CASCADE PLENARY MEETING, CHANIA, CRETE

May 19th – May 22nd, 2015

Minutes by: Rudi Hessel, Jane Brandt, Florian Schneider, Erik van den Elsen
Draft: June 23rd, Final July 17th, 2015

Present
Matteo Jucker Riva (UNIBE)
Michalis Christoforu (CUT)
Gudrun Schwilch (UNIBE)
Nicky Geeson (MEDES)
Yusuf Yigini (JRC)
Diana Sietz (WU)
Susana Bautista (UALI)
Angeles Garcia Mayor (WU)
Mara Baudena (UU)
Rosanna Salvia (MEDES)
Gianni Quaranta (MEDES)
Lia Hemerik (WU)
Jane Brandt (MEDES)
Lindsay Stringer (UNIVLEEDS)
Cecilia De Ita (UNIVLEEDS)
Max Rietkerk (UU)
Florian Schneider (CNRS)
Rudi Hessel (ALTERRA)
Erik van den Elsen (ALTERRA)
Yannis Daliakopoulos (TUC)
Ioannis Tsanis (TUC)
Aris Koutroulis (TUC)
Ioanna Panagea (TUC)
Luuk Fleskens (WU)
Jacob Keizer (UAVR)
Alejandro Valdecantos (CEAM), from Wednesday
Ramon Vallejo (UB), from Wednesday

Action list

no	what	who	when
1	pF curve estimation from texture data for all sites	Jacob	30 Sept
2	Inform Yusuf when WP3 database is ready	Angie	As soon as ready
3	Discuss database, and propose plan	JRC, Coordinator	30 Sept
4	Complete WP7 table, send to Gudrun	SS	July 31st
5	Put thesis Nina on website	Erik	July 31st
6	Send guidelines for drones to Yannis	Susana	July 1st
7	Send spreadsheet about ecosystem services to all	Ramon	July 1st
8	Complete WP7 input	UALI	July 1st
9	Put Florian in contact with Christiana about NDVI	Michalis	July 1st
10	Add executive summaries to all deliverables	All	From now on
11	Set up advisory board	Coordinator	Oct 31st
12	Submit reply to reviewers on time	Erik	Done
13	Send publications to Erik	All	As soon as ready
14	Organise 2017 meeting in Matera, in spring	Gianni	Spring 2017
15	Organise 2016 meeting at JRC	Yusuf	Spring 2016
16	Integrate assessment of cultural services in WP7 stakeholder meetings	WP5,7	July 31st
17	Update slides and questionnaire	Matteo	July 1st

18	WOCAT completed	SS	31 July
19	Resilience assessment completed	SS	31 Oct
20	Key summaries of deliverables	WPL	July 15th
21	Send readme file about WP2 data dropbox	Yannis	Done
22	Provide deliverable tables to coordinator	WPL	June 5
23	Send link for wiki to communicate about models	Florian	Done

Tuesday May 19th

Welcome (Ioannis)
Welcomes participants to Chania. Popular destination; picturesque. Gives introduction about TUC and Crete.

Introduction (Erik)
Introduces programme & topics of the meeting. Integration is an important topic as now halfway project. New team members present themselves (Cecilia, Diana, Yusuf, Lia).

WP2 (Ioannis)[1]
Gives overview of WP2.

CASCADE frameworks (Yannis)
Resilience: pressure that can be sustained by system without changing state; i.e. from which the system can recover. Explains cusp catastrophe figure.

Questions
Erik: After summer (in March) not recovered. Answer (A): roofed control is upside down, water gets in. Also for flipped roofs no full recovery. Need to relief pressure but also restore resources. Might take more than one season.
Max: which site, what is patch mortality? A: how green the patch under the roof is; i.e. which part is dead, which is green. Surface area.
Lia: why lower line also higher? Wetter? A: climate variability. Variability between plots also much larger.
Mara: Take into account timescales. Difficult to say what cause is. A: in this site looking at annuals.
Susana: Looking for shifts to alternative stable states. Won't be able to see that within CASCADE. Can look at mechanisms, but no experimental evidence of shifts. Even in annuals can have more than yearly effect.
Angie: including grass? A: yes, whole patch
Max: Loss of resources & pressure on X-axes. Are these unrelated? Needs to be to be valid. What pressures considered? A: grazing or fire frequency. There is some relation between pressure and loss of resources. Max: Nice framework, but need mechanistic models and link these to this.

WP3 (Angie)
Plant patch scale. Experiments completed, analysis ongoing. D3.1. due in July 2015. Data being checked to enter in database. Explains setup experiments per site, for fire sites. Varzea short term effects fires, Ayora long term. Short term fire resulted in more organic carbon, but black carbon, which is recalcitrant, not labile. HWC not increased. Labile decreased. Long term (Valencia), 1 fire no effect, 2-3 fires did have effect on labile & on nitrogen.

Erik: which depth? A: top 5 cm. Erik: effect below? A: highly reduced, have data 5-20 cm for Valencia. Erik: does it influence plants, as roots go much deeper? A: difficult to say as plants in different life stages (Valencia). Varzea? Jacob gives info. Angie: herbaceous plants need upper 5 cm, have roots on surface.

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[1] All presentations can be found on the CASCADE website

Jacob: Valencia in different stages of recovery. Are they stable? A: Shrublands 20 y old can be considered stable. 10 y less sure, now at same level as 20 y.

Nicky: looked at soil microbiology? Will affect release organic matter. A: Nitrogen should be influenced. Experiments Jaap Bloem in some sites.

Jacob: influence plants on soil properties. A: Valencia no real patches, but looking at micro-sites. No differences found.

Susana: most activity in upper layers even if roots deeper. Microbial communities resilient (results other projects).

Angie drought stress experiment. Adapted treatment to force response. Experiment considered finished, but roofs are still in place for longest duration exclusion. Databases are being completed and checked. Varzea no effect on plant growth due to very wet year. Valencia did find effect. WP3 data used for parameter estimation models, not so much validation (more from WP5 and independent data).

Erik working on soil moisture with Marius Heinen; is aware of need data in WP3.

Jacob: do not have calibration TDR either. Susana: not possible to use raw data? Erik: variation between sensors is large, too large for dry conditions. That range needs accurate data. Field variability is also large. Susana: 1) analyse dynamics in detailed way, 2) have ideas of trends (broad picture). Can have broad pictures earlier? Erik: sufficient to remove sensor variability. Jacob: dry range relevant for plant, not if below availability for plants (below wilting point). Susana: look at probability to go below wilting point? Interesting. Erik: which moisture content is wilting point? A: this varies, depends on pF curve. Erik: need pF curve data? Need soil samples 10 cm to determine these. Susana: Would be needed. Jacob: use soil texture data to estimate these data. Jacob to do pF curve estimation from texture data for all sites (action 1).

Matteo: interesting results, relation with vegetation. Can get indicators from that? Relevant for deciding on management measures. A: what kind of indicators? Matteo: vegetation health, vegetation indicators that give information on how soil is doing. A: too early to tell, still analysing.

Rudi: status of work for grazing sites? A: working on databases, analysis behind the sites with forest fires, varies per site.

CASCADE data services (Yusuf)
Database now version 2. Previous version is on website. New version starting from scratch. Discusses advantages/disadvantages different sharing options for data. Developed own tool. Different permissions, password protected. Has search facilities. Rudi: per study site or across sites? A: per site, can think about more.

Questions
Matteo: was working on google form for WP7. Can pass from Google drive to database? A: is easy. Save as csv, covert the SQL query. Matteo: keep Google form for data entry? A: possible, but need manual conversion.

Angie: data uploaded from WP3, but not definite. Will inform Yusuf when database is ready (action 2). Main index is study site. Would be better to have WP at highest level. Different WPs have different databases, even if from the same sites. Erik: cannot organise in different way? Choose entrance yourself? Different people different interests. Yannis: is possible.

Erik: WPL meeting Wageningen. Dropbox or database. Need to decide on that and all use it. Max: is essential. But also use other ways to share data, different version. Rudi: after project needed, 2nd version much improved, so use database. Lindsay & Florian: not allowed to use dropbox at institute. Florian: can have only 1 database authority, which is Yusuf. Angie: not sure about updates that might be needed. Susana: dropbox, email useful for sharing info between some partners. WPL to provide final versions for database. Luuk: WP8 need data from all partners, easier to communicate individually. For work in progress email/dropbox easier. Florian: work in progress versus final, can be done in programming, is a tag. Y: is possible. Jacob: always need standardisation of data. Matteo: has multiple choice info, possible? Y: Yes, keep form, provide spreadsheet. Luuk: spatial data included? Y: not sure if needed, can be in Google maps? Need much system resources. Luuk: model output will be spatial data. Jacob: store as pictures? Luuk: possible, but no real database. Susana: Spatial data needed, discussed about this too at WPL meeting. Can JRC provide data too? Rudi: provide shapefile, cut existing maps? E.g. model input. Yusuf: is possible.

Erik: coordinator to discuss with Yusuf, propose plan for database (action 3).

WP4 (Susana)
Measurements not done before, so new. Changed title T4.1 compared to DOW (is suggested by reviewers too). Cover and pattern both have influence in sponge experiment, coarser pattern more runoff. Sponges do not have all effects of vegetation. Pattern investigated for plant communities, no difference fine/coarse found overall. Did find for individual species. Bare soil connectivity important.

Erik: so connectivity depends on species. A: yes, e.g. some plants single stem, some multiple → capacity to capture runoff.

Large plots results 30% plot decreasing vegetation. Had large drought. Compared to patch size. Confirms that degraded plots more affected by the drought. Some indication for tipping point? Cannot reach equilibrium in CASCADE, or prove tipping. Looking for mechanisms and hints. Will continue monitoring after CASCADE. Have aerial images, analysing these. Discuss with Cyprus in order to use same procedure.

T4.3 plots ready, plants to be planted when rain comes. Also new experiment for this task

WP6 presentation (Florian Schneider)
Purpose finding mechanism: why and how do these sifts occur? Are there indicators that announce these shifts?

Improve models, find degradational trends, validation of models. Make code available and create an indicator toolbox.

Progress on model realism realization (including pressures, feedback mechanisms, adding species of vegetation.) Work done by various people (see slide).

Florian gives an overview of what they have done in the period (see slide: 'What we have done" Herbivory model, fire model. Etc.). Florian gives an overview of the inventory of models done during the Montpellier meeting.

The tasks remaining are multi-species model, test the indicators on data. Also they want to improve the link model <> data.

What has been happening in Montpellier? Grazing modeling. Characteristics of current models are named (slide); homogeneous in space. They made a heterogeneous model (Spatially Explicit Grazing), Florian explains and shows. 2nd model represents Livestock resilience. Different points of equilibrium depends on the shape of the plant shape and size in the fields. PhD student Alain Danet is starting doing research on nursing. In progress is a.o. spatial livestock resilience modeling.

Mara Baudena:
UU1 research is interaction along drought and grazing stress gradients
UU2 = Fire and succession in Mediterranean forests.

UU1 plant interactions and ecosystem stability along water and grazing stress gradients. Can these kind of stresses lead to catastrophic shifts? (Mart Verwijmeren – see presentation).

UU2 Fire and succession in Mediterranean forests (Mara and Ana Vasquez). Question: can fire modify the ecological succession and induce a new state with different species composition?

Spain: (see slide), Portugal (Ana): see slide. Conclusion of both Mara and **and** Ana is that in the end the oak forest comes back to the natural environment in Europe.

Questions
Matteo: Is there a possibility to include climatic variability? Mara: currently not done this, but this is one of the ideas to do that.
Matteo: to identify land management is investigated 3rd mechanism: recolonization from unburnt patches. Would it be possible to incorporate this into Mara's model? Mara answers that we see that this mechanism is happening. We can incorporate this in models. Calibration of the models is going well.
Luuk: two modeling approaches, validation will happening to patches? Florian: yes, we will do that by using Drone images. Starting with Cyprus, but we are not getting images.
WP6 in WP8 models, then we need ideas about connectivity. Florian: models used are difficult to be linked. Marts model is using biomass. So that can be used in WP8. We need to talk about links between models (WP6 <> WP8).

Ioannis: measuring plant growth using Drones. Do you plan to use stereographic pictures? Florian: currently we are using 2D models. We need to discuss that (says Ioannis). Florian finds this important since plant volume plays a role in this.

WP7 Gudrun.
Evaluation of land management. Objectives: 1) identify and evaluate management practices and 2) To develop management strategies.

Progress task 1: prepared D7.1 with 20 technologies and 3 approaches. Review of data done by Matteo and HP and Gudrun. Assessment of existing measures.

Gudrun shows a screendump of the wocat website with CASCADE results. SLM technologies in WOCAT is shown (table, see slide). Gudrun asks to complete this table to partners (action 4). Gudrun shows examples of measures in Portugal, Spain, and Crete. Gudrun shows an overview of categories of measures (pie chart see slides). Prevention, mitigation, restoration measures.

Task 2 progress:
Resilience and assessment tool
Conducted by Matteo. Field visits in Cyrpus, before that in Crete, Spain etc. Tool is available and will be shown, tested on the excursion day tomorrow. It is a questionnaire.
Master Thesis in Spain too, looking at the trajectories of landuse change, try to understand the history of land by Camille Fluckiger (see slide) completing this month.

Matteo has been working on review paper about impacts of land management (slide).

Task3 will lead to Deliverable 7.3. Example is the DESIRE book. Do we do that now as well or not? Still looking into this. Gudrun gives some examples of possible contents of this work, e.g. Some basic principles of SLM regarding regime shifts, Overgrazing (slide), Fire (slide), Abandonment (slide). In this direction the proposed measures will go.
Format for this work: 1 thick book or 3 smaller booklets (series) focusing on 3 pressures mentioned above. 4 page summaries of SLM technologies or simpler? Translation into different project languages?

Next 12 months:
- task 2 resilience assessment (see slide)
- improve incomplete SLM tech
- draft guidelines by nov 2015
- (slide)

WP collaborations:
- how to link P5 data into WP7 resilience assessment
- (slide)

Problems:
- delay in certain study sites (slide)
- communication with CS sites.

Questions
Lindsay: thesis of Nina? A: On the website (action 5)
Diana: Would it be useful to have a basic set of principles in requirements (eg water when trees are planted) Gudrun: yes, these basic requirements are incorporated in the technologies.
Diana: Is this also quantified: Gudrun: yes, also.

JJ: are best practices based on restoration or prevention? Gudrun: both.

WP8 (Cecilia) socio-economic modeling
Scenario analysis and upscaling of measures.
Luuk: D8.1 has been delivered. Diana will work on 8.2 and 8.3. On Thursday we will go more into details on these D's. D8.4: what kind of scenarios are we developing?

Cecilia: stakeholder perceptions… (slide)
Complex environmental problems need knowledge from stakeholders. (slide1)
2-step methodology (1, 2) slide two sets of questions in both methods asked. A) and b) slide.
Changes perceived by stakeholders. 5 changes were prominent (slide) purple table. Answers of stakeholders were location and age dependent.
Adaptation strategies grouped into 4 diff categories (1) to 4)).

Discussion: policy recommendations can be derived from the slide. Further research is needed on how to implement measures, etc. (Slide)
Conclusions: see slide.

Diana presents conceptual ideas for SE modeling (T8.2 and T8.3). Taking advantage of ecosystem models using the model (stability) based on the S-plane.

SLM effects on stability. (slide). Different type of measures are possible (management, vegetative, agronomic, structural)

SLM timing: prevent catastrophic shifts we are interested in the green area between T1 and T2. Further mechanisms are explained: on T2 there is a 100% probability that this shift will happen from T2 to a lower' state. Above T1, a shift is almost impossible. What happens in between T1 and T2? Non-linear behaviour. possible states are drawn under the S-figure.

SLM timing: foster restoration shifts: same figure is drawn for restoration. Probabilities for (positive) shifts are drawn: 0% probability (slide).

Costs and benefits-I. Examples are given for strength of measures (costs). Better measures bring restoration to a higher level. How can deterioration again be avoided? 'Avoided damage x probability' and 'Potential damage x probability'. Costs and investments depend on site specific factors.

Costs and benefits-II. Can the system be stabilized after being damaged and when the system 'hangs' at a higher level? How does the system continue from that stable state? Some kind of hysteresis loop following a different path? (Slide).

Costs and benefits-III. Another example of recovery from a very low stable state. Rmin. Certain minimal state of resource would be necessary to start restoration. (hierarchical confinement).

Translation into monetary values is a challenge.

WP9 presentation: Nicky
Intro. Halfway through the project. Graph of typical activity within a project (slide). Different formats to use are shown. Who and where are the policy makers who can use our results? Discussions with WP7 and 8 are held about policy.

Best practice about branding, standard disclaimer box should be used, name of photographer should be mentioned when pictures are used.
A number of posters have been made about Chania (Crete) and Paphos (Cyprus). Together with WP5 people, a booklet about overgrazing was made. Every now and then Twitter is

being used. This is best used towards the end of the project, when final results are becoming available.

Jane: animation of the concept about 'tipping points'. Jane reports about her visiting Berlin GSW.

CASCADiS has been restructured into 6 different sections. 4 themes are being used. The different deliverables are grouped under the final 4 themes. Availability of the deliverables will increase towards the end of the project. Deliverables are being reformatted for making readable on the website. Processing the different deliverables is going to be quite a task towards the end of the project. Del.'s available now are quite accessible. In order to speed up processing del's for the website authors might indicate what portions of the dels are most suitable for dissemination through the website.

Matteo and Gudrun: resilience assessment (introduction of the WP7 tool).
Method for resilience assessment, T7.2. T7.3 (guidelines for land management).What are we looking at? Introduction to 7.1, 7.2 and 7.3 is given by Matteo as introduction to the excursion on Wednesday.

Wednesday May 20th

We visited the Messara study site.

The morning stop was in a valley in which reforestation had been done some 20 years ago. In the same valley, there is also a grassland that is being grazed. Both the afforestation and the grassland were described using the questionnaire developed by WP7. To do this, the group was split in two parts, each describing one of the systems. Several stakeholders also attended this part of the excursion, and provided information that was relevant to fill the questionnaire. WP7 collected the questionnaires for two purposes, namely 1) as information about these 2 systems, and 2) as a final check of the questionnaire, before using it together with stakeholders in all study sites.

In the afternoon, several of the experimental sites of CASCADE were visited, including the site where rainfall exclusion experiments are ongoing. Experiments and results were presented and discussed.

The pictures below give an impression of the field trip.

Morning stop: valley with reforestation and grazing systems (picture R.Hessel)	Rainfall exclusion roofs with temperature sensor (picture R.Hessel)
Discussion of rainfall exclusion experiments (picture R.Hessel)	Grazing in degraded area; note exposure of rocks in the foreground (picture R.Hessel)

Thursday morning

WP 5 presentation – Ramón Vallejo
Questions

Erik	You said you will need aerial pictures from Crete and Cyprus. Are these necessary for both D5.1 and 5.2?
Alejandro	We will need the images for Messara.
Yannis	We have just purchased a drone to do that. Can you give us some for the resolution of the images?
Susana	We can send you some guidelines (action 6). For now you can do a single flight at 10-12 m with overlapping images. However we are also interested in the microtopography and for that you will need to fly lower, at 5 m.
Luuk	The link you have shown between the state and the ecosystem services is interesting. It would be useful to see the spreadsheet you used to do that.
Alejandro	It is just a spreadsheet for working with the data, for converting the field data.
Luuk	Yes, I am interested in it.
Gudrun	I would like to see this too.

Ramón	Certainly we can do that (action 7).

Study site presentation Várzea, Portugal – Jan Jacob
Questions

Matteo	Thinking about the resilience assessment tool, logging is an interesting practice to analyse. Do you have examples of the use of logging in your area?
Jan Jacob	I don't think we can do that properly without a post document. There is some traditional logging and also conservation logging. Conservation logging is done after a fire on state land and is contracted to private.
Matteo	Could we also find logging practices that are used for prevention or conservation?
Jan Jacob	There are examples where it is done to control fire.
Matteo	But, prescribed fire is the most useful, accepted system in the area?
Jan Jacob	Yes, in our case it is legal and there are accredited people doing it.
Diana	Fire management is a good example of a practice to look at for scale impacts. What do you know about using strip networks to control fire in your area?
Jan Jacob	There is a firebreak system in this area, but the opinion seems to be that it is not very well managed.
Ramón	Because of the stochastic nature of the fires, you can't prove the effectiveness of firebreaks in the field, you have to do it by modelling.
Jan Jacob	It is not clear if it is efficient or not.

Study site presentation Albatera, Spain (Susana)
Questions

Gudrun	Can you complete the WP 7 input by July?
Susana	Yes (action 8)

Study site presentation Ayora, Spain (Alejandro)
Questions

Erik	What is an inter-journal special issue?
Alejandro	It is where you can submit an idea for a special issue containing articles that are of interest to several journals but all from the same publisher. I'm not yet sure how it works, but they are there. It is shared open access to the special issue from each of the journals
Yannis	I notice that you showed analysis of the first treatment, what about the rest?
Angie	The experiment for CASCADE is officially finished, but depending on the level of interest and efforts of the farmers, it can continue.
Alejandro	We will continue to the recovery of all four treatments.
Rudi	Have you been able to kill any plants with the roof treatments?
Angie	The most significant results have been in Ayora, but I still don't have most of the data, so I can't tell.
Rudi	Did we do the wrong experiment?
Angie	It means that these plants are very resilient to drought. We reduced water availability, but they are still gathering water, through their extensive roots.
Susana	In Alicante we have had the driest year ever, so the exclusion experiments have had little effect.
Jan Jacob	We managed to kill 3 plants, but they were in the control plot!

Susana	We are committed to monitoring recovery once the treatments are finished. It would be a pity not to do this.
Yannis	I don't have a problem with continuing the experiment but, as it is not my field, I don't have any use for the data. If you can use the results, we will keep going, but it would be useful to have a time frame.
Susana	We can keep talking about this, rather than giving an answer now.
Rudi	The second exclusion treatment is still running in all sties?
Susana	Yes, if you want to stop doing it, let us know
Alejandro	We will stop in August.
Susana	We can continue this discussion in the WP3 meeting this afternoon.

Study site presentation Castelsaraceno, Italy (Gianni)
Questions

| Matteo | Could we evaluate the change of objectives by different generations more? |
| Gianni | Yes, of course |

Study site presentation Messara, Greece (Ioanna)
Questions

Matteo	Following the idea of relating WP5 to 7 as much as possible, are there management practices we could assess?
Yannis	Most of the places are not managed in any way, this is the problem. If they are fenced, it's not certain why they are, or how long they will stay fenced.
Gudrun	This kind of rotational grazing may be considered a management practice.
Matteo	We could maybe consider who the grazers are and how they move around.

Study site presentation Randi Forest, Cyprus (Michalis)
Questions

| Florian | I was interested in the aerial images for WP6. I wasn't aware that you collected NDVI data at patch scale. |
| Michalis | I will put you in touch with Christiana who can explain this (action 9). |

Project Management (Erik)

1. Periodic review results
| Erik | Reply to reviewers is necessary by 5 June. |

a) Concepts of catastrophic shifts.
Susana	WP6 is the only one in which catastrophic shifts can be generated. In WP7 and 8 we are looking at how shifts can be managed once they have occurred.
Max	We also made a glossary with this terminology.
Luuk	It is strange for the reviewers to comment on the WPs because they are fixed and we can't change them. We can always add comment on catastrophic shifts.

b) Relevance of soil aspects and land use.
Erik	Do we agree with the reviewer's point here?
Yannis	The drivers in the study sites are not land use change.
Rudi	We are looking at certain ecosystems, as we said in the DOW.
Matteo	Land use change always comes up as a driver for fire, shrub encroachment and land abandonment.

Florian	Land use change is not an independent driver. It is an important aspect of the two drivers we are considering. Maybe we need to change our presentation, rather than what we are doing.
Gudrun	I think it will come in the WP7 reports.
Ramon	We have a lot of data on soils. Maybe we need to explain it a bit more in the reports. They want a characterisation of the soils. We have this information and can include it in the deliverables.
Erik	WP3 has not provided any deliverable yet. Perhaps, although we have presented a lot of soil parameter information, the link to the degradation has not been stressed yet.
Susana	This reflects the expertise of one of the reviewers. We aren't investigating every possible driver for tipping points. Our questions are how human activity could trigger a tipping point. All of this can be modulated for climate or soil differences, but we aren't investigating this specifically. We can provide the soil descriptions and say that we are taking this into account, along with climate.
Luuk	In WP8 we do take the initial soil state.
Erik	OK, but let's bear in mind that we could highlight this in future deliverables.

c) Deliverables 4.1, 7.1 and 8.2

Erik	My suggestion is that we adjust the discussion of the results in D4.1, taking the comments into account.
Susana	I can do this.
Gudrun	I want to highlight that the content of Deliverable 7.1 is not the report, but the WOCAT database.
Erik	I suggest we add a gender paragraph in D8.1
Lindsay	OK.

d) Executive summaries

Erik	I suggest we add an executive summary to all deliverables, not only for the benefit of the reviewers but also because they can be used in CASCADiS (action 11).
Jane	I suggest a maximum length of 1 page for these summaries.

e) Detailed discussion on Deliverables 2.1 and 2.2

Erik	The project officer said that since these deliverables have been accepted then we don't need to make any further changes unless we want to.

f) Networking with other soil projects

Erik	Let us know when you are exchanging or using data from other projects.
Gudrun	We can make links to DESIRE and RECARE.
Angie	This information has been provided in the periodic report, but we can highlight it.

g) Reference to the activity of the Project Advisory Board

Erik	We don't actually have an active advisory board, but will set one up now (action 11).

h) Financial report

Erik	We have addressed the financial issues.

Coordination of responses
Erik   Susana, can you have the revised version of D4.1 by the end of May? The
            reply to the review and revisions to the deliverables have to be given at the
            same time. Lindsay, can you do that too?
            Do you trust us to answer the other questions, or would you like us to
            consult further?
Ramón   We can provide you with some additional input.

Erik will submit reply on time (action 12).

2, 3, 4, 5
No questions

6. Scientific papers
Alejandro   Remember to consider the option of inter-journal special issues.
Erik   Please also send me your recent publications (action 13).

7. Next meetings
Erik   We would like to combine one of the plenary meetings with the policy
            meeting Gianni is proposing to hold in Italy.
Lindsay   We may not have enough results from WP8 in 2016 and we would prefer to
            have only one meeting with the policy makers, so I would prefer to that this
            meeting in 2017.
Gianni   We will hold the meeting in Matera, which is the cultural capital for 2019.
            Our meeting will be included in some of the events. However, 2016 or 2017
            is the same for us.
Luuk   If we hold it in spring, there will still be time to take account of the
            discussions with the policy makers.
Rudi   Agrees with 2017 meeting in Matera, as WP8 is the WP most involved with
            policy makers, and WP8 has preference for 2017. This is decided (action 14)
Yusuf   I suggest we hold the 2016 plenary meeting in JRC. This is decided (action
            15)

Thursday Afternoon

WP3 publication session
Discuss publication strategy. Discuss who is working on what, or intending to work.
Possibilities for continuation experiments. 2 papers about several sites planned; 1 on stress-
gradient, 1 on drought-stress experiments. Makes list of planned papers from individual sites.
Following sites plan papers: Varzea, Valencia, Santomera, Crete. Italy does not plan paper
WP3 but is willing to take part in comparative paper. Cyprus wants to analyse data first and
look at possibilities publication afterwards. Would like to combine the 2 experiments (stress-
gradient and drought stress). Planning: draft deliverable early July, submit middle July. At
that moment discuss 2nd across-site paper.

Susana: make extra experiment after flipping second roof experiment? Need to look at data
for flipping 1st roof experiments to see if this would be interesting.

Angie/Susana: Soil moisture data needed for interpreting other results. Also large dataset, so worth publishing for sites too.

Erik plans paper on method for calibration, but does not use site data for that. Does not plan paper about study sites; lack of time. Not expert on plants. Will think about it.

WP5 ESS assessment, but not all kinds. Plans to do also assessment of cultural services, needed for WP7 too. WP7 agrees (action 16). Wants to include 3 indicators: aesthetic value, cultural value, recreational value. First 2 most important.

Plan to take pictures of different types of afforestation. Pictures comparable slope, area, amount of sky, quality of picture. Do not use term 'degraded' in order not to influence stakeholders. Ask individual stakeholders for each indicator to order the pictures. Blank cards too, to separate value for pictures, each card value 1. Do for aesthetic, cultural, (recreational). Do at same time as WP7 questionnaire. Yannis: how many? Susana: does not matter, but preferably more than 10. Gianni: use willingness to pay? How much willing to pay for 1 ha of such land? Economists estimate value in this way. Susana: Willingness to pay combines the different indicators, prefers to separate.

Also do not have provisioning services, which are site-dependent.

Matteo (Feedback about questionnaire)

Matteo reports some of the feedback for the questionaire:
- Clarity on what to analyse, when and how
- Definitions of properties efficiency
- Interactions between technologies would be interesting: facilitating or counteracting technologies

Matteo clarifies that it was only part of final questionnaire which has about twice the volume.
Susanna worried that this is too long
Mara suggests some parts might be merged, e.g. vegetation types and biodiversity.
Matteo points out that questionnaire is to be assessed by an expert, with the exception of point 2.2 which is to be assessed by stakeholders.
Susanna would separate that clearly, to distinguish stakeholder and expert role while answering
Matteo final layout will be clearer and descriptions will be shorter and clarified. Stakeholder questionnaire will be separated from the expert assessment.
Jane asks about details on how the questionnaire will be answered
Gudrun clarifies that the tool will be a online assessment that automatedly produces graphs
Matteo distinguishes three sections of the questionnaire: state and vulnerability of the system, e.g. management covers Ecosystem services; how efficient is management in preventing, restoring mitigating shocks; How resilient is management, amount of maintainence?

Application on questionaire

In each study site there should be at least 2 land management systems assessed: 10-15 perception questionnaires (section 2.2) from different stakeholder categories. Assessed systems should be relevant for the area, and potentially provide solutions for the prevention of

degradation or might be at risk of degradation. The technologies that might be relevant should be assessed, ideally in combination with the assessment of WP5.

Matteo presents which systems he imagines for assessment on each of the study sites:

Portugal (Varzea)
1. Agroforestry system with control of vegetation through fire;
2. Public forest with (conservation) logging

Jan-Jakob asks why only conservation logging? Probably commercial logging should be included. Should it be the same 15 stakeholders for the two systems? If it can be different people, the assessment is feasible.

Albatera, Spain
Susana says that for pine afforestation there are two management actions with different implementation. Systems differ in technologies, rather than land management system. Do you prefer to go more in detail and compare the similar systems? Conclude: We are going to assess all three land management systems.
1. Restored shrublands
2. Pine afforestation (management 1)
3. Pine afforestation (management 2)

Ayora, Spain
1. Pine afforestation under selective clearing and fuelbreaks
2. Afforestation with resprouter species

Matteo asks if there is a sufficient number of stakeholders.
Alejandro confirms that there are about 12 people involved so far.
Matteo asks about another system where the forestry service was planting resprouters. Could it be a management system for assessment?
Alejandro objects that there are not much contacts to stakeholders, thus not feasible.

Castelsaraceno, Italy
1. Grazing system near forest (ctting of ferns, fencing, ploughing and seeding)
2. Managed forest (firebreaks, selective cutting)

A third system will also be assessed.

Messara, Crete
1. Grazing system with managed grazing and fodder production (rotational grazing, fodder production)
2. Restore pasture with carrob trees (carrob planting)

Matteo points out that for 1, technologies are not yet described therefore site would be interesting for both, adding the technologies to WOCAT and the management assessment. But the system does not add to WP5. For 2 there are no stakeholders except the owner. The monastery is another potential stakeholder.
Yannis confirms.

Randi forrest, Cyprus
1. Grazing system with fodder provision (fodder provision, carrob protection)
2. To be determined

Matteo says that stakeholder scope needs to be enlarged, e.g. by including administration, forestry department, and fire protection. In same area as WP5 assessment. *Michalis* suggests wildlife management department as another stakeholder. For now, no other system is

available for assessment. Matteo thanks for the feedback and the questionnaire. promises to update slides and questionnaire (action 17)

Deadlines:

- for descriptions of WOCAT methods: **July 2015 (Action 18)**
- complete resilience assessment: due **October 2015 (Action 19)**

Questionaire that is included in WP5 will be merged into WP7 assessment, to optimize interaction with stakeholders (action 16).

Modelling session
Erik brief introduction. Should start focussing on output project, including exchange of data between different groups modelling. Biophysical and Socioeconomic modellers will give brief intro.

Max
Lot of modelling done in WP6, also challenge to integrate that. Also with socio-eco model after that. Summarises WP6 models based on results of modelling meeting in Montpellier. 2 main types of models used:
- CA (rules).
- More physically based (differential equations)

Both types address similar questions, but dealt with in different way. Interesting to compare. Discusses data needs models & model output.
How to integrate (part of) WP6 models with socio-economic models?

Erik: important to look for connections after next presentation.
Luuk: Missing link. What questions should we answer in model? Max: combination biophysical and socio-economic is of interest to everyone. Details perhaps not. Erik: look at objectives, deliverables. Get overview of models. Luuk: discussion on how to convert the concepts into numbers we can model. Lia: need to know which questions should be answered. Florian: output data is relevant, hook in different kinds of models into Cascade. Should fit together. Match output bio-physical with input socio-economic. Should also connect experiments. Erik: today modelling, tomorrow broader. Luuk: start from scenario side, look at data tomorrow. Mara: select type of model based on aim. Diana: range of models, difficult to decide which to use. Rudi: start with scenarios, determine which method needed for that, which input. Biophysical modellers to look at options for providing that input. Erik: or measures? Florian: need problem oriented approach. Future arrays of possibilities, from which to make a selection. Have to find specific questions to start with. Lindsay: start with deliverables. Have different conceptions of models. Output should become input of bio-physical. Is more a data-flow than a model integration.

Luuk
Will build on technologies WP7, should be included in scenarios. Kinds of scenarios, which drivers? What timescales? For whom (policy makers)? Data to support scenario analysis? Identified some drivers relevant for multiple sites, e.g. abandonment, erosion, vegetation reduction, droughts.
Start with current state, look at management options, land use change processes, policy options. Climate change relevant? Might depend on timescale, e.g. if 10-15 y not so large effect?

Lindsay: needs to be manageable? Cannot include everything, need to select. Only use output, do not close loop (effect of scenarios on bio-physical issues). Luuk: there is not one single question in each site, multiple things. Models will look at part of the problem. Models also do not provide whole story. Diana: ask sites to tell us what the most important problems are? But want to compare across sites as well. When is management option feasible. Erik: Do generic answers exist? Lindsay: different scales and levels. Per site specific solution, but for policy makers need bigger picture. Erik: very generic needed? Diana: not that generic needed? Can have comparative analysis. Luuk: interesting scenario what will happen if we do not do anything. Matteo: think of drivers; these can be general. E.g. fires occurs in all sites except Italy. Grazing for several sites. Abandonment also general. Can model ways to increase productivity, sustainable productivity etc. Rosanna: drivers are socio-economic? Luuk: yes, e.g. pastoralism becoming less and less interesting. Need to keep things simple. Tsanis: literature data relevant for sites, e.g. correlation with NDVI. Luuk: not sure about climate, but gradient climate for different sites.

Matteo: look at timeframe, e.g. farmer will not change, but his son will.

Erik: don't get further now, think about. Lindsay: agrees, no clear ideas yet from WP8.

Friday morning

Dean of TUC
Welcomes to Crete. Real problems in Crete, glad that Cascade is there. Challenge to work together with shepherds. Overgrazing and fires both problem, so far not much success to combat these. Glad Cascade addresses these tough questions.

Project integration (Rudi)
Questions

Ramon	WP leaders could quite soon provide the key summaries of what we are know we are producing, this would facilitate the process of integration. This is agreed (action 20)
Luuk	The themes shown are meant to enhance the understanding of non-specialists, but if we want to show that we want to make scientific advancement we may need to rephrase them.
Mara	The headings are not showing what is new. Where do we have to show this integration? Is it in a separate deliverable, or should it come from each of the deliverables?
Rudi	Statements of integration are not necessarily included in each deliverable. We will also provide an executive summary.
Lindsay	We need to make a distinction between dataflows and integrative outputs, they are different things. In using the data from different WPs we are integrating, but it is not obviously visible as such.
Rudi	Yes, that's true, but we probably also need to do some further integration of the results.
Jane	CASCADiS itself is a deliverable and it will be the one which addresses the integration of all WPs.

Deliverables (Erik)

Questions

Matteo	Maybe what would help us is a description of the output data from each WP, in the metadata in the database.
Erik	But would you make the content of your deliverable dependent on what is available? I would think your deliverable should be driven by what data you need.
Matteo	I do both. If I have data that is relevant for land management practice, I will integrate it, if not I will have to get it from somewhere.
Angie	I think we already did this exercise after the WP meeting, the list of variables that will be available.
Yannis	The WP 2 data is in the drop box.
Angie	We know what data has been gathered in the field, I think this list is already somewhere.
Rudi	It would be useful for the WP leaders to add another column to the table summarising the deliverable as Ramón suggested (action 20). This would help people to find the most likely source of information. We need to specify what we need for each deliverable, but also what we can provide for others
Angie	WP 6 did this in Montpellier, there is a list of variables that the models can provide. The same is true of the biophysical data. This is what Matteo needs.
Yusuf	It was not always clear what the variables are.
Angie	If you have some doubts about the list of variables, contact me.
Jan Jacob	The WP leaders have this knowledge and can provide it to the case study leaders. It may be that the data needed can't be provided.
Angie	I understand it would be useful for Matteo to have the list of variables, but the information is there, because we did it at the WP leaders meeting.
Jan Jacob	The idea is to get the links between WPs some are already ongoing. Maybe the question now is how we are going to link with WP8.
Mara	It may be easier to describe what is the output rather than the input.
Rudi	I suggest we have small groups for each WP.
Nicky	WP 9 also needs to have an overview of what information is available.
Yannis	We already have a read.me file describing what is available.
Angie	We need to communicate with each other about what has been done. Some WP leaders were complaining they didn't know what was being gathered in each WP this summary information needs to be.
Yannis	I can send read.me files to the WP leaders (action 21)
Luuk	Thinking about WP8, I can see that data from WP2 and 7 and 6 are necessary. We have a problem with scale from the field data. There is not clear link with using it as input data.
Jan Jacob	We don't need to integrate everything and anything.
Erik	The deliverable should be the starting point of your discussion. If the data from WP3 is not at the right scale, then you will have to need to decide if you can use it or not.
Jan Jacob	Maybe we should concentrate on the deliverables that require more integration than others.
Erik	We could start with each deliverable, look at if info is required from others.
Mara	I got a lot of data from the site partners, that was used from before, that might be considered from WP5 but it is their data, not mine.

Erik	That kind of data does not have to be listed.

Meeting divided into groups to discuss. After that Gudrun presented the completed table with required external data for D7.2. We are uncertain about what information about resilience of SLM practices will come from the modelling.

(The following discussion concerns the type of qualitative and quantitative data can be supplied by the models.)

Angie	This can possibly be inferred from experimental results.
Florian	If it is a precise question for the models, the input parameters need to be specified.
Matteo	The link between grazing and aridity would be interesting to understand.
Mara	The types of model we use are not meant to be tailored to answer a specific question. They may be qualitatively predictive but not quantitative.
Florian	We can develop the model to answer this question, but it is not in the tasks that we are doing in WP 6.
Angie	Would this information be more useful than that you can get from the field experiments?
Luuk	For WP8 we can take a generic grazing strategy as a concept. I don't think we are concerned about how precise the outcome is, but if we use a different model for different sites, how transportable it is to a different site?
Mara	I would be more comfortable in saying that the model is most valid for the place it is developed.
Angie	It depends on the systems and how similar they are. There are differences in the grazing systems in Crete and Cyprus, but maybe the fire sites are more generic.
Ioannis	We don't have the parameters of the models, the dependent and independent variables, the sinks and sources.
Florian	The models work over a gradient of livestock pressure, the output is the s shaped curve, giving information about thresholds between vegetated and non-vegetated states.
Jan Jacob	I get the impression that we should not expect from WP 6 to give any clear prediction about how management should influence regime shifts.
Florian	They can, but not in these quantitative terms. We can provide recommendations for indicators to use to determine the state of the system. This is one of the qualitative outputs we can provide.
Rudi	This is part of WP 8
Luuk	But grazing models in WP6 have grazing pressure as an input.
Rudi	It is not as if we need quantitative input in all cases.
Florian	This information about what is needed is very useful for WP6.
Angie	The early warning indicators and indicators of thresholds are the most useful information that the models can provide. This is useful for management.
Mara	Don't forget that the ecological models are not the same as forecast models. We are already at the cutting edge of what can be done.
Jan Jacob	You can say that management needs to maintain a cover above a certain threshold, that this can be the starting point for a strategy.
Gudrun	This is useful information for us.
Angie	To find thresholds for grazing intensity, the experiments will provide more information than the models.
Ioannis	I would like to know what the time and spatial steps are in the models.

Rudi	We have different kinds of models. The cellular automata models work on probabilities rather than physical processes.
Mara	A lot of the models are developed for understanding. There are a lot of steps between that and giving management strategies.
Jan Jacob	Could you define what kinds of management strategies you could provide information on?
Florian	We focus on this qualitative information, many of them are linked together, but it is difficult to identify the links.
Gudrun	What is most valuable information for is us that connectivity is more important than cover. This is information I can translate into management.
Diana	To get from the models the semi-quantitative information, we have to translate it into the real world, with approximate (for example) sheep numbers. It will need to be an iterative approach. I think this is a really useful exercise.
Rudi	We would like you to provide this table for each deliverable within 2 weeks (action 22). We will make a first draft of it and it can be updated later. Any other business?
Ioannis	I would request the modelling community to provide at least descriptions about the models.
Florian	We have a wiki that we are using to communicate about models, I can send the link around (action 23).
Jane	Request that a short summary of the deliverable is also provided with the tables (action 20).
Erik	Yes, we will add that.

Closure

Rudi and Erik thank TUC again for hosting and organising the meeting, after which the meeting is closed.