NEWSLETTER

Vol. 1 - April 2015

News - Forthcoming

- **Annual Conference of the Society for Tropical Ecology**
  April 07. - 10, 2015, Zurich, Switzerland
  Oral presentation by SP6: "How to benefit from being eaten? Elephant seed dispersal experiments with *Dillenia indica* in Southeast Asia" (Session 15: Seed dispersal - new approaches and findings"

Conference contributions and meetings

- **Kick-off Workshop GLUES- WOCAT book and videos** (click title for information on WOCAT methods)
  January 26. - 29., 2015, Leipzig, Germany

- **Sustainable Natural Rubber Initiative (SNR-i) Workshop**
  February 12., 2015, Brussels, Belgium
  Dr. Marc Cotter together with representatives of the rubber processing industry participated at the workshop of the SNR-i. The SNR initiative was developed under the framework of the International Rubber Study Group (IRSG), an inter-governmental organization composed of rubber producing and consuming stakeholder, as a voluntary and collaborative industry initiative. The purpose of of the initiative is to ensure the sustainability of the natural rubber value chain and to promote the growth and the use of sustainable natural rubber.

SURUMER publications

Ahlheim, M., Börger, T., Frör, O. (2015) Replacing rubber plantations by rain forest in Southwest China- Who would gain and how much? Environmental Monitoring and Assessment, January 2015, 187:3

Scientific Topics

Rapid Appraisal of Agricultural Innovation Systems (RAAIS) workshop

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Rapid Appraisal of Agricultural Innovation Systems (RAAIS) workshop, Xishuangbanna, China

A research for development platform was established in Xishuangbanna on 24th September 2014. Platform members discussed the major rural development problems in the region, and identified that the top priority was 'changing the structure of agricultural production'. This includes a wide spectrum of issues, such as changing the crops which are grown, the management techniques, improving processing and marketing opportunities for other agricultural products. Rubber is the most dominant crop in Xishuangbanna, and receives the most attention from local research institutes, government offices and farmers.

Rapid Appraisal of Agricultural Innovation Systems (RAAIS) is a diagnostic tool that can guide the analysis of complex agricultural problems and innovation capacity in the agricultural system. RAAIS focuses on the integrated analysis of different problem dimensions (biophysical, technological socio-cultural, economic, institutional and political), interactions across different levels (national, regional, local), and the needs and interests of different stakeholder groups (farmers, government, researchers, etc.).

Rubber plantations have earned a lot of money but have also caused serious environmental problems. There are many options to diversify rubber farming, which could lead to healthier environments and more stable incomes. For the RAAIS workshop the organizers decided therefore to focus the entry theme to deal with rubber diversification. This workshop leading to a good attempt for "Lessons learned from farmers". For more detailed information, could refer to Schut et al., 2014. *(SP1, Yang)*

Pic. 1 - Group picture of workshop participants

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Bee monitoring in NRWNNR

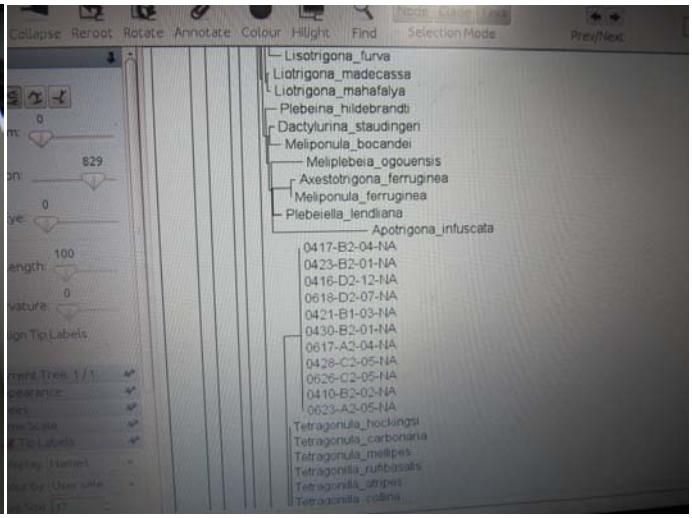
After field work between April and August 2014 conducted by Xiuwei Liu, work is progressing in the lab of IOZ in Beijing. The bees collected from different sites and land use types were collected from malaise trap bottles (Pic. 2). After initial morphological sorting, bees were selected for DNA sequencing. Following sequencing, bees were taken out from alcohol (Pic. 3) and mounted onto boards (Pic. 4). These dried bees were handed to the taxonomic experts Zeqing Niu and Feng Yuan for morphological taxonomy. In parallel, computer analysis is conducted using the DNA sequences by Douglas Chesters. These analyses include phylogenetics and DNA taxonomy (Pic. 5).

The results from morphology and DNA taxonomy were compared, since elsewhere this has been shown to reveal hidden species. In our case we found one case of a morphospecies (*Bombus breviceps*) split into multiple MOTU (molecular operational taxonomic units, a proxy for species, based on clustered DNA sequences). This genetic information usually helps to refine the taxonomic work, although we still have disagreement between two taxonomic experts after further study of these specimens. Still, we are developing protocols to monitor bees in a rapid, objective and standardized means of describing insect diversity in monitoring and ecology study. *(SP4, Liu)*

Pic. 2 - Malaise bottles

Pic. 3 - Specimen in alcohol

Pic. 4 - Phylogenetic analysis



Pic. 5 – Bee specimen, *Bombus breviceps*

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Demo- sites – first assessment of planting success

In February 2015, SP5 conducted the first evaluation of the demo-site plantings conducted 6 months ago during the previous rainy season. The first year after planting is usually very critical since the trees have to adapt to the new site and are therefore very sensitive. The evaluation took place in the second half of the dry season and gives a first impression on the preliminary success of the planting. The following three tables present baseline data for the planted trees at Naban, AmaXinZhai and BanQianDi. Data for the covering rubber trees will be presented later.

Table 1: Naban (consisting of 3 sub-sites)

	No. of trees	Survival rates %	Average height m	Range of height m
Dipterocarpus sp.	5	80.0	0.50	0.35-0.77
N. yunnanensis	12	100.0	1.23	0.7-1.66
P. sinensis	75	94.7	0.68	0.30-1.09
T. yunnanensis	235	97.9	0.63	0.20-1.27

Table 2: AmanXinZhai

	No. of trees	Survival rates %	Average height m	Range of height m
N. yunnanensis	19	94.7	0.99	0.40-1.30
P. sinensis	2	100.0	0.48	0.45-0.50
T. yunnanensis	216	99.1	0.48	0.13-0.80

Table 3: BanQianDi (consisting of 3 sub-sites)

	No. of trees	Survival rates %	Average height m	Range of height m
N. yunnanensis	20	95.0	1.12	0.59-1.42
P. sinensis	4	100.0	0.45	0.34-0.51
T. yunnanensis	39	97.4	0.47	0.16-1.05

With survival rates of beyond 90% (Tables 1-3, Fig. 1) the situation is very positive (the 80% of the *Dipterocarp sp*. is based on only 5 individuals), but it needs to be seen how the performance further develops. Therefore, the next assessment is planned end of the coming season, which is one year after planting.

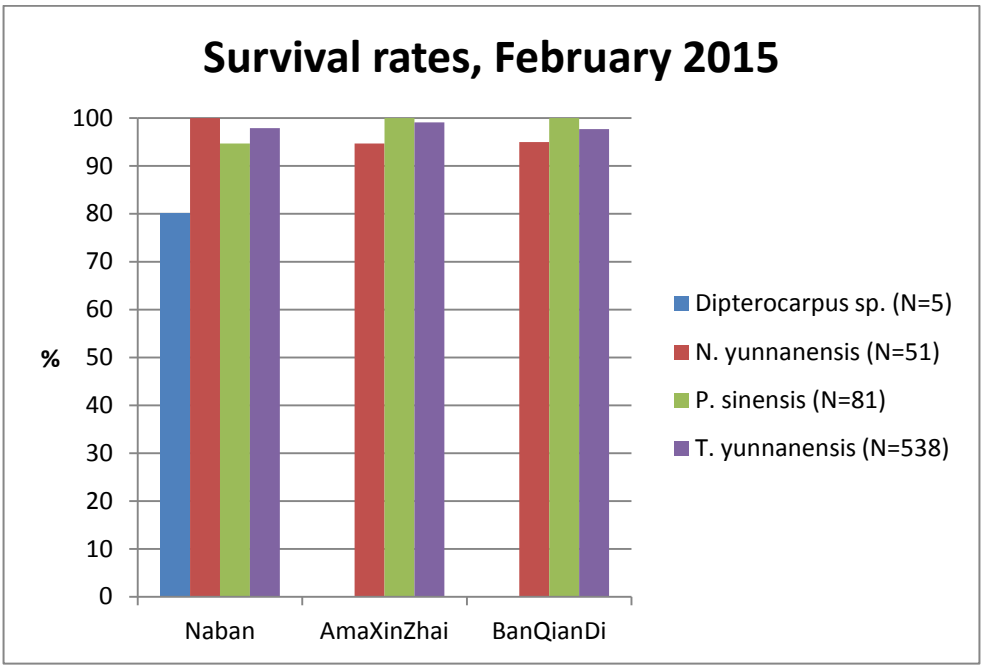

Fig. 1 - Survival rates 6 months after planting

Pic. 6 - Promissing performance of *T. yunnanensis* at the Naban site: The picture has been taken in March 2015, that is towards the end of the dry season. It shows new sprouts, proofing that the plant well adapted to its new habitat.

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SP6 work progress and more

After around 300km of walking in the jungle and around, 180 interviews with farmers, more than 100 sampled camera locations and more than 34 recorded wildlife species, 32 leech bites, one monkey bite, two times running from elephants and estimated ten liters of blood lost to mosquitoes, SP6 successfully finalized its field work. We are currently analyzing the data and will soon provide further results. We can already conclude that mature rubber trees seem to be hardly susceptible to elephant damages, young rubber plantations however are at much higher risk and newly planted fields in elephant range should therefore be more carefully managed.

Special experiences

As a special goodbye greeting, some wild elephants visited us (and the fresh vegetation around the bungalow) one night shortly before we left. They were also kind enough to pass one of our cameras not too far away.

Interactions with stakeholders

The cooperation with the Khlong Saeng Wildlife Research Station, the Tai Rom Yen National Park, the Khlong Saeng Wildlife Sanctuary, the King Mongkut's University of Technology Thonburi, the Srinakharinwirot University and the Golden Triangle Asian Elephant Foundation was very fruitful and we are very grateful for all the fantastic support our partners offered to the project.

We created posters on our SP aims and outcomes for the authorities to exhibit at the Research Station and the National Park Headquarters for informing tourists and locals about the wildlife presence in protected and cultivated lands. *(SP6, Harich)*

Pic. 7 - Sunset over Tai Rom Yen National Park.

Pic. 8 - Elephants investigate one of our camera traps.

Pic. 9 - SP 6 poster on the project's aims and outcomes for the authorities to exhibit at the Research Station and the National Park Headquarters

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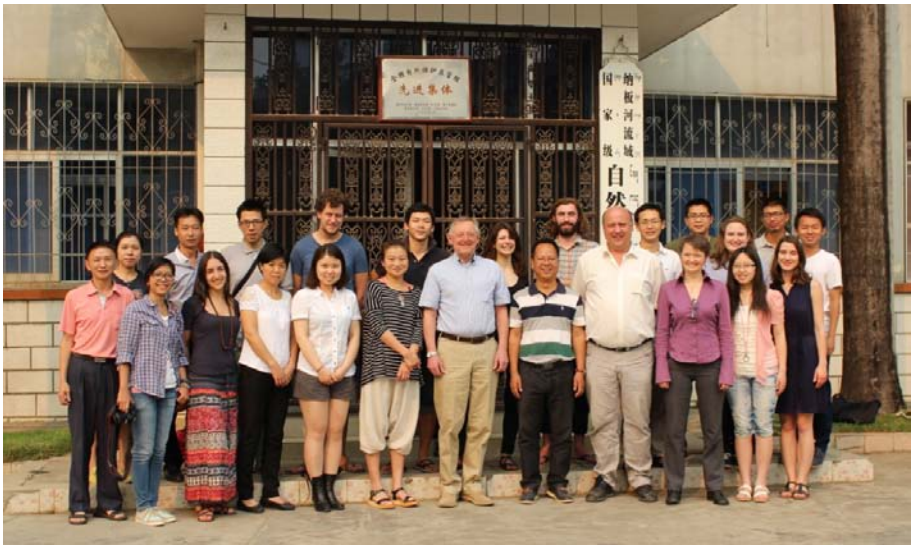
Field phase of the Study Project "Willingness to accept land use changes"

With great support by NRWNNR bureau, a group of 12 students from Humboldt-Universität zu Berlin (HUB) and China Agricultural University (CAU) conducted a qualitative survey on "willingness-to-accept". The field phase in six villages of the Naban Valley lasted from 8th to 21st of March, 2015. The topics of the study are factors of farmers' willingness to accept change towards more sustainable land-use in general, as well as their acceptance vis-a-vis two specific SURUMER cases: intercropping and water protection. Preliminary findings were discussed with village heads during a focus group discussion on 19th, and were discussed with experts from NRWNNR Bureau on the 21st of March. Both, the village heads and NRWNNR experts showed great interests into this topic and gave positive feedback towards the performance of the working group and the preliminary results (see attached presentation). Information gathered from the study project will be further analyzed and the report will finalized until July. *(SP8, Aenis& Wang)*

Pic. 10 and 11 - Students interview rubber farmer



Pic. 12 and 13 - Field B, CAU, and Experts from NRWNNRB

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Focus group discussion with village heads on their priorities regarding ESS

On 19th March, the forth village heads focus group discussion was held in Mandian Research and Education Center in NRWNNR. Leaders from Naban, Mandian, Kemu, Panbing and Zhongzhichang village attended the meeting. The objective was to discuss farmers' priorities towards different ecosystem services (ESS) of relevance in SURUMER, therefore the village heads were asked to priorize ESS. Preliminary results show that there are some differences in priorites compared with regional stakeholders, but water quality and quantity and soil erosion are top priority of both stakeholder groups. *(SP8, Aenis& Wang)*

Pic. 14 and 15 - Village Heads value ESS at the focus group meeting

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Abstract Annual Conference of the Society for Tropical Ecology 2015 - SP6

How to benefit from being eaten? Elephant seed dispersal experiments with *Dillenia indica* in Southeast Asia

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Elephants represent one of the largest living seed dispersers and they play an important role in maintaining tree diversity in forest ecosystems. While several plant species rely on African elephants (*Loxodonta africana; L. cyclotis*) as exclusive seed dispersers, no such obligate seed dispersal mutualisms have been recorded for Asian elephants (*Elephas maximus*), thus far. We examined if *Dillenia indica* Linn., a megafaunal fruit tree species, depends on or profits from elephants as seed dispersal agents, and thus will suffer in the absence of these animals. We conducted feeding trials with domestic Asian elephants in northern Thailand and quantified the gut retention time of *D. indica* seeds in order to calculate potential dispersal distances. Furthermore, we undertook germination experiments with a total of 1200 digested and undigested control seeds to determine any differences in germination rate and time. We further installed camera traps around *D. indica* trees in a natural forest to monitor wildlife consumption of fruits. We found that the germination rate for digested seeds was only 9% higher than for undigested control seeds but that the germination time was significantly faster (> 1 week on average) for digested seeds. The average minimum and maximum gut retention times were 20.4 and 72 hours, respectively. Only rodents were monitored visiting the trees in the wild, what might be partly due to a low number of elephants in the protected area and an overall high hunting pressure on other mammals. We conclude that *D. indica* benefits from seed dispersal through elephants without depending on it. However, the declining numbers of megafaunal seed dispersers such as elephants might lead to long-term impacts on the tree populations such as an increase in plant clusters as well as a generally lower geographic distribution.

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