, 3 under review and 1 in preparation). The WP presented at 6 science conferences the work of ROBIN and the WP. The work was also disseminated through 2 flyers (Spanish and English, including one for stakeholders in Mexico) and one factsheet (for the EU Parliament meeting, available on ROBIN homepage). An important platform for dissemination of this research effort is a website which will be maintained by UNIKLU beyond ROBIN. The website will host the online tool OPTamos, together with a step-by-step user guide, and an animated video, that serves not only as a guide on how to use the tool but also for promotional purposes. The promotional video for the OPTamos tool is published via Vimeo. The WP has produced a press release in English and German and is currently reaching out through formal PR channels for publicity in the media.

OPTamos collaborates with FCMappers, an online tool for analysing Fuzzy Cognitive Maps (FCM), an approach that was also used in ROBIN together with SMCE (http://www.fcmappers.net/joomla). OPTamos and FCMappers will work together to disseminate and promote the use of participatory approaches in a more systematic way. Further dissemination activities are underway to reach out to NGOs and educational institutions for the use of OPTamos in projects and classroom teaching.

WP4.1 Management and Coordination

Work progress and achievements for WP4.1 during this reporting period are presented as part of the report on Project Management in Section 3.

WP4.2 External Communications

External communications succeeded in deploying the channels of communication to the general public that we intended in our communication strategy and complied with the DOW. The website was quickly set-up. As results started to come out we organized the publication of our newsletter and open additional public communication channels to have presence both in tweeter and in Facebook.

Scientists in ROBIN kept a good pace of communication with peers through publications and mostly through participation in relevant events. A great success of the communication strategy was the compliance of ROBIN partners with the branding of the projects. This resulted in a good visibility which allowed the project to be acknowledge as an interesting partner in climate change mitigation regarding biodiversity as an option. NERC and INECOL were the institution that carried out most of the work on keeping the Website, publishing the newsletters and maintaining ROBIN presence both in tweeter and Facebook. NERC was in charge of producing a series of thematic slideshows. INECOL was very involved in promoting ROBIN through the Citizen Science platform that CONABIO is operating now called NaturaLista, which partners with iNaturalist from the Academy of Science of California. Through this initiative we also managed to have a regular presence on radio through the official station of the government of Veracruz, Mexico.

We managed to have all of the newsletters and fact-sheets published both in English and Spanish, and a few in Portuguese. There are an active commitment among the partners to finish-up and publish several very relevant results of ROBIN in pear review journals.

Task 4.2.1: (led by INECOL) Develop a communication strategy and produce communication products required to implement it, including the project web-site.

We developed our communication strategy very early in ROBIN and mostly complied with what we planned. It was very effective to keep partners on target. Following the communication strategy we set-up our Website very early in the project and then, in collaboration with partners, we started to publish ROBIN newsletters and after some deliberation with partners, we decided to have presence in Twitter and Facebook, which resulted in a good increase of our visibility, although the Internet seemed not to be the preferred channel for people interested in our results. We got significant communication

by participating in specialised events and by following the links that the partners already had in their regions. This was most successful in Europe, Brazil and Mexico.

Task 4.2.2: (led by INECOL) Communication with global organisations ....

ROBIN project was presented in a meeting entitled "Forest Landscape: SOLUTIONS FOR CLIMATE CHANGE MITIGATION" held at the European Parliament in Belgium. The 12 fact sheets were also distributed at this meeting. During the event ROBIN was described as a a "timely, relevant and exemplary" by a DG Research representative.

We continued working with the Scientific Cooperation group of the Pacific Alliance where a project for the monitoring of biodiversity under climate change scenarios is being developed by Chile, Peru, Colombia and Mexico. The approach of this work now is part of the agreements of the Declaration of Paracas, Perú, signed in July 2015. ROBIN has continued providing insights for REDD implementation in Mexico.

Task 4.2.3: (led by INECOL) External communications in the Mesoamerica region ....

The dissemination of the conceptual approach developed by ROBIN in the meetings held with the technical managers of the environment ministries and representatives from the offices of international cooperation of Chile, Peru, Colombia and México, motivated the interest of this countries, members of Pacific Alliance, to explore possibilities to incorporate this approach in the scientific cooperation agenda on climate change. We are also cooperating as ROBIN with the platform iNaturalist (Science Academy of California, USA) which has been adopted by CONABIO in Mexico through NaturaLista (http://www.naturalista.mx) as citizen window on biodiversity.

Task 4.2.4: (led by IBIF) External communications in the South American region ....

Dissemination of information relating to the ROBIN project in local newspapers and in particular the workshops led by WP3 in Brazil generated a lot of interest. Here our partners at EMBRAPA were instrumental in August 2015 in helping to organise the 3rd Cognitive Perception Workshop "The role of biodiversity in climate change mitigation" held in Belém, presented indicators to support public policies and scenarios for Amazon in 2050. At this event representatives from more than 20 public and private institutions, NGOs, government officials and traditional communities took part in the Workshop.

In addition as a result of the meeting at the European Parliament an invitation to attend the BRAZIL-EU International Seminar On Nature Based Solution And Sustainable Urbanization (19-20 Nov. 2015 in Brazilia); and our partner from EMBRAPA attended this meeting to present work of ROBIN.

IBIF in Bolivia was able to coordinate with FAO and OTCA and transfer some publications that were released through ROBIN. The intention here was to promote the transfer of

results accomplished through ROBIN which could be replicated and reproduced by these organizations in the region. The impact of ROBIN will be felt through the continued dissemination of the research as it becomes available through specialized publications. Additionally, IBIF has thematises its monthly seminars for 2015 to ROBIN results and key messages. This work will be continued through 2016 with the work published through ROBIN and on specialized literature. Additionally, IBIF participated in Bolivia´s international forest fair and dedicated most of the booth presentations to ROBIN´s work. Brochures were prepared and disseminated as well as an update of project results. Brochures were also disseminated at the university with the undergraduate population as well as two book fairs in Santa Cruz, Bolivia.

In addition, the three stakeholder workshops in Bolivia were an excellent opportunity to disseminate ROBIN. Specifically, the last stakeholder workshop held in Santa Cruz, Bolivia. EMBRAPA and UPM researchers gave presentations of research being conducted through ROBIN which was highly applicable such as agroforestry, ecosystem integrity modelling and land use in the Guarayos region of Bolivia. This is also by far the best ways to disseminate research results as the meeting was attended by government authorities as well as representatives from FAO.

IBIF has also prepared a small package related to the work the institution does that includes the findings for ROBIN. This is set to be published in 2016 and is an important part of the institutions presentation card. This assures that the work that is continuing in publications from the project are at the core of what IBIF presents to donors and financial entities.

Disseminating through the web is very difficult in determining impact. Facebook and Twitter are more useful in the sense that they can give you impact numbers to a certain degree. Successful measures of impact are actual use of research results by third parties.

Task 4.2.5: (led by NERC) External communications in Europe ....

In the final reporting period we organised or contributed to the following dissemination events in Europe:

- A **stand at European Green Week** (3-5 June, Brussels) initiated by the European Commission called "RTD Natural Resources in the Global Context projects". We presented key findings and outputs from ROBIN alongside two other EC-funded projects (http://robinproject.info/home/robin-showcased-at-european-green-week-2015/)
- A **major science-policy meeting at the European Parliament**. This was organised together with the EP Intergroup on Climate Change, Biodiversity and Sustainable Development (EP) and the European Bureau for Conservation and Development (EBCD). It took place in Brussels on 21 October and was called "Forest Landscapes: Solutions for Climate Change Mitigation". It brought together a range of stakeholders, including MEPs, NGOs and staff of the European Commission (EC). Also present were ROBIN project members from both Europe and Latin America. Catherine Bearder MEP, a member of the Parliament's Committee on the

     Environment, Public Health & Food Safety, chaired the meeting
(http://robinproject.info/home/robin-holds-successful-science-policy-meeting-at-european-parliament-report-available/)

- A **COP21 side event**, "Realising the potential of nature and people in the implementation of REDD+ and its safeguards", at the COP21 climate change talks in Paris. This was initiated by the EC and took place in the EU's Pavilion. ROBIN's coordinator, Terry Parr, chaired the event at which he and several other ROBIN project members presented key findings from ROBIN (http://ec.europa.eu/clima/events/0107/calendar_en.htm#schedule).

People outside the project were also invited to attend ROBIN's final science meeting (19-20 October, Brussels).

To support the dissemination of key findings and recommendations from ROBIN, we produced a set of **fact sheets**. Digital copies are available on the ROBIN website (http://robinproject.info/home/products/factsheets/). Printed copies were disseminated at the European Parliament and COP21 events, as well as at a **Mapping and Assessment of Ecosystems and their Services (MAES) workshop** (15-16 December, Brussels), at which the QUICKScan tool and some results from ROBIN were presented. All ROBIN partners have copies for further dissemination.

The full European Parliament event was recorded on video. From this, CEH made a short **promotional video**, disseminated via YouTube. The team behind the OPTamos decision-support tool also produced a **video about using OPTamos**, disseminated via Vimeo Both these were also made available via the CEH website (http://www.ceh.ac.uk/news-and-media/blogs/does-biodiversity-weaken-effects-climate-change).

ROBIN was described in a **CEH project case study information sheet** (http://www.ceh.ac.uk/case-studies).

Three **slideshows** were produced during the course of the project, aimed at explaining in simple terms, the objectives of ROBIN and some of its key findings: http://robinproject.info/home/gallery/slideshows/.

Information about ROBIN was widely disseminated via **social media** both directly via ROBIN's Twitter and Facebook feeds, and indirectly via ROBIN partners such as CEH and via the website and social media channels of ALTER-Net, the European ecosystem research network.

WP4.3 Data and information management

WP4.3 aims at providing technical solutions to facilitate the exchange of data among the project partners, and to make available the results of the project externally. For this purpose, a common place where data could be stored and exchanged was set up and the metadata standard was defined, so that homogeneity and cross- compatibility would be ensured for data coming from various project partners. In order to make the data sets and their metadata available externally, a geo-portal has been developed at CONABIO and at WU. This geo-portal is the warehouse for the spatial data and products used and generated in ROBIN.

Sharing datasets among organizations also requires consensuses on user rights and limitations of the data. This aspect of data sharing, not considered initially, is currently being addressed by implementing a one year warranty, in which data sets are being uploaded but will not be available to the general public for download until October 2016.

Task 4.3.1: (led by Conabio & WU) Collect ROBIN datasets with standardized metadata and formats from partners.

After setting up the necessary physical architecture (servers etc.) and virtual functionality (geoserver etc.), CONABIO in collaboration with PIK and WU has elaborated instructions to generate metadata and to upload data sets which have been distributed. Deliverable D4.3.2 contains the corresponding documentation (incl. meta-data information, data availability and data access via ROBIN data base, data format). Data sets from PIK have been received, UNAM is working on metadata for their products, and communication with WU is on-going on this topic.

Task 4.3.2: (led by Conabio & WU) Define the quality control for and from the project partners and for all external products to be used within the project.

As part of this activity a document (deliverable D4.3.1) has been prepared to inform about the meta data standards. A Web-based metadata data base has been provided to project partners.

Task 4.3.3: (led by Conabio & WU) Make the different data sets available:

One of the geoportals has been developed and is hosted by WU and provides the viewing capabilities for geo-spatial datasets which are prepared as output of the project. Conabio developed and hosts another geoportal that provides viewing and download features for geo-spatial data sets and their metadata. Together, these geoportals form part of the ROBIN database to ensure permanent access for external users. These data portals are part of the ROBIN database and the web addresses of the portals are:
CONABIO server: http://www.conabio.gob.mx/robin/
WU server: http://scomp5062.wur.nl/projects/robin/

The ROBIN Geoportal is running in CONABIO and WU and the data sets have been (and are being) uploaded. Some points about embargoes and disclaimers were discussed among project partners and a one year embargo was agreed as a preferred solution to guarantee sufficient time for publishing manuscripts and then make spatial data sets available.

2.2 Issues encountered and any potential implications for the work described in the DoW, milestones, deliverables and/or resources

WP1.1	
WP1.2	
WP2.1	
WP2.2	
WP2.3	Deliverable D2.3.4: Resilience and tipping-points due month 46 was delayed by complications with the simulation model, due to the complexity of collaborating across disciplines and across institute boundaries, however version 1 is under intern review by mid-November and the final version will be ready before the final reporting is completed.
WP3.1	In general, the use of resources within the third reporting period in WP3.1 has been in line with the submitted tasks and completed milestones as herein described. However, UPM contributed more than initially planned to WP3.1 because it was not foreseen from the beginning that UPM had to be in charge of the organisation of the full series of three stakeholder workshops in Bolivia and Brazil. During this reporting period, UPM had to use additional PMs to prepare, develop and process the third round of stakeholder workshops in Bolivia and Brazil. Additionally, D3.1.4 includes a considerably larger amount of activities, results and documents than originally expected (the mentioning workshops in Bolivia and Brazil, the mathematical analysis of FCMs, the fieldwork and bio-economic modelling carried out at provincial level and the econometric analysis done at national level). During the whole project, UPM has organised eight workshops related to WP3.1 (one training workshop in Madrid, three stakeholder workshops in Bolivia and Brazil, and one in Mexico) while, originally, UPM was responsible for organising only five in Mexico and Bolivia (see previous periodic reports). All in all, this has meant that UPM has had to use a larger amount of PMs than initially planned in WP3.1
WP3.2	
WP4.1	UPM contributed more than initially planned to this WP, due to UPM's organisation of the 3rd annual ROBIN meeting held in Madrid (28th October-1st November 2013) in the second reporting period. UPM was left with insufficient person months for this reporting period in management, therefore had to use additional PMs. Embrapa has had all the support of the ROBIN project leadership, especially regarding the delay in financial resources internalization in Brazil for the Project.
WP4.2	
WP4.3	

2.3 Staff resources allocated and used by partners

	NERC	ALTERRA	CONABIO	EMBPARA	IBIF	UNI-KLU	INECOL	PIK	UNAM	WU	UPM	GFC
	Person months allocated for the project by each partner for each Work Package											
WP1.1	14.1	9.2	21.2	28.0	42.8	0.0	19.5	0.0	35.8	32.0	0	0
WP1.2	17.3	8.82	31.9	7.0	22.5	0.0	8.6	9.9	10.2	36.0	0	7
WP2.1	5.5	22.2	1.0	4.0	4.0	5.5	7.5	5.3	19.8	6.0	7.4	3.5
WP2.2	25.9	35.6	13.2	6.0	3.0	0.0	29.6	38.3	6	6.0	0.0	6
WP2.3	46	22.8	1.0	8.0	15.0	7.3	47.0	11.6	29.4	9.0	4.9	7
WP3.1	0	1.685	0.0	20.0	11.8	14.9	20.0	0.0	18.8	15.0	38.2	0
WP3.2	0	1.685	0.0	1.0	0.3	48.4	0.0	2.0	2.6	2.6	13.4	0
WP4.1	31	1.0	1.0	1.0	12.8	0.2	0.6	0.0	14.3	1.0	1.3	1
WP4.2	10.7	0.83	0.0	1.0	4.2	0.2	12.9	1.0	0	0.1	0	0
WP4.3	0	0	7.5	0.0	0.0	0.0	0.0	0.0	0	9.0	0	0
Total used	150.6	103.8	76.7	76.0	116.4	76.5	145.6	68.1	136.8	116.7	65.2	24.5
Total	134	96	58	91	123	63	135	79	145	118	58	52
% of resources used by each partner until close of final period**	112	108	132	84	95	121	108	86	94	99	112	47

Details of the person months and personnel costs for each partner will be provided in the financial reporting. The higher % for WU is due to 2 person months being reallocated to this partner to enable progress of work.

2.4 Major cost items

No major cost items were purchased during the reporting period.

3. Project management during the reporting period

3.1 Project Management Objectives

- To manage the project and coordinate the contributions of all participants
- To ensure progress in conformity with the agreed Description of Work by management of the project's resources, timetable & delivery schedule, risks and quality procedures
- To facilitate consultation with regional stakeholders
- To provide administrative support to project management and governance bodies
- To coordinate reporting, preparation of working documents and papers for management and governance meetings
- To liaise with the European Commission

3.2 Consortium management tasks and achievements

Please find below a bulleted list of some of the consortium management tasks and achievements during the final 12 months of the ROBIN project:

- Completion and submission of the financial and technical reports for the Second Period:
  - o Second Period Technical Report submitted: 09/01/2015
  - o 11 of 12 Partners Second Period Form Cs submitted, including audit certificates for those who needed to provide one: 09/01/2013
  - o ROBIN project First Scientific and Technical Review 19/01/2015 to 06/02/2015
  - o Submitted response to the "Consolidated Review Report" on 16/03/2015
  - o Second report accepted and Intermediate payment letter sent to ROBIN on 20/04/2015
  - o All the project Deliverables due during the final reporting period were submitted by the end of the project.
- The reviewers report was addressed and in this final period we have taken care to increase our publications and dissemination activities, where ROBIN was presented at a number of high level events such as the European Parliament and COP21, which have greatly increased visibility of our project. The publications in this final period have been good with a number of papers published or under-review. These products will continue to be delivered even after the project closes.
- Third payments have been made to all partners except for two: (1) ALTERRA because of the lack of submission of a Form C at the time of the second reporting period and (2) GFC because they retained a significant balance of their pre-financing payments. All other partners received payments in accordance with their budgets and accepted costs claimed. Additionally an exercise to inform all partners of their remaining spend for the final year was conducted. This meant each partners was informed individually of the amount of their claimed costs to date, the payments made to date and amount of spend remaining for the final period.
- With agreement from the partner the third payment to GFC was withheld. The reason for this being that their cumulative expenditure claim for the first and second Reporting Periods was low and therefore to mitigate against the possibility of over-payment the payment was withheld until the finalisation of the project. GFC has the smallest budget

overall and it is anticipated that their spend profile will be greater in the final / dissemination phase of the project.

- Some minor movements of resources have been agreed between partners to facilitate completion of the work programme in accordance with the DoW. Changes agreed at or before the Final Reporting Period were/will be reflected in the final payments made to project partners.

- Please find below a summary of the payments made to partners to-date

Partner No.	Partner	Original total budget per partner	Original EU contrib. Per partner	Pre-finance & RP 1 payments made	RP1, RP2-accepted EC contribution	Net sum of adjustments to EC contribution payments in RP1&2 period	New total EU contribution	Third payments made to partners	Total payments made to partners	% of EC contribut.
1	NERC	2,042,078	1,691,016	1,177,892	1,083,616	- 23,992	1,667,024	210,515	1,388,406	83
2	ALTERRA	1,170,709	885,407	677,217	254,520	- 5,250	880,157	-	677,217	77
3	CONABIO	400,888	303,979	284,381	293,393	12,000	315,979	31,598	315,979	100
4	EMBRAPA	398,658	301,158	169,005	137,726	- 1,986	299,172	31,306	200,311	67
5	IBIF	440,053	343,755	302,384	249,081	7,978	351,733	33,686	336,071	96
6	UNI-KLU	678,338	514,843	348,483	333,722		514,843	65,263	413,746	80
7	INECOL	423,470	319,522	275,743	247,950	12,500	332,022	38,794	314,537	95
8	PIK	613,603	465,581	287,078	195,076		465,581	37,090	324,167	70
9	UNAM	457,133	356,498	281,903	267,375	- 24,500	331,998	37,159	319,063	96
10	WU	1,551,492	1,173,383	958,430	877,267	23,250	1,196,633	141,975	1,100,405	92
11	UPM	705,790	535,642	450,674	376,084		535,642	51,386	502,059	94
12	GFC	124,450	94,894	45,865	26,030		94,894	-	45,865	48
	Totals	9,006,661	6,985,678	5,259,054	4,341,840	-	6,985,678	678,772	5,937,826	85

- All partners received a third payment in May 2015 as detailed above, some are near (or at) their total budget; therefore they will need to justify their claims in the final report to retain all payments made
- NERC does not hold a balance from the third payment as all resources were distributed
- Some further movements of resources between partners have been agreed during the final stages of the project and these will be reflected in the final payments to project partners. Please find below a summary of the further movements of resources agreed:
  o Transfer of 3433 Euros (EC contribution) from NERC to UNAM to fund the extra stakeholder workshops in February 2015
  o Transfer of 8808 Euros (EC contribution) from EMBRAPA to NERC who organised travel to 2 delegates to present at Our Common Future meeting in Paris (July 2015) plus support for the III Stakeholder meeting in Belem (Aug 2015)

- The Regional Coordinators have been active in their regions helping to ensure the smooth running of the project on a day-to-day basis. They have also been central in maintaining effective lines of communications between partners within regions and across the project as a whole.
    Specific activities in South America included:
  o Organised III Cognitive Perception Workshop "The role of biodiversity in climate change mitigation" held in Belém, 3 August 2015

- The Project Council met at the final full project meeting 10 October 2014, Santarem, Brazil. Since then communication updates have taken place via email and individual Skype calls when needed to discuss specific WP issues.

- The internet based collaboration tool established since the first Reporting Periods has continued to be used and maintained throughout this reporting period. This is hosted on the NERC iShare system (based on MS SharePoint) at no cost to the project. This is the default repository for all cross project information and in particular for project management information and meeting papers.
- Templates and guidance have been provided to all project partners and work package leaders to collect together the information required for The Third and final Periodic Report. However due to the number of activities taking place in the final months of the project the reporting process has not had multiple iterations as in previous periods.
- Ad hoc support to partners' on all project management, coordination and financial issues has been provided throughout the reporting period on an ongoing basis.

3.3 Problems and Solutions

There have not been any serious problems during the Third Reporting Period but there have been a number of issues, including the following:
- The issues relating to Third Payments to partners: there was a slight delay in sending payments as all partners were asked to update their FIFs. This request came from the finance officers at NERC who needed to ensure no changes had occurred since the last payments that were 18 months prior to the Third payments. This was ensure funds were sent to the correct banking details. All FIFs were ether resent or updated in some cases where they were lacking.
- Payment to EMBRAPA was later than other partners due to the fact that they changed their bank account in the period between verify their FIF and NERC raising the payment order– this resulted in a delay as a trace on the payment needed to be completed to track the payment and then to re-direct it to the correct EMBRAPA account.
- Some of the deliverables were delayed but a concerted effort in the final stages of the period that brought the project back on track and all deliverables due in this period have now been submitted.

3.4 Changes in the consortium

There have been no changes to the consortium during the reporting period.

3.5 Project planning and status

- The Project Board met regularly throughout the reporting period (9 times) to discuss and manage progress with the project. Skype was an effective means of maintaining regular contact and has helped to keep down meeting costs. The frequency of these meetings was increased to ensure all partners and WPs remained on track to deliver their goals in the final year of the project.
- Project meetings were held in Potsdam (Germany) between 18-20 May 2015 and Brussels 19-20 October 2015. The later included a sessions at the European Parliament on 21 October 2015.
- Plans for the completion of project deliverables, other products, cross-project publications and final dissemination activities were discussed at the regular meetings of the Project Board and were discussed extensively at the Project Meeting in Potsdam where each of the 18 cross-cutting papers were discussed and plans for their delivery were presented.
- In Potsdam we also discussed the procedure for the final Fact Sheets that summarise some of the highlight messages of the project work and are in addition to the deliverables and publications arising from the project.
- Across the project partners there was a clear understanding of what needed to be delivered in the final year of the project and coherent plans were in place at the start of the year to ensure these are progressing with the targets detailed in the Description of Work. The regularly scheduled Project Board meetings were a mechanism to ensure delivery remained on track and to deal with any issues in a timely manner that might influence ability of partners to deliver.
- Legacy: at the end of ROBIN and shortly thereafter a number of events took place that highlighted the work of ROBIN to a wide audience. As a result of these activities and the relevance of the work of ROBIN it's outputs will continue to be discussed at events future event. The most recent event was the organisation of the side event: "Realising the potential of nature and people in the implementation of REDD+ and its safeguards", at the COP21 (01/12/2015) and the European Parliament discussions (Oct 2015). Further publications from the project will continue to be uploaded to the project site and the participant portal.

3.6 Impact of deviations from the planned milestones and deliverables

There have been delays in the submission of some individual deliverables but all deliverables have been submitted by the time of the final reporting. There have been some relatively modest revisions to the Work Programme (summarised below) but these did not have any major impacts on delivery of milestones and deliverables.

i. The interaction between Module 3 and Modules 1 and 2, as planned in the DOW (task 3.1.4), were less than originally anticipated but has not diminished the achievements of the stakeholder workshops. The final SH workshops in WP3.1 was delayed so that it could make use of the participatory models and scenarios developed in the previous workshops (i.e.1st & 2nd SH workshops). Through this slight delay presentations of these results were made at the III SH workshops where policy options were identified.

ii.   Some deliverables were only completed at the very end of the project due to their interdisciplinary nature and the complications of working across timezones/workingcultures. However all deliverables have been completed and are available.

3.7 Changes to the legal status of beneficiaries

There have been no changes to the legal status of any of the project partners during this reporting period.

3.8 The Project website

The project's external public website can be found at: http://robinproject.info
This website is was populated regularly over the final year of the project and is a conduit for disseminating the e-newsletters plus the final dissemination products of the Fact Sheets – that are targeted at non-specialists. A mailing list for the e-newsletters was created via this website. This website will be maintained for a period of five years after the end of the project.

An internal web accessible site has also been established on the NERC iShare system to provide easy access to project documentation and a suite of tools to facilitate collaboration across the project.

3.9 Project meetings during the reporting period

Please find below a tabular summary of project meetings attended by two or more partners and external meetings where ROBIN was represented by one or more partners.

Meeting name/title	Venue or type of communication	Date (s)	Type of meeting	Meeting participants	Comments e.g. How did ROBIN feature at the meeting
Project Board Meetings	SKYPE	8/12/2014 19/12/2014 10/02/2015 17/03/2015 June 2015 06/08/2015 15/09/2015	ROBIN meeting	Marta Pérez-Soba (ALTERRA)	All ROBIN people
Meetings to discuss outline and progress of report D113	SKYPE + Wageningen	7/11/2014 14/11/2014 26/01/2015 9/2/2015 29/04/2015	ROBIN meeting	L. Dutrieux, M. Herold, L. Kooijstra, M. Peña-Claros, L. Poorter (WU), T. Parr, T. Warnaars (CEH), G. Roerink (Alterra)	All ROBIN people
Meetings to discuss outline of report D123	SKYPE + Wageningen	25/11/2014 10/02/2015 31/03/2015 05/06/2015 26/06/2015	ROBIN meeting	T. Parr, T. Warnaars (CEH), M. Kolb, M. Schmidt (CONABIO), M. Peña-Claros, L. Poorter (WU), E. Arets (Alterra)	All ROBIN people
Several meetings to discuss CLUE model results	Wageningen	multiple	Short work meetings	WU and ALTERRA	All ROBIN people
Plans for the final Deliverable 3.1.4	Telecon	5 Nov, 2014	ROBIN Meeting	ROBIN Project Partners (UPM, NERC)	

Meeting name/title	Venue or type of communication	Date (s)	Type of meeting	Meeting participants	Comments e.g. How did ROBIN feature at the meeting
Meeting to discuss manuscript of carbon stocks and carbon sequestration using LPJmL (manuscript led by P. Balvanera & S. Quijas)	SKYPE	12/11/2014	ROBIN meeting	P. Balvanera & S. Quijas (UNAM), K. Thonicke & A. Boilt (PIK), M. Peña-Claros	All ROBIN people
Meetings to discuss outline of cross-ROBIN paper 1	Skype	Nov 2014, Sept 2015	Skype	Kirsten Thonicke, Jill Thompson, Marielos Peña-Claros, Lourens Poorter, Masha van der Sande	All ROBIN-people
II Scientific Research Seminar of the Tapajós National Forest.	Santarém/Brazil	20 – 21, November 2014	Seminar iCMBio	Interns from Embrapa in the ROBIN Project.	Participation of students who had developed their research activities in the ROBIN project with presentation of papers under the form of poster.
II Scientific Research Seminar of the Tapajós National Forest.	Santarém/Brazil	20 -21 November 2014	Seminar iCMBio	2 Embrapa researchers	Guest speakers presenting results obtained in the field work, under the ROBIN Project scope
Biodiversidad, cambio climático & bienestar social: Pensando en el futuro (Biodiversity, climate change & social	Hotel Rul, Villa Purificación, Jalisco (Mexico).	22/11/2014	Stakeholedre workshop	workshop hosts: Elena Lazos and Peter Gerritsen	

Meeting name/title	Venue or type of communication	Date (s)	Type of meeting	Meeting participants	Comments e.g. How did ROBIN feature at the meeting
well-being: Thinking to the future).					
Temporal variation of ecosystem services in climate change and land use scenarios	Skype	28 November 2014	ROBIN meeting	ROBIN Project Partners (3 participants)	
Meeting to discuss on biomass resilience secondary forest	Wageningen	16/12/2014	2ndFOR meeting	Poorter, Peña-Claros (WU), Balvanera (UNAM) and Bongers, Chazdon, Martinez-Ramos	
What is human wellbeing? What is human wellbeing?	Skype	January 2015

February 2015 | Robin | Post-doc – Julio Diaz, Lazos

Balvanera, Maass, Diaz, Lazos | Principal |
Organization of the workshop - Participatory process for decision making at local level	Skype	January & February 2015	Robin	Uni-Klu, Gerritsen, Lazos	
Ecosystem integrity	Skype	Jan 2015	ROBIN meeting	WP1.2 + WP1.1 + Terry Parr	Definition of tasks necessary to streamline EI concepts in ROBIN
Case study Southern Coast of Jalisco	Skype	26.01.2015	ROBIN meeting	Nathalia Álvarez, Elena Lazos, Peter Gerritsem, Sandras Quijas, Patricia Balvanera, Jasmín Solís	Preparation of the 5th stakeholder workshop
Meeting with the ReSerBos project	Chamela	27-30 Jan 2015	ReSerBos meeting	Poorter (WU-Robin), Balvanera (CieCo-Robin), and 20 researchers from UNAM	

Meeting name/title	Venue or type of communication	Date (s)	Type of meeting	Meeting participants	Comments e.g. How did ROBIN feature at the meeting
Ecosystem integrity and trade-offs	Skype	28.01.2015	ROBIN meeting	Miguel Equihua, Julián Equihua, Nashieli García, Pedro Díaz, Octavio Maqueo, Melanie Kolb, Michael Schmidt	
Case study Southern Coast of Jalisco	Skype	16.02.2015	ROBIN meeting	Nathalia Álvarez, Elena Lazos, Peter Gerritsem, Sandras Quijas, Patricia Balvanera, Jasmín Solís	Revision of materials for the 5th stakeholder workshop
Reflexiones sobre la Interrelación entre Biodiversidad, Cambio Climático y desarrollo social: Propuestas para la Costa Sur de Jalisco (Reflections about the interrelations between biodiversity, climate change and social development: Proposals for Jalisco's Costa Sur).	Hotel RUL, Villa Purificación, Jalisco, México	21.02.2015	ROBIN Meeting; stakeholder workshop	ROBIN Project Partners (UNAM, INECOL, UNI-KLU, and UPM)	WP3.2 SHW Mexico
3rd SH workshop in Bolivia- 1st Organisation meeting	Telecon	3 March, 2015	ROBIN Meeting	ROBIN Project Partners (UPM, IBIF)	
Ecosystem integrity and trade-offs	CONABIO	06.03.2015	ROBIN meeting	Miguel Equihua, Julián Equihua, Nashieli García, Pedro Díaz, Octavio Maqueo, Melanie Kolb, Michael Schmidt	Streamlining between WP1.1 and WP1.2
Meeting to talk about the water footprint in Bolivia	Wageningen	19/03/2015	ROBIN meeting	M. van Eupen, L.Miguel-Ayala (Alterra), M. Peña-Claros (WU)	All ROBIN people

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Meeting name/title	Venue or type of communication	Date (s)	Type of meeting	Meeting participants	Comments e.g. How did ROBIN feature at the meeting
UPM contribution to Deliverable 2.3.3	Telecon	20 March, 2015	ROBIN Meeting	ROBIN Project Partners (UNAM, UPM)	
Meeting subject: Discussion regarding the application of questionnaires and field trip planning for Rurópolis / Belterra	Skype	24 March 2015	Teleconference	1 Embrapa researcher	Primary data collection for WP3.1 database.
Human well being and Ecosystem Services	Skype	March & April 2015	Robin	Balvanera, Maass, Diaz, Lazos	
Talk on the National Biodiversity Monitoring System	National ecology Congress in Mexico	April, 2015	UNAM, INECOL	Nashieli Garcia	
Assessment of main trade-offs between biodiversity, climate change mitigation measures and other ecosystem services and human well-being at national scale and in local case study areas	Skype	14 April 2015	ROBIN meeting	ROBIN Project Partners (3 participants)	Information for Deliverable 2.3.3
SH workshops in Brazil- 1st Organisation meeting	Telecon	16 April, 2015	ROBIN Meeting	ROBIN Project Partners (UPM, EMBRAPA)	
Alterra and WU meeting to discuss progress of ROBIN activities	Wageningen	16/04/2015 30/04/2015 26/05/2015	ROBIN meeting	WU and Alterra people related to ROBIN	All ROBIN people
Meeting to discuss overall results and paper writing	Wageningen	30-04-2015	Prepare papers and	WU and ALTERRA	All ROBIN people

Meeting name/title	Venue or type of communication	Date (s)	Type of meeting	Meeting participants	Comments e.g. How did ROBIN feature at the meeting
			presentations of work done		
Matching event Germany-Columbia	Berlin, Germany	22.04.2015	Symposium	Germany, Columbia	Overview of collaboration within ROBIN project, approaches to investigate biodiversity in climate mitigation
UN SEEA-EEA expert meeting	UN headquarters NYC	28.-30.04.2015	Expert workshop	Melanie Kolb	Endorse ecosystem integrity as a tool for experimental ecosystem accounting
XVII Brazilian Symposium on Remote Sensing - SBSR.	João Pessoa-/Brazil	25 – 29, April 2015 (http://www.dsr.inpe.br/sbsr2015/files/p0225.pdf)	Seminar	6 Embrapa researchers (EMBRAPA Satellite Monitoring and EMBRAPA Soils).	Participation of a member of ROBIN Project with a scientific paper presentation.
Update on status of D123	Skype	27.04.2015	ROBIN meeting	Melanie Kolb, Terry Parr	
Seminaries in Biodiversity and Biotechnology	Belém	5.05.2015	MPEG Rede de biodiversidade e biotecnologia da Amazônia Legal PPG-Bionorte-polo Pará	1 Embrapa researcher	Lecture given at the Post Graduate Program in Emilio Goeldi Museum
2nd generation DGVM workshop	Landskrona, Sweden	11-13 May 2015	Workshop	120 participants from Europe and North America	Presentation of LPJmL-FIT approach on how to incorporate biodiversity in 2nd generation

Meeting name/title	Venue or type of communication	Date (s)	Type of meeting	Meeting participants	Comments e.g. How did ROBIN feature at the meeting
					dynamic global vegetation models
INEGI EEA meeting	INEGI, Mexico City	15.05.2015	Workshop	Melanie Kolb	Endorse ecosystem integrity as a tool for experimental ecosystem accounting
ROBIN X-Cutting Papers Meeting	Potsdam, Germany	18-20 May, 2015	ROBIN meeting	ROBIN Project Partners (All partners)	
Ecosystem integrity and trade-offs	CONABIO	18.05.2015	ROBIN meeting	Miguel Equihua, Julián Equihua, Nashieli García, Pedro Díaz, Octavio Maqueo, Melanie Kolb, Michael Schmidt	Review of tasks
World Water Congress XV International Water Resources Association.	Edinburgh	May 25-29 2015	International conference	Laura Miguel Ayala	Poster on "Impact of soybean expansion on Water Footprint in the Amazon under climate change scenarios" (poster was on screen the whole congress)
UPM contribution of X-Cutting paper 8b on tradeoffs	Telecon	3 June, 2015	ROBIN meeting	ROBIN Project Partners (UNAM, UPM)	UPM contribution of X-Cutting paper 8b on tradeoffs
Ecosystem workshop	Bonn, Germany	6.-8.June.2015	Workshop organized by Conservation International	80 participants, international UNFCCC audience	Discussion on role of biodiversity and ecosystem resilience in ecosystem-based adaptation

Meeting name/title	Venue or type of communication	Date (s)	Type of meeting	Meeting participants	Comments e.g. How did ROBIN feature at the meeting
3rd SH workshop in Bolivia- 2nd Organisation meeting	Telecon	9 June, 2015	ROBIN Meeting	ROBIN Project Partners (UPM, IBIF)	
Evaluation of simulated functional diversity using plant-trait data	Wageningen, NL	14.-20. June.2015	Consultation WU-PIK	4 people from ROBIN partner and other WU experts in tropical ecology and remote sensing	
III Seminar Agrohidro Network	Corumbá/Brazil	June 15 – 19, 2015 (http://www.cpap.embrapa.br/iii-seminario-da-rede-agrohidro/Programa_-_III_Seminario_da%20Rede_Agrohidro.pdf)	Workshop	1 Embrapa researcher and 1 student (sponsored by the researcher)	Participation of a member of ROBIN Project with a scientific paper presentation, poster and oral presentation
3rd workshop	Bolivia	26 and 02 June, 2015	ROBIN meeting W.P. 3.1	2 Embrapa researchers	Participation in the meeting, including a lecture presentation by Embrapa researchers
INEGI EEA meeting	INEGI, Mexico City	03.06.2015	Workshop	Melanie Kolb	Endorse ecosystem integrity as a tool for experimental ecosystem accounting
Meeting subject: scheduling and logistics adjustments to facilitate the workshop	Skype	July, 2015	Teleconference	1 Embrapa researcher	Ensured the success of the event, as it was expressed in the evaluation questionnaires.

Meeting name/title	Venue or type of communication	Date (s)	Type of meeting	Meeting participants	Comments e.g. How did ROBIN feature at the meeting
Presentation of ROBIN and the National Biodiversity Monitoring System in	Work meeting at the department of foreign affairs, Santiago, Colombia	July, 2015	UNAM, INECOL	Nashieli Garcia Alaniz, Miguel Equihua, Octavio Perez Maqueo	
3rd Bolívia SHW	Santa Cruz de la Sierra, Bolivia	1st July, 2015	ROBIN Meeting	ROBIN Project Partners (UPM, IBIF, EMBRAPA, policy makers and local stakeholders)	
International Association for Landscape Ecology's 2015 World Congress	Portland (Oregon, USA)	5-9 July 2015	Scientific Conference	Marta Pérez-Soba and Theo van der Sluis (ALTERRA)	Interactive session presenting "QUICKScan: a participatory approach to map ecosystem services and develop hands-on knowledge" based on the work in WP2.3 in ROBIN
Our Common Future under Climate Change (CFCC): http://www.commonfuture-paris2015.org/	Venue was UNESCO headquarters in Paris, Oral presentation, see slides at http://www.slideshare.net/CFCC15/paper-50353012	6-10 July 2015	Scientific Conference	Jana Verboom; Conference: Ca. 2000 scientists from many countries; our session: mainly forest degradation and remote sensing scientists from various countries	This was a ROBIN presentation, presenting the main findings of deliverable 2.3.4. on tipping points
UN SEEA-EEA national meeting	INEGI, Mexico City	17.07.2015	National workshop	Melanie Kolb	Endorse ecosystem integrity as a tool for experimental ecosystem accounting
Robin Workshop	Workshop, Belem, Brazil	31.07 to 05.08 2015	Robin Workshop	Nelson Grima Liria	
Meeting with GIZ	Workshop, Mexico city	August, 2015	GIZ, CONABIO	Nashieli Garcia Alaniz	

Meeting name/title	Venue or type of communication	Date (s)	Type of meeting	Meeting participants	Comments e.g. How did ROBIN feature at the meeting
Presentation of ROBIN and the National Biodiversity Monitoring System in Lima, Peru	Work meeting at the department of foreign affairs, Santiago, Peru	August, 2015	UNAM, INECOL	Nashieli Garcia Alaniz, Miguel Equihua, Octavio Perez Maqueo	
III Cognitive Perception Workshop "The role of biodiversity in mitigating climate change"	Belém, Brazil	3 August 2015	Workshop	ROBIN Project Partners (UPM, EMBRAPA, UNI-KLU, policy makers and local stakeholders)	Validation of the Fuzzy Cognitive Maps and selection of public policies options to reduce biodiversity loss in Amazon.
Ecosystem integrity and trade-offs	CONABIO	14.08.2015	ROBIN meeting	Miguel Equihua, Julián Equihua, Nashieli García, Pedro Díaz, Octavio Maqueo, Melanie Kolb, Michael Schmidt	Review of status of publications and deliverables related to ecosystem integrity
Update on status of D123 contributions	Skype	02.09.2015	ROBIN meeting	Melanie Kolb, Terry Parr	
Meeting to discuss outline of cross-ROBIN paper 1	Skype	Sept 2015	Skype	Kirsten Thonicke, Jill Thompson, Marielos Peña-Claros, Lourens Poorter, Masha van der Sande	All ROBIN-people
Meetings to organize scientific meeting in Brussels	SKYPE	11/09/2015	ROBIN meeting	T. Warnaars (CEH), M. Peña-Claros (WU), A. Boilt (PIK), Maggie (EMBRAPA)	All ROBIN people
Ecology at the interface (EEF) conference	Rome, Italy	21-25 Sep 2015	Conference	80 participants in session, international audience	Presentation of LPJmL-FIT approach on how to incorporate biodiversity in dynamic vegetation

Meeting name/title	Venue or type of communication	Date (s)	Type of meeting	Meeting participants	Comments e.g. How did ROBIN feature at the meeting
					models, session on trait-based research
XIV World Forestry Conference	Durban South Africa	September 2015	Conference	UNAM partners	International meeting
Meetings to organize scientific meeting in Brussels	SKYPE	Sept to Oct 2015 several meetings to plan agenda and speakers	ROBIN meeting	T. Warnaars (CEH), M. Peña-Claros (WU) and some meetings also with T. Parr (CEH)	All ROBIN people
Coordination meetings with Mexican governmental institutions on the transfer and implementation of the conceptual framework of Ecosystem Integrity the implementation of the National Biodiversity Monitoring System.	CONABIO, CONAFOR	October 2015	Robin and National Forestry Commission, National (CONAFOR),	Nashieli Garcia, Michael Schmidt, CONAFOR, CONANP	
Presentation of ROBIN and the National Biodiversity Monitoring System in Santiago, Chile	Work meeting at the department of foreign affairs, Santiago, Chile	October 2015	UNAM, INECOL	Nashieli Garcia Alaniz, Miguel Equihua, Octavio Perez Maqueo	Presentation of ROBIN and the National Biodiversity Monitoring System in Santiago, Chile
Brazilian Field-Work Analysis Meeting	Madrid, Spain	13-16th October 2015	ROBIN meeting	ROBIN Project Partners (UPM, EMBRAPA)	
ROBIN Final scientific meeting	Brussels	19-20 October 2015	Scientific meeting	ROBIN Project Partners (NERC, Alterra, CONABIO, EMBRAPA, UNI-KLU, INECOL, PIK, UNAM, WU, UPM)	This was the final scientific meeting main objectives:

Meeting name/title	Venue or type of communication	Date (s)	Type of meeting	Meeting participants	Comments e.g. How did ROBIN feature at the meeting
					• To present the latest results of the project • Communicate key messages and findings • To disseminate the achievements of the full 4year project • Bring together the community of researchers, end-users working on this subject
Meeting to discuss first draft of cross-ROBIN paper 1	Brussels	Oct 19 2015	ROBIN meeting	Many ROBIN-colleagues	All ROBIN-people
ROBIN at the European Parliament Intergroup on "Climate Change, Biodiversity and Sustainable Development", conference-debate in the European Parliament entitled "FOREST LANDSCAPES: SOLUTIONS FOR CLIMATE CHANGE MITIGATION" hosted by MEP Catherine Bearder.	Brussels	21 Oct 2015	Policy meeting	ROBIN Project Partners (NERC, Alterra, CONABIO, EMBRAPA, UNI-KLU, INECOL, PIK, UNAM, WU, UPM)	

Meeting name/title	Venue or type of communication	Date (s)	Type of meeting	Meeting participants	Comments e.g. How did ROBIN feature at the meeting
Ecosystem integrity and trade-offs	CONABIO	23.10.2015	ROBIN meeting	Miguel Equihua, Julián Equihua, Nashieli García, Pedro Díaz, Octavio Maqueo, Melanie Kolb, Michael Schmidt	Next steps for implementation at national level
Case study Southern Coast of Jalisco	Centro Universitario de la Costa, Universidad de Guadalajara/Skype	26.10-29.10.2015	ROBIN meeting	Nathalia Álvarez, Elena Lazos, Peter Gerritsem, Sandras Quijas, Patricia Balvanera, Jasmín Solís	Review of status of publications related to case study
Trade-offs between ecosystem services for the Southern Coast of Jalisco, Mexico	Skype	26-28 October 2015	ROBIN meeting	ROBIN Project Partners (12 participants)	
Cross Cutting Paper Meeting on the application of the Indicator Framework at local level	Madrid, Spain	27th- 29th October 2015	ROBIN meeting	ROBIN Project Partners (Alterra and UPM)	Cross Cutting Paper Meeting on the application of the Indicator Framework at local level
Alterra and UPM meeting to discuss paper on INTEGRATION OF FUZZY COGNITIVE MAPS (WP3) IN THE ROBIN FRAMEWORK (WP21)	Madrid	27-30 October 2015	ROBIN meeting	Marta Pérez-Soba (ALTERRA) and Consuelo Varela Ortega and Irene Blanco (UPM)	
II Scientific Research Seminar of the Tapajós National Forest.	Santarém/Brazil	20 November 21 2014	Seminar iCMBio	2 Embrapa researchers	Guest speakers presenting results obtained in the field

Meeting name/title	Venue or type of communication	Date (s)	Type of meeting	Meeting participants	Comments e.g. How did ROBIN feature at the meeting
					work, under the ROBIN Project scope
4th Symposium of Studies and Researches in Environmental Science in the Amazon	Belém-Pará-Brazil	20 November, 2015	Master Program Scholar in Environmental Sciences - State University of Pará (UEPA)	1 Embrapa researcher	Participation as a speaker to present results of the ROBIN Project

3.10 ROBIN related publications during the reporting period

Authors	Publication title or <u>full reference</u>	Date published or current status e.g. is it submitted or in press	Publication type							
			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Conference/ Workshop			Others
						Oral	Abstract	Poster	
Álvarez, Natalia S., Peter R. W. Gerritsen, Elena Lazos Chavero y Melanie Kolb	Transformaciones en el uso del territorio y soberanía alimentaria de la Costa Sur de Jalisco (1994-2010), Décimo Congreso de la Asociación Mexicana de Estudios Rurales	23.-26.06.2015		x		x			
Ascarrunz, N., Toledo, M., van der Sande, M.T.	Short course about functional traits, Santa Cruz, Bolivia, 29-092014 – 01-10-2014					X			
Balvanera, Patricia, L. Jones, M. Simoes, S. Quijas, D. Masante, M. Equihua, C. Varela, E. Lazos, O. Pérez-Maqueo, J. Equihua, M. Kolb, N. Garcia Alanis, K. Thonicke, A. Boit, B. Purse, L. Martorano, N. Azcarrunz, N. Beltrao, M. Maass, P. Gerritsen, J.Verboom, I. Blanco, J. Day, J.Díaz, P. Díaz, P. Esteve, R. Ferraz, S. Ibañez-Bernal, Ví. Jaramillo, G. Murray-Tortarolo, M.Pérez-Soba, L. Braat, T. Mwampamba, N. Nascimiento, M. Peña-Claros, S. Pereira, L. Poorter, M. Schmidt, M. Skutsch, R. Smith, J.Thompson, M. Toledo, M. van Eupen	Present and future tradeoffs between biodiversity, ecosystem services and human well-being in tropical Latin America, Eighth ESP World Conference	09.-13.11.2015				x	X		Annals
Braat, L.	MANAGEMENT & POLICY in ROBIN	Presentation at the EP Brussels				X			

Authors	Publication title or full reference	Date published or current status e.g. is it submitted or in press	Publication type						
			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Conference/ Workshop			Others
						Oral	Abstract	Poster	
Bayma et al,	Caracterização das unidades da paisagem em ambiente de floresta tropical por meio de imagens-fração MESMA	2015							Annals
Blanco, I.; Consuelo Varela-Ortega, Paloma Esteve and Marisol Toledo.	Analyzing the future of the agro-forestry systems in the Bolivian Amazon using participatory tools (FCM & ANP) 10th Conference of the Spanish Association of Agricultural Economics, Cordoba (Spain), 9-11th September, 2015	10/09/15				X			
Blanco I. and Consuelo Varela-Ortega	Analyzing adaptation to climate change in the water and the agricultural sectors in the Spanish Guadiana basin. Master class. Department of Agricultural and Resource Economics Humboldt University. Berlin	22/01/15				X			
Boit A, Sakschewski B, Boysen L, Cano Crespo A, Clement J, Garcia Alaniz N, Kok K, Kolb M, Langerwisch F, Rammig A, Sachse R, van Eupen M, von Bloh W, Zemp D, Thonicke K,	Large-scale impact of climate change versus land-use change on future biome shifts in Latin America, Global Change Biology.	In revision	x						
Bongers F., R. Chazdon, L. Poorter & M. Peña-Claros.	The potential of secondary forests.	Science (2015) 348: 642-643 DOI: 10.1126/science.348.6235.642-c	X						
Brede, B., Verbesselt, J., Dutrieux, L.P., Herold, M	Performance of the enhanced vegetation index to detect inner-annual dry season and drought impacts on Amazon forest canopies,	ISRSE (2015) DOI: 10.5194/isprsarchives-XL-7-W3-337-2015	X						

Authors	Publication title or <u>full reference</u>	Date published or current status e.g. is it submitted or in press	Publication type							
			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Conference/ Workshop			Others
						Oral	Abstract	Poster	
Brede, B. ; Suomalainen, J.M. ; Bartholomeus, H.M. ;Herold, M.	Influence of solar zenith angle on the enhanced vegetation index of a Guyanese rainforest	(2015) Remote Sensing Letters 6 (12). p. 972 – 981 DOI: 10.1080/2150704X.2015.1 089362	X						
R.J.W. Brienen, O.L. Phillips, … E.J.M.M. Arets, Peña-Claros M, Poorter L, Toledo M, et al.	Long-term decline of the Amazon carbon sink.	Nature (2015) 519:344-346 DOI: 10.1038/nature14283	X						
Cano-Crespo A, Oliveira PJC, Boit A, Cardoso M, Thonicke K 2015	Forest edge burning in the Brazilian Amazon promoted by escaping fires from managed pastures, JGR-<u>Biogeosciences</u>, 120:2095-2107, <u>doi:10.1002/2015JG002914</u>	Published JGR-<u>Biogeosciences</u>, 120:2095-2107, <u>doi:10.1002/2015JG00291 4</u>	x						
Cano *et al.*	Contradicciones de la política pública y acciones ambientales en la Costa Sur de Jalisco	In press	X						
Cesário et al,	DESCRIÇÃO MORFO-FUNCIONAL DE FORMAS DE HUMUS EM SOLOS TROPICAIS: ESTUDO EM FLORESTAS MANEJADAS DA AMAZÔNIA	2015						X	Annal s
RL Chazdon, P. Balvanera, M Peña-Claros, 63 others and L. Poorter..	Carbon mitigation potential of secondary forests	Science Advances (submitted)	X						
Dutrieux, L., Verbesselt, J., Kooistra, L., Herold, M.,	2015. Monitoring forest cover loss using multiple data streams, a case study of a tropical dry forest in Bolivia.	ISPRS Journal of Photogrammetry and Remote Sensing 107: 112-125.	X						

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			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Oral	Abstract	Poster	Others
						Conference/ Workshop			
		10.1016/j.isprsjprs.2015.03.015							
Dutrieux, L.P., Jakovac, C.C., Latifah, S.H., Kooistra, L.	Reconstructing land use history from Landsat time-series: Case study of a swidden agriculture system in Brazil.	International Journal of Applied Earth Observation and Geoinformation (Vol 47 p112-124) <u>doi:10.1016/j.jag.2015.11.018</u>	X						
Dutrieux, L.P., Poorter, L., Equihua, J., Ascarrunz, N., Herold, M., Peña -Claros, M., Roerink, G., Toledo, M., Kooistra, L.	Country wide mapping of forest diversity and structure by combining forest inventories with remote sensing	Ecological Applications (submitted)	X						
Equihua, Miguel , Michael Schmidt, Manuel Maass, Terry Parr, Nashieli García-Alaniz	Proyecto ROBIN: El papel de la biodiversidad para mitigar el cambio climático, Quinto Congreso Mexicano de Ecología	April 22nd 2015				x			
Erb, Karl-Heinz; Lauk, Christian; Kastner, Thomas; Mayer, Andreas; Theurl, Michaela; Haberl, Helmut	Exploring the biophysical option space for feeding the world without deforestation, submitted to Nature Communications	submitted	X						
Esteve, P.; Consuelo Varela-Ortega, Irene Blanco, Thomas Downing	A hydro-economic model for the assessment of climate change impacts and adaptation in irrigated agriculture. Ecological Economics. 120:49- 58. DOI:10.1016/j.ecolecon.2015.09.017	2015 Ecological Economics. 120:49- 58. DOI:10.1016/j.ecolecon.2015.09.017	X						
Esteve, P.; Irene Blanco, Consuelo Varela-Ortega and Marisol Toledo	Balancing agricultural development and forest conservation in Amazonia: Can ecosystem degradation be reversed?	01/07/15				X			

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			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Oral	Abstract	Poster	Others
						Conference/ Workshop			
	11th International Conference of the European Society for Ecological Economics 2015 Leeds (UK), 30th June- 3rd July 2015.								
Fauset, S., Johnson, M.O., …, E.J.M.M. Arets, Pena-Claros M, Poorter L, Toledo M, et al	Hyperdominance in Amazonian forest carbon cycling.	Nature Communications (2015) 6: 6857 DOI: 10.1038/ncomms7857	X						
Ferraz et al	ECOSYSTEM SERVICES INTEGRITY ON DIFFERENT PHYTO-ECOLOGIC ZONES OF THE AMAZON STATE, BRAZIL – EXPERT AND PROBABILISTIC BAYESIAN MODEL APPROACHES - Rodrigo Ferraz; Margareth Simões; Andrei Alvez - 8th World ESP Conference, South Africa from 9-13 November 2015;	2015						X	Annals
Ferraz et al	ECOSYSTEM SERVICES INTEGRITY STATE ON DIFFERENT PHYTO-ECOLOGIC LANDSCAPE PATTERNS OF THE BRAZILIAN AMAZON - Ferraz, R.; Simões, M; Alaniz, N.; Alvez, A. - Cuarto Congreso Internacional de Servicios Ecosistémicos en los Neotrópicos: 30 de septiembre al 3 de octubre 2015, Mar del Plata;	2015						X	Annals
Finegan, B., M. Peña-Claros, A. de Oliveira, A. Alarcón, N. Ascarrunz, M. S. Bret-Harte, G. Carreño-Rocabado, F. Casanoves, S. Díaz, P. Eguiguren	Does functional trait diversity predict aboveground biomass and productivity of tropical forests? Testing three alternative hypotheses.	Journal of Ecology (2015) 103: 191–201	X						

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			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Oral	Abstract	Poster	Others
Velepucha, F. Fernandez, J.C. Licona, L. Lorenzo, B. Salgado Negret, M. Vaz, L. Poorter									
García Alaniz *et al.*	*Mexican National Biodiversity and Degradation Monitoring System*	Published		X					
S. Gebhardt, T. Wehrmann, M.A.M. Ruiz, P. Maeda, J. Bishop, M. Schramm, R. Kopeinig, O. Cartus, J. Kellndorfer, R. Ressl, L. Andrés Santos and M. Schmidt.	MAD-MEX: Automatic Wall-to-Wall Land Cover Monitoring for the Mexican REDD-MRV Program Using All Landsat Data	Remote Sensing 2014 (10.3390/rs6053923)	X						
Gerard, France; Danny Hooftman, Frank van Langevelde, Elmar Veenendaal, Jon Lloyd	Is the CART pulling the horse? Discontinuities in tree cover as evidenced from remotely sensed imagery can be explained by binning procedures – a comment on Hanan et al. (2014) and Staver and hansen (2015)	Correspondence in Global Ecology and Biogeography - In prep.	X						
Gerard, F. F. C. T. George, G. Hayman, C. Chavana-Bryant, C. Doughty, G. P. Weedon	Leaf phenology amplitude derived from MODIS NDVI and EVI: Synchronicity of leaf phenology for Meso- and South America.	Geoscience Data Journal – In prep	X						
Gerritsen ; Peter R.W., Elena Lazos Chavero, Natalia S. Álvarez Grzybowska, Jazmín Solis Carpio	"Voces de la Tierra Pródiga": Testimonios Campesinos sobre las Transformaciones Socio-ambientales en la Costa de Jalisco, Occidente de México, Occidente de México. Book Chapter.	In press	X						

Authors	Publication title or full reference	Date published or current status e.g. is it submitted or in press	Publication type							
			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Oral	Abstract	Poster	Others
Grima, N., Singh, S.J., Smetschka, B., Ringhofer, L.,	2016. Payment for Ecosystem Services (PES) in Latin America: Analysing the performance of 40 case studies. . Ecosystem Services 17C, 24–32. http://www.sciencedirect.com/science/article/pii/S2212041615300607	Published Feb 2016 Ecosystem Services (Vol. 17 p 24-32) DOI 10.1016/j.ecoser.2015.11.010	X						
Grima N., Smetschka B., Singh S.J.,	Implementation of an SMCE process	In preperation	X						
Hamunyela, E.; Verbesselt, J.; Herold, M.	Using spatial context to improve early detection of deforestation from Landsat time series	(2016). Remote Sensing of Environment 172 . p. 126 - 138. DOI: 10.1016/j.rse.2015.11.006	X						
Hausknost, D., Grima Liria, N., Singh, S.J.	The Political Dimensions of Payments for Ecosystem Services (PES): Cascade or Stairway?	submitted to Ecological Economics.	X						
Jakovac, C.C., Latifah, S.H., Dutrieux, L.P., Peña-Claros, M, Bongers, F.	Spatial and temporal dynamics of swidden cultivation in riverine Amazonia: expansion and intensification	In preparation	X						
Kok K, van Eupen M., Cormont, A. et al.	Scenario development in Latin America: extending the SSPs for deforestation, biodiversity, and climate mitigation	In preparation	X						
Kolb, Melanie , Terry Parr, Julián Equihua, Miguel Equihua, Octavio Pérez-Maqueo, Pedro Díaz, Michael Schmidt, Nashieli García-Alaníz, Margareth Simoes, Rodrigo Ferraz, Marielos Peña-Claros, Peter	Integridad ecológica y el cambio de uso del suelo, Quinto Congreso Mexicano de Ecología	April 22nd 2015				x			

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			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Conference/ Workshop			Others
						Oral	Abstract	Poster	
Verweij									
Kolb, Melanie, Peter Gerritsen, Elena Lazos, Gustavo Garduño, Natalia Álvarez, Sandra Quijas, Jazmín Solís, Nelson Grima Consuelo Varela, Irene Blanco	Participatory prospective analysis for integrating forests and other land uses: A multi-model approach for the Southern Coast of Jalisco (Western Mexico)							x	
Krausmann, F.; Erb, K-H., Gingrich, S., Haberl, H., Bondeau, A., Gaube, V., Lauk, C., Plutzar, C. and Searchinger, T.D.	Global human appropriation of net primary production doubled in the 20th century	PNAS 2015 10.1073/pnas.1211349110	X						
Kruijt, B. Celso von Randow, Peter Good, Antoon Meesters, Jana Verboom, Gillian kay, Han Dolman, Gilvan Sampaio	A blueprint for an early warning for critical transition system in Amazonia. EU-AMAZALERT Delivery report 5.1-3.	Date of approval by the Coordinator 30 November 2014							X
Lazos *et al.*	Reflexiones sobre las interrelaciones entre conservación de biodiversidad y bienestar humano: Pasado, Presente y Futuro. V Congreso Mexicano de Ecología, San Luis Potosí, SLP, México, 19-25 abril 2015	In preparation				X			
Lazos *et al.*	"Entre Promesas y Esperanzas" Actores regionales de la Costa Sur de Jalisco y la construcción de su futuro socioambiental"	In press	X						
Lisboa et al,	MULTI-TEMPORAL COVER PATTERNS USING LANDSAT TM IN THE TAPAJÓS NATIONAL FOREST AND ITS SURROUNDINGS: A CASE STUDY	2015						X	Annals

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			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Conference/ Workshop			Others
						Oral	Abstract	Poster	
	L. Lisboa; C. Vettorazzi; L. Martorano; R. Muniz; N. Beltrão								
Lohbeck, M., Poorter, L., Martínez-Ramos, M., Bongers, F.	Biomass is the main driver of changes in ecosystem process rates during tropical forest succession.	Ecology (2015) 96:1242-1252 DOI: 10.1890/14-0472.1	X						
M Lohbeck, F Bongers, M Martinez-Ramos, L Poorter.	The importance of biodiversity for multiple ecosystem functions in a human-modified tropical landscape.	Journal of Ecology (submitted)	X						
Luciana de Avila, Masha van der Sande, et al.	Effects of management intensity, residual diversity and trait composition on biomass recovery of a tropical rain forest	In preparation	X						
Lutz, Juliana, Smetschka, Barbara, Grima, Nelson:	Cooperation as a Means for Creating Sustainable Local Food Supply Systems - Potentials and Challenges,	to be submitted to: Sustainability	X						
Maass *et al.*	Changes in biodiversity and trade-offs among ecosystem services, stakeholders and components of well-being: the contribution of the ILTER to PECS.	Ecology and Society (E&S). (accepted**)**	X						

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			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Conference/ Workshop			Others
						Oral	Abstract	Poster	
Manners. R and Consuelo Varela-Ortega	Analysing the vulnerability to deforestation of Latin American and Caribbean forests. European Geosciences Union General Assembly 2015, Vienna (Austria) 12-17 April. 2015	14/04/15				X			
Manners. R and Consuelo Varela-Ortega	Analysing Latin American and Caribbean forest vulnerability: an alternative approach using a composite index. Centre for the Investigation and Study of the Management of Environmental and Agrarian Risks (CEIGRAM), Madrid (Spain)	22/05/15				X			
Martorano et al,	EVIDENCE OF ECOLOGICAL RESILIENCE CLUSTERS TO CLIMATE TYPOLOGY IN THE AMAZON RAINFOREST: A METHODOLOGICAL PROPOSAL L. Martorano ; L. Lisboa; R. Muniz; E. Sotta; N. Beltrão	2015						X	Annals
Mayer, Andreas et al.:	Uneven dynamics of material extraction and trade in Brazil at the beginning of the 21st century,	to be submitted to: Journal of Industrial Ecology	X						
Michelle, J., Galbraith, D., Bloor, M., Pena-Claros, M., Poorter, L., Toledo, M., Baker, T., et al.	Variation in stem mortality rates determines patterns of aboveground biomass of Amazonian forests; implications for dynamic global vegetation models.	Global Change Biology (submitted)	X						

Authors	Publication title or <u>full reference</u>	Date published or current status e.g. is it submitted or in press	Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Conference/ Workshop Oral	Abstract	Poster	Others
Miguel Ayala, L., Michiel Van Eupen, M., Zhang, G., Pérez-Soba, M., Martorano , L., Lisboa , L., Beltrão, N.	Impact of soybean expansion on Water Footprint in the Amazon under climate change scenarios	To be submitted to Science of the Total Environment http://www.journals.elsevier.com/science-of-the-total-environment/ Poster in world Water Congress XV				x	x	x	
Miguel Ayala, L.	The Water Footprint: a generic multi-scale methodology to assess the impact of agricultural expansion	Oct 2015 at the ROBIN presentation meeting, Brussels				X			
Nascimento et al,	SCENARIO ANALYSIS OF THE MAIN DRIVERS FORCES THREATENING THE CONSERVATION OF THE TAPAJÓS NATIONAL FOREST, BRAZILIAN AMAZON N. Nascimento ; L. Martorano ; NES. Beltrão	2015						X	Annals
Peña-Claros, Marielos, Masha van der Sande, Eric Arets, et al.	Diversity, traits and environmental effects on biomass dynamics across Neotropical forests	In preparation	X						
M. Peña-Claros	The role of nature on climate change mitigation and adaptation	October 2015, Brussels, Belgium				x			
Pérez-Maqueo, Octavio , Miguel Equihua, Julián Equihua, Pedro Díaz, Nashieli García-Alaniz, Melanie Kolb, Michael Schmidt	Integridad ecológica como indicador de biodiversidad y sus aplicaciones, Quinto Congreso Mexicano de Ecología	19.-24.04.2015				x			
Pérez Maqueo, Octavio	Redes Bayesianas: conectoras de conocimiento	June 3rd 2015							X

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						Conference/ Workshop			
Pérez-Soba, M.	How can the ROBIN Framework help to understand the impacts of deforestation under climate change in Latin America? Finding your way through the maze	Oct 2015 at the ROBIN presentation meeting, Brussels				X			
Poorter, L., van der Sande, M.T., Thompson, J., Arets, E.J.M.M., Alarcón, A., Álvarez-Sánchez, J., Ascarrunz, N., Balvanera, P., Barajas-Guzmán, G., Boit, A., Bongers, F., Carvalho, F.A., Casanoves, F., Cornejo-Tenorio, G., Costa, F.R.C., de Castilho, C. V., Duivenvoorden, J.F., Dutrieux, L.P., Enquist, B.J., Fernández-Méndez, F., Finegan, B., Gormley, L.H.L., Healey, J.R., Hoosbeek, M.R., Ibarra-Manríquez, G., Junquira, A.B., Levis, C., Licona, J.C., Lisboa, L.S., Magnusson, W.E., Martínez-Ramos, M., Martínez-Yrizar, A., Martorano, G., Makell, L.C., Mazzei, L., Meave, J.A., Mora, F., Muñoz, R., Nytch, C., Pansonato, M.P., Parr, T.W., Paz, H., Simoes Penello, M., Pérez-García, E.A., Rentería, L.Y., Rodríguez-Velazquez, J., Rozendaal, D.M.A., Ruschel, A.R., Sakschewski, B., Salgado Negret, B., Schietti, J., Sinclair, F.L., Souza, P.F., Souza, F.C., Stropp, J., ter Steege, H.,	Diversity enhances carbon storage in tropical forests	<u>Global Ecology and Biogeography</u>, <u>24(11),</u> 1314–1328, <u>doi: 10.1111/geb.12364</u>.)	x						

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			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Conference/ Workshop			Others
						Oral	Abstract	Poster	
Swenson, N.G., Thonicke, K., Toledo, M., Uriarte, M., van der Hout, P., Walker, P., Zamora, N. & Peña-Claros, M.									
Poorter, Lourens ; Frans Bongers , T. Aide , Angélica María Almeyda Zambrano , Patricia Balvanera , Justin Becknell , Vanessa Boukili , Eben Broadbent , Robin Chazdon , Dylan Craven , Jarcilene Almeida-Cortez , George André Cabral , Bernardus de Jong , Julie S. Denslow , Daisy Dent , Saara DeWalt , Juan Dupuy , Sandra M. Duran , Mario M. Espirito-Santo , Maria Fandino , Jefferson Hall , Jose Luis Hernandez-Stefanoni , Catarina C. Jakovac , André Junqueira , Deborah Kennard , Susan Letcher , Madelon Lohbeck , Erika Marin-Spiotta , Miguel Martinez-Ramos , Paulo Massoca , Jorge Meave , Rita Mesquita , Francisco Mora , Rodrigo Munoz , Robert Muscarella , Ule R.F. Nunes , Susana Ochoa-Gaona , Edith Orihuela-Belmonte , Marielos Peña-Claros , Eduardo A. Perez-Garcia , Daniel Piotto , jennifer powers , Jorge Rodriguez-Velazquez , I. Eunice Romero-Perez , Jorge Ruiz , Lucia Sanaphre , Arturo Sanchez-Azofeifa , Nathan Swenson , Marisol Toledo , Maria Uriarte , Michiel van	Biomass resilience of Neotropical secondary forests.	Nature in press	x						

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			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Oral	Abstract	Poster	Others
Breugel , Hans van der Wal , Maria D.M. Veloso , Tony Vizcarra Bentos , Bruce Williamson , Pedro Brancalion , Ricardo César , Juan-Carlos Licona , Alexandre de Oliveira , Juan Saldarriaga , Naomi Schwarz , Marc Steininger , Hans Vester , Alberto Vicentini , Ima Guimarães Vieira, Danae Rozendaal ,									
Poorter, L.	Biodiversity, functioning and resilience of tropical forests	March 2015 at the Dies of Wageningen University				x			
Poorter, L.	The potential of secondary forests; How fast do they recover in terms of carbon and diversity?	Oct 2015 at the ROBIN presentation meeting, Brussels				x			
Poorter, L.	Biodiversity, functioning and resilience of tropical forests	August 2015 at INPA, Manaus, Brazil				x			
Poorter, L.	Recovery of biodiversity and biomass of Neotropical secondary forests	January 2015, Chamela, Mexico				x			
J.A. Prado-Junior, I. Schiavini, V.S. Vale, C.S. Arantes, M.T. van der Sande, M. Lohbeck, L. Poorter.	Conservative species drive biomass productivity in tropical dry forests	Journal of Ecology (in revision)	X						
Quijas *et al.*	Modelación espacial y temporal de servicios ecosistémicos usando modelos dinámicos de la vegetación. V Congreso Mexicano de Ecología, San Luis Potosí, SLP, México, 19-25 abril 2015	In preparation				X			
Quijas, *et al.*	Potencial de la biodiversidad y los ecosistemas para mitigar el cambio climático en América Latina. V Congreso Mexicano de	In preparation				X			

Authors	Publication title or <u>full reference</u>	Date published or current status e.g. is it submitted or in press	Publication type			Conference/ Workshop			
			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Oral	Abstract	Poster	Others
	Ecología, San Luis Potosí, SLP, México, 19-25 abril 2015								
Quijas *et al.*	Modelling carbon stock and sequestration ecosystem services from a dynamic vegetation model for policy design.	In preparation	X						
Quijas *et al.*	Modelling carbon stock and sequestration from a dynamic vegetation model for policy design	submitted	X						
Ringhofer, Lisa, Simron Jit Singh, Barbara Smetschka	Climate Change Mitigation in Latin America: A Mapping of Current Policies, Plans and Programs, IFF Social Ecology Vienna, Social Ecology Working Paper Vol 143,	(2015): published		X					
Ringhofer, L., Singh, S.J., Smetschka, B., Grima, N., Lauk, C.	Mainstreaming Biodiversity in Development Practice: Can the concept of Payment for Ecosystem Services (PES) Deliver?	submitted to: Journal Progress in Development Studies	X						
Rodrigues et al,	CARACTERIZAÇÃO DA ESTRUTURA FLORÍSTICA DA ÁREA EXPERIMENTAL DE MANEJO FLORESTAL KM 114, NATIONAL FOREST DO TAPAJÓS: ÁREA EXPLORADA E NÃO EXPLORADA	2015						X	Annals
Roerink; Gerbert	"Impact of plant phenology on carbon stocks in the Amazon basin". To be submitted to the Remote Sensing of Environment journal	DRAFT	X						
Roerink, Gerbert & Michiel van Eupen	"HANTS Phenology – Methods and applications" presented at the Final ROBIN Scientific workshop in Brussels in October 2015					X			

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			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Conference/ Workshop			Others
						Oral	Abstract	Poster	
Rozendaal DMA, P. Balvanera, M Peña-Claros, M. Toledo, N. Ascarrunz, J.C. Licona, 60 others and L. Poorter..	Recovery of species composition and diversity during secondary succession	In prep.	X						
Sakschewski, B, W von Bloh, A Boit, L Poorter, M Peña Claros, J Heinke, J Joshi, K Thonicke.	Amazon forest resilience emerges from plant trait diversity.	Nature Climate Change, in revision	X						
Sakschewski, B., von Bloh, W., Boit, A., Rammig, A., Kattge, J., Poorter, L., Peñualeas, J., Thonicke, K.	Leaf and stem economics spectra drive diversity of functional plant traits in a dynamic global vegetation model.	Global Change Biology (2015), 21:2711-2725, doi: 10.1111/gcb.12870	x						
Schmidt, Michael, Steffen Gebhardt, Thilo Wehrmann, Jose Luis Ornelas, Arturo Victoria, Jesus Argumendo, Raul Rodriguez, Enrique Serrano	Deforestation and Degradation Monitoring in Mexico in the frame of the REDD+ mecanism			x					
Simões; M. ; Rodrigo Ferraz, Peter Verweij, Miguel Equihual, Octavio Maqueo, Andrei Alves et al	Mapping The Brazilian Amazon Ecosystem Integrity: A Bayesian Spatial Modelling Approach - 4th International Conference on Earth Science & Climate Change. OMICS International. Monday, 15 June 2015, Alicante, Spain.	2015					X		Annal s
Simões M.; R. Ferraz; M. Equihual ; O. Maqueo ; N. Alaniz; P. Verweij; A. Alvez	IMPACTS OF BIODIVERSITY LOSS IN THE CARBON STOCK AND EVAPOTRANSPIRATION FLUXES REGULATION IN BRAZILIAN AMAZON - - Our Common Future Under Climate Change International Scientific Conference 7-10 JULY 2015 Paris, France	2015						X	Annal s

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			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Conference/ Workshop			Others
						Oral	Abstract	Poster	
Simões et al	Ecosystem Integrity of Brazilian Amazon through the Use of Bayesian Networks and their Relationship to Ecosystem Services Margareth Simões, Rodrigo Ferraz, Peter Verweij, Andrei Alves, Miguel Equihual, Octavio Maqueo - XVII Simpósio Brasileiro de sensoriamento Remoto, João Pessoa, abril de 2015.	2015						X	Annals
Simões, M. Rodrigo Ferraz; Sandro Pereira; Andrei Alvez et al	LAND USE CHANGES SCENARIOS AND FUTURE ENVIRONMENTAL SERVICES PROVISION IN THE BRAZILIAN AMAZON 8th World ESP Conference, South Africa from 9-13 November 2015;	2015						X	Annals
Simões et al	SCENARIOS OF LAND USE CHANGES AND IMPACTS ON ECOSYSTEM SERVICES IN THE BRAZILIAN AMAZON - Simões, M.; Ferraz, R.; Pereira, S.; Alaniz, N.; Alvez, A. - Cuarto Congreso Internacional de Servicios Ecosistémicos en los Neotrópicos: 30 de septiembre al 3 de octubre 2015, Mar del Plata;	2015						X	Annals
Singh, Simron J., Barbara Smetschka, Nelson Grima, Lisa Ringhofer, Panos Petridis, and Katharina Biely	(2016): Social Multi-Criteria Evaluation (SMCE) in Theory and Practice: Introducing the software OPTamos; IFF Social Ecology Vienna, Social Ecology Working Paper Vol 160	published		X					

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			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Oral	Abstract	Poster	Others
Smetschka B., Grima N., Singh S.J., Gerritsen, P., Lazos, E.:	Sustainable land use decisions in Cuitzmala watershed: stakeholders options and decision criteria	In preperation	X						
Thonicke, Kirsten; Alice Boit, Michiel van Eupen, Kasper Kok, Anouk Cormont, Marta Pérez-Soba, Laurence Jones, Melanie Kolb, Sandra Quijas-Fonseca, Patty Balvanera	Integrated modelling of land use change impacts on ecosystem services in Latin America. GLOBAL LAND PROJECT OPEN SCIENCE MEETING. Land transformations: between global challenges and local realities	Proceedings conference				X	X		
Tsianou, M., Plutzar, C., Erb, KH., Haberl, H., Peres, C. & Davies, R.G.	Range size, endemism and threat status of Neotropical continental birds: a comparison of extent-of-occurrence and habitat suitability perspectives	submitted to: Diversity & Distribution	X						
Van der Sande, M.T.	Drivers of biomass growth in tropical canopy trees: credits to sapwood. Netherlands Annual Ecology Meeting, Lunteren, the Netherlands, 4-2-2014							X	
Van der Sande, M.T.	Scaling from leaf to forests across the Amazon: relating carbon, traits and environment. ALTERRA, Wageningne, the Netherlands, 10-02-2014					X			
Van der Sande, M.T.	Among tall trees with dense wood: What drives biomass dynamics? Forest Ecology and Forest Management group, Wagenigen, the Netherlands, 10-04-2014					X			
Van der Sande, M.T.	Explaining aboveground biomass dynamics: taxonomic diversity, traits or environment? EMBRAPA, Belém, Brazil, 13-06-2014					X			

Authors	Publication title or full reference	Date published or current status e.g. is it submitted or in press	Publication type						
			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Conference/ Workshop Oral	Abstract	Poster	Others
Van der Sande, M.T.	Explaining aboveground biomass dynamics: taxonomic diversity, traits or environment?. IBIF, Santa Cruz, Bolivia, 01-08-2014					X			
Masha van der Sande, Pieter Zuidema, Frank Sterck	Explaining biomass growth of tropical canopy trees: the importance of sapwood	Oecologia (2015) doi: 10.1007/s00442-015-3220-y	X						
van der Sande, M.T., Arets, E.J.M.M., Peña-Claros, M., Hoosbeek, M.R., Cáceres-Siani, Y., van der Hout, P. & Poorter, L.	Soil fertility and species traits, but not species diversity, drive productivity and biomass stocks in a tropical rainforest	New Phytologist (submitted)	X						
van der Sande, M.T., Peña-Claros, M., Ascarrunz, N., Arets, E.J.M.M., Licona, J.C., Toledo, M. & Poorter, L.	Drivers of biomass change in a tropical forest: testing for effects of diversity, traits, and environment	Journal of Ecology (submitted)	X						
van der Sande, M.T., Arets, E.J.M.M., Peña-Claros, M., Luciana de Avila, A., Roopsind, A., Mazzei, L., Ascarrunz, N., Finegan, B., Alarcón, A., Cáceres-Siani, Y., Licona, J.C., Ruschel, A., Toledo, M. & Poorter, L.	Old-growth Neotropical forests are shifting in species and trait composition	Ecology (submitted)	X						
van der Sande, Masha; Eric Arets, and many other ROBIN-colleagues.	Is biodiversity a nice-to-have or a must-have for carbon stocks and dynamics in tropical forests?	In preparation	X						
van der Sande, Masha ; Boris Sakschewski, Eric Arets, Werner von Bloh, Alice Boit, Marielos Peña-Claros, Kirsten Thonicke, Lourens Poorter	Does trait diversity insure the long-term stability of biomass and productivity in tropical dry and wet forest?	In preparation	X						

Authors	Publication title or full reference	Date published or current status e.g. is it submitted or in press	Publication type						
			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Oral	Abstract	Poster	Others
Masha van der Sande et al.	Understanding the dynamics of managed forests – the role of environment, traits and diversity	April 2015 at the European Conference of Tropical Ecology				X			
Masha van der Sande et al.	Are Neotropical forests changing in species and trait composition?	July 2015 at the annual meeting of the Association for Tropical Biology and Conservation				X			
Masha T. van der Sande, Lourens Poorter, Lammert Kooistra, Patricia Balvanera, Kirsten Thonicke, Jill Thompson, Eric J. M. M. Arets, Alice Boit, Loïc P. Dutrieux, Julian Equihua, Nashieli Garcia Alaniz, France Gerard, Martin Herold, Laurence Jones, Melanie Kolb, Francisco Mora, Tuyeni H. Mwampamba, Terry Parr, Boris Sakschewski, Margareth Simões, and Marielos Peña-Claros	Biodiversity enhances climate change mitigation by tropical forests	Submitted to Frontiers in Ecology December 2015	X						
Varela- Ortega, C. and I. Blanco	Multi-scale analysis of biodiversity and climate change mitigation in Latin America. WINS (Workshop of Institutional Analysis of Social-Ecological Systems). Department of Agricultural and Resource Economics - IRI-THESYS (Integrative Research Institute on Transformations of Human-Environment Systems). Humboldt University. Berlin	22/01/15				X			

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			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Conference/ Workshop Oral	Abstract	Poster	Others
Varela- Ortega, C., Paloma Esteve, Irene Blanco, Rhys Manners and Marisol Toledo.	How to reconcile food production and ecosystem conservation in tropical countries? ROBIN e-Newsletter Issue 5.	17/02/15			X				
Varela- Ortega, C., Irene Blanco, Paloma Esteve, Rhys Manners, Ana Tarquis and Laura Barrios	Biodiversidad y cambio climático en la amazonía: perspectivas socio-económicas y ambientales. Presentation of the results attained in the project AL14-PID-12, funded by UPM to carry out research activities in Latin America during the year 2014 in the context of the ROBIN project (complementary funds).	18/02/15				X			
Varela- Ortega, C., Ana Tarquis, Irene Blanco, Paloma Esteve, Marisol Toledo and Lucieta Martorano.	Interpreting participatory Fuzzy Cognitive Maps as complex networks in the social-ecological systems of the Amazonian forests. European Geosciences Union General Assembly 2015, Vienna (Austria) 12-17 April. 2015	14/04/15				X			
Varela- Ortega, C., Paloma Esteve, Rhys Manners, Irene Blanco and Laura Barrios.	Analysis of current patterns of deforestation in Latin America and the Caribbean

11th International Conference of the European Society for Ecological Economics 2015 Leeds (UK), 30th June- 3rd July 2015. | 03/07/15 | | | | X | | | |

Authors	Publication title or _full reference_	Date published or current status e.g. is it submitted or in press	Publication type						
			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Conference/ Workshop			Others
						Oral	Abstract	Poster	
Varela- Ortega, C., Irene Blanco, Rhys Manners, Paloma Esteve	Identifying options for integrating biodiversity and CC mitigation in Amazonian regions using participatory methods

Final ROBIN Scientific Meeting, Brussels (Belgium), 19th-20th October, 2015. | 20/10/15 | | | | X | | | |
Verboom J. ; B. Kruijt; C. Von Randow; M. Perez Soba; H. Baveco; M. Van Eupen; T. Parr; K. Thonicke; L. Jones; A. Boit; P. Balvanera; E. Leyequien Abarca; C. Huntingford; E. Blyth; I. Cisowska; L. Martorano; M. Toledo; B. Purse; D. Masante,	Exploring causes, risks, and consequences for ecosystem services if tipping points in Latin American forests – the role of biodiversity, Conference "Our Common Future Under Climate Change", Paris, 7-10 July 2015Latin American forests - the role of biodiversity http://www.slideshare.net/CFCC15/paper-50353012	Abstract in abstract book, oral presentation July 2015				X	X		
Verweij, P.,Cormont, A., Kok, K., van Eupen, M., te Roller, J., Pérez-Soba, M., Janssen, S., Staritsky, I	Opening a black box model: increasing the applicability and transparency of the iCLUE land use change model	To be submitted to Environmental Modelling & Software	X						
Zemp D, Schleussner CF, Barbosa HMJ, Hirota M, Sampaio G, Staal A, Wang-Erlandsson L, Rammig A	, Self-amplifying Amazonian forest loss with dry-season intensification, Nature Clim4ate Cha0ne	Submitted 2015	**x**						

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			Peer reviewed paper	Non-peer reviewed paper	Publicity flyer or Brochure	Conference/ Workshop			Others
						Oral	Abstract	Poster	

3.11 Co-operation with other projects/programmes during the reporting period

Please find below some examples of cooperation with other projects/programmes during the reporting period:

Amazalert – joint meeting held in Belem in October 2014 and then ongoing collaboration with work on tipping points in WP 2.3 (Deliverable 2.3.4).
ROBIN organised a joint stand at the EC's "Green Week" event in June 2015. This involved ROBIN N and two other FP7 projects: COBRA and COMET-LA.
ROBIN co-ordinated a side event at the climate change COP21 in Paris in November 2015. This involved collaboration with DG Research –climate and other organisations including the CBD Secretariat, CIFOR, the Tropical Forest Foundation and UN-REDD.