



SAMS –Newsletter

Vol. 5, September 2019

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Dear SAMS community,



Smart
Apiculture
Management
Services

We would like to inform you with this quarterly update about news and upcoming events on our project activities.

1. Project activities since July 2019

- 1.1. UCD Preparation Meeting in Bandung
- 1.2. UCD Prototyping Workshop in Bandung
- 1.3. Implementation of SAMS Monitoring Systems, Bandung, Indonesia
- 1.4. Initiation Bandung Bees Sanctuary
- 1.5. Beekeepers Engagement in Ciwidey and Babussalam
- 1.6. SAMS Review Meeting and 5th SCM in Brussels, Belgium
- 1.7. Survey Market Preparation
- 1.8. SAMS Product Development Story
- 1.9. Quality Standards for Honey from Ethiopia
- 1.10. Honeybee Colony Absconding: The Case of Beekeeping in Ethiopia
- 1.11. Capacity Building: Trainings for Stakeholders in Ethiopia
- 1.12. News from iceaddis
- 1.13. News from LLU:
- 1.14. DW development progress:



@SAMS_EU_H2020

Upcoming Events

Monthly Dissemination, Bandung, Indonesia

11.2019 - SAMS system INSTALLATION TRAINING AND WORKSHOP with students @Jelgava by UNIKAS

03.2020 - 6th SCM in Jelgava, Latvia

2. Conferences and Events

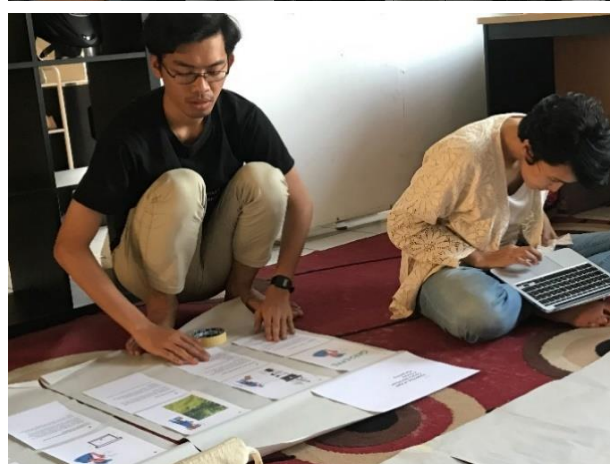
- 2.1. Öko FELDTAGE 2019, Grebenstein, Germany
- 2.2. TV report - Hessenschau - Bees collect data for research, Witzenhausen, Germany
- 2.3. 46th Apimondia Conference, Montreal, Canada
- 2.4. Researchers' Night event at the Latvia University of Agriculture, Jelgava, Latvia

1. Project activities since March 2019

06. 2019 - UCD Preparation Meeting in Bandung

During an intensive but fruitful week (June 22-30) with perfect collaboration and good progress, the UCD working group (CV.PI, ICEADDIS, GIZ and UNPAD) met in Bandung to prepare the upcoming UCD Prototyping Workshop. Among the preparation work was the refinement of the User Research with beekeepers and scientists. Thus, personas and As-Is scenarios for inspection of beehive and harvesting were visualized and the observations with beekeepers and other user research activities were documented in an UX Nuggets Air table. Based on the well-designed personas and As-Is scenarios the SAMS partners then started to prototype on SAMS products during the UCD Prototyping Workshop in July.

Moreover, the methodology for the workshop including a better understanding of UCD via an UCD introduction game, energizers as well as different techniques was defined. The UCD working group enjoyed the workflow, and was looking forward to meet the SAMS consortium, during the UCD Prototyping Workshop the week after, to keep the work in progress.



Pictures: UCD team during its work

By GIZ

07.2019 - UCD Prototyping Workshop in Bandung

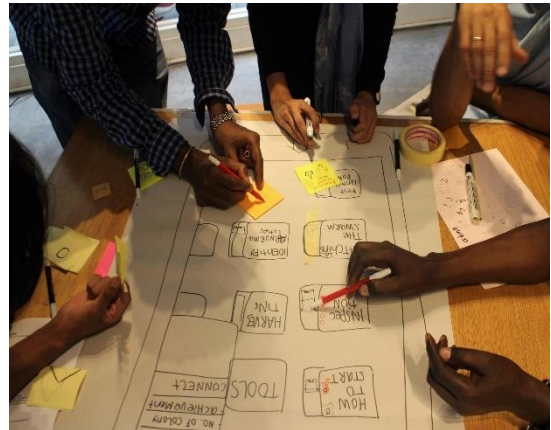
The intercultural and interdisciplinary SAMS consortium came together in Bandung from July 1 to 8 to review the SAMS User Research and to start prototyping on the SAMS products following the User Centered Design principles. The event was organised by CV.PI with collaboration of Labtek Indie and Universitas Padjadjaran

The workshop started with an official day mandatory in Indonesian culture at UNPAD. During this event, Indonesian representatives of several institutions signed a document, announcing their willingness to be part of the Indonesian Advisory Board. Followed by this event, the SAMS team had the opportunity to visit two



Picture: Signing of the SAMS Indonesia Advisory Board.

beekeeping sites. During the site-visits at Tani Kota and Ciwidey, where the first SAMS HIVES were installed, the SAMS consortium got an impression and better understanding of beekeeping in Indonesia. Within the next four days, the SAMS consortium brainstormed and prototyped on digital solutions to improve the beekeepers' work. As a result, it was agreed to focus on an online marketplace and on a data application for beekeepers. The UCD Prototyping Workshop in Bandung ended officially with a beekeeping seminar for start-ups and students. After presentations of the SAMS experts (HOLETA, UNIGRA, UNIKAS, UNPAD) and an Indonesian beekeeping specialist, the start-ups and students worked on developing SAMS business ideas during a hackathon.



Pictures (from top left to bottom right): Group picture of the participants; prototyping during the workshop, Andika Sastrawiguna and his father Mr. Debby during a site visit at their apiary in Ciwidey ("D'Bees") and Apis cerana honeybees in front of their hive entrance.

By GIZ, CV.PI and UNPAD

07.2019 - Implementation of SAMS Monitoring Systems, Bandung, Indonesia

A second installation training took place following the SAMS Co-Creation Prototyping Workshop in Bandung, Indonesia. The most recent experiences and know-how regarding the construction, installation and maintenance of the SAMS monitoring systems were exchanged and the participants were trained as multipliers. Ten further monitoring systems could be built under the supervision of our project partners from the University of Kassel. More prototypes follow soon.



Pictures: Implementation of SAMS monitoring hive systems

Also in Ethiopia, ten more systems were built and already installed at the Bee Research Center in Holeta at the end of July. With the support of the University of Kassel, essential expertise on the construction, installation and maintenance of the monitoring systems could also be shared there. Further multipliers were trained. The systems already provide data on the temperature, weight and acoustics in the bee colonies. In addition, the outside temperature and humidity are recorded and is also transmitted online to the SAMS Data Warehouse.

By UNIKAS

07.2019 - Initiation Bandung Bees Sanctuary

Initiation of new beekeeping areas in the education area of UNPAD, Dago, Bandung. This area was prepared as a center for bee development and SAMS implementation and formed a new start in beekeeping and is expected to be one of the beekeeping centers that not only serve as bee farms but also as bee tourism sites, beekeeping information, and research in West Java especially in Bandung. Activities undertaken at this time are land suitability surveys and focus group discussions in planning ideas about business models to be carried out. In the focus group discussions, the participants involved stem not only from beekeepers but also from academics and creative communities in the UNPAD area.



Pictures: Land Suitability Survey for Bandung Bees Sanctuary (BBS); middle: satellite image of the BBS location.

By UNPAD

07.-09.2019 -Beekeepers Engagement in Ciwidey and Babussalam

Several cycles of UCD research and the implementation of the SAMS hardware prototype version 1 and 2 were carried out. Through another user feedback round, Mr. Debby (Ciwidey Beekeeper) gave feedback to the SAMS project and told us about his the needs. During the meeting with Debby, we also had the chance to extend the network “**Lebah Madu Indonesia**”. This group brings together hundreds of beekeepers in various regions in Indonesia. The formation of it was an initiative of Debby as he saw that the existing beekeeping associations had not been able to accommodate the interests of grassroots beekeepers.

We also had the chance to engage with another beekeeper, namely Kelompok Budidaya Lebah Ciburial located in Babussalam, Bandung. Ciburial beekeepers are led by Aepudin (Aep). Aep has dozens of *Apis cerana* and *Trigona* colonies. The beekeeping methods of Aep are quite interesting, since he’s constantly experimenting with the habitus of the beehive boxes ranging from cylindrical, cube, combed and not combed ones. Aside from beekeeping, Aep also cooperates with the Babussalam Islamic Boarding School to distribute honey and herbal medicine approaching the Apitherapi method. For the Ciburial beekeepers, we plan to implement hardware prototype version 3. Therefore, we intend to invest more time to form a long-lasting and mutual- benefit relationship with Kang Aep rather than short and transactional relationship.



Picture: Maintaining relationship with Kang Debby.



Picture: Oki from Labtek Indie with Pak Tami, a representative of the Ciburial Beekeeper Group.

By CV.PI

09.2019 - SAMS Review Meeting and 5th SCM in Brussels, Brussels

In June 2019, the SAMS project had crossed the half line of the project duration. Therefore, the consortium prepared the mid-term report with all activities, which ensures the cooperative working environment of the team as well as the successful and impactful implementation. On September 18, all SAMS partners were invited to DG Connect, European Commission to discuss the mentioned progress report of the first 18 implementation months. Based on the questions and recommendations of the EU Project Officer E. Carlson and the three external experts R. Chaabouni (Université de Tunis El Manar, Ecole Nationale d'Ingénieurs de Tunis), C. Joyce (Connemara Programme), M. C. Seijo-Coello (University of Vigo) the consortium received a great feedback and good advices for the implementation of the following 18 months.

The 5th Steering Committee Meeting was organized by the GIZ in cooperation with the University of Kassel and took place on September 19 and 20. The SCM complemented the review and gave the SAMS partners the chance to internally review the meeting, discuss aspects and plan further actions.



Pictures (from left to right): the SAMS team enjoying its dinner after the fruitful and exciting review meeting at GD Connect, European commission.

By GIZ

09.2019 - Survey Market Preparation

Market survey is an activity, carried out by the UNPAD team in the context of describing the market conditions for bee products, especially for honey, in Indonesia. The description of the processes occurring in the beekeeping product market will be explored by conducting survey activities. The surveys will not target only consumers of bee products but also target breeders and business people or the bee products industry in Indonesia. The preparations carried out for this market survey activity are the creation of a questionnaire form that is reviewed by a team of SAMS beneficiaries, research, and communication with the bee product industry.

By UNPAD

SAMS Product Development Story

So far, SAMS hives were implemented in Tani Kota, Babusalam and in Ciwidey. We also decided to implement a system near our office to monitor and do conduct troubleshooting easily. In this implementation we tried to iterate the hardware with some values to keep in our mind:

- 1. More user friendly for the beekeepers:** new cases for the devices; restart button including a lamp
- 2. Easier to assembly:** Use of a prototyping circuit board to make the components more compact to replace components more easily; modification of the system to need fewer device parts per system
- 3. More frequent data delivery:** Device sends data every hour instead of every 6 hours



Picture: Hardware Prototype Implementation in Babussalam.

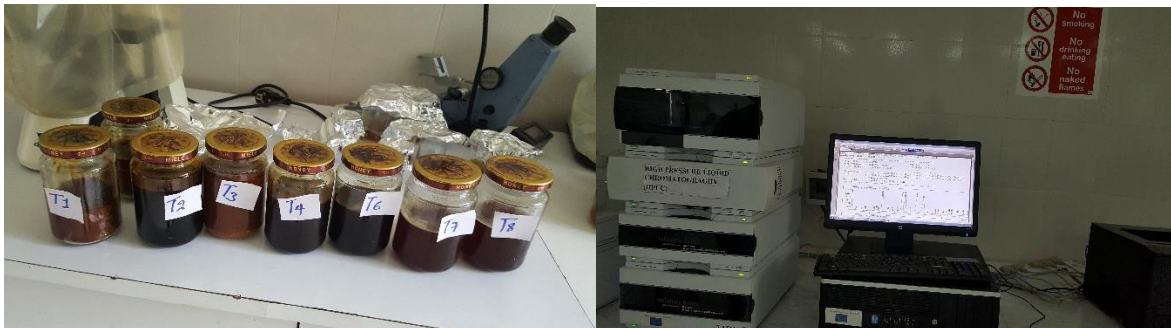
4. More reliable hardware: Debugging the programming code of the microcontroller to improve data transfer to the data warehouse

More improvements of the SAMS hive are planned.

By CV.PI

Quality Standards for Honey from Ethiopia

Identification of quality standards of honeys from different origin is one of the basic requirements to affect marketing of the products. As an important approach to promote the products and attract investment in the beekeeping sector of Ethiopia, analysis of different quality parameters on *Schefflera abyssinica*, *Croton macrostachyus*, *Coffee arabica* and *Vernonia amygdalina* honey samples collected from South Western parts (including UNESCO delignated forest) was conducted to compare their compounds with national and international standards. The results of analysis showed that on average the honey samples contained 18.5 g/100 g, 69.48 g/100 g, 38.6 g/100 g and 35.5 g/100 g moisture, sucrose, glucose and fructose, respectively. Further and on average the honeys consisted of proline = 210.1 g/kg, pH =4.05, free acid =7 meq/kg and HMF values = 1.2387 mg/kg, electrical conductivity = 0.16mScm⁻¹ and invertase activity = 140.7 (according to Schade) for the honey samples. This assessment showed that all analyzed parameters of the honey samples meet the basic honey quality standards both national and international specifications and therefore for this region, there are no more obstacles for a potential collaboration between investors, local buyers and local beekeepers.



Pictures (from left to right): Honey samples of *Croton macrostachyus* labeled for analysis; sugar profile analysis by using HPLC at Holeta Bee Research Honey Quality analysis.

By HOLETA

Honeybee Colony Absconding: The Case of Beekeeping in Ethiopia

Honeybee colony losses due to absconding in Ethiopia is a serious concern amongst the beekeeping community and policy makers. To understand the major causes and recommend possible solutions to this problem, 160 honeybee colonies were subjected to four different colony management groups over four seasons under Gedo and Bako conditions. The management groups were: providing colonies with dearth period food and hive shade (A), providing colonies with no dearth period food but hive shade (B), providing colonies with dearth

period food but no hive shade (C) and providing colonies with no dearth period food and no hive shade (D). The results showed that there were significant differences among the management groups regarding absconding with the highest (90.6%) recorded under D compared to C (32.8%), B (31.3%) and A (10.9%). Differences were also high among the groups for honey yield per year, with averages of 44.2, 24.6, 25.1 and 9.1 kg/colony for A, B, C and D, respectively.

However, the yield record in Gedo and Bako under

treatment A was 46.7 kg/year and 45.8 kg/year, respectively. Highest incidences of diseases (*Amoeba* and *Nosema*) and pests (Wax moths, small hive beetles, *varroa* mite were recorded frequently under D, while only few cases were reported for A. The study found that major causes of colony absconding and low productivity of honeybees in the country were absence of hive shade and failure to feed colonies in dearth periods. To overcome the problem and enhance output from beekeeping, providing colonies with regular dearth period food and permanent hive shade are recommended as a solution to improve the productivity of honeybees in the country. Additionally, continuous monitoring to assess variables associated with honeybee colonies should be adapted as regular necessity for successful beekeeping.

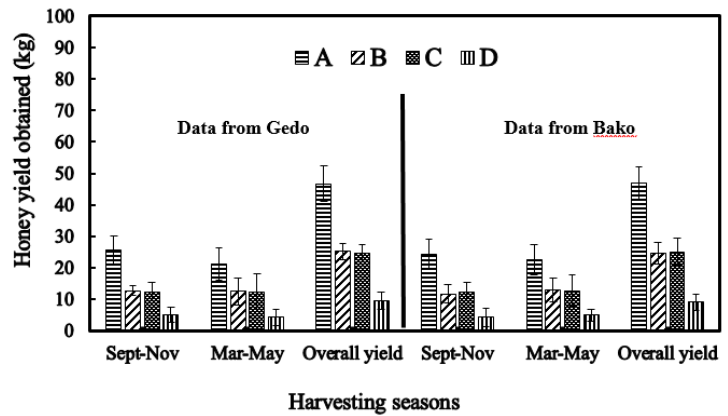


Figure: Effect of different treatments on annual honey yield at Gedo and Bako apiary sites

By HOLETA

Capacity building: Trainings for stakeholders in Ethiopia

Capacity building trainings on Bee-Management and Bee-Health Services including topics like beekeeping equipment, basic beekeeping management, bee product diversifications, post-harvest management of bee products, etc. for beekeepers were conducted in Ambo, Wolmera, Holeta and Ginchi in the months of April, May and June 2019. Each training lasted 5 days (=40 hours each). In total, within 120 hours of training 104 beekeepers have been trained by HOLETA, of which 64 were female beekeepers and the remaining 44 male beekeepers of which 24 of them belonged to the youth. Within the trainings, the beekeepers were also motivated in marketing their bee products and in establishing local market places.

Besides, training on application of the hive monitoring system was conducted by the experts from UNIKAS in April and July 2019. A total of 11 participants were trained on topics including functionality, sensors, used data, hardware and software. Further, 15 and 45 participants attended the theoretical and practical training on building the monitoring system prototype.



Pictures (from left to right): Beekeepers learn how to identify the varroa mite and other pests from brood in Ambo animal health laboratory; experts from ICT startups on how to build and application of hive monitoring system in Holeta.

News from iceaddis

- 1) Designing of market research questionnaires and revising them with the international UCD team. It is expected to publish them by October 1st.
- 2) Developing of startup growth strategy for the *Honey or Money* project
- 3) Participating in the second high fidelity prototype installation at Holeta Bee Research Center in Ethiopia.

By iceaddis

News from the LLU:

- 1) Scientific paper with title “Application of fuzzy logic for honey bee colony state identification” is prepared and submitted to the Journal of Biosystems Engineering (<https://www.journals.elsevier.com/biosystems-engineering>).
- 2) Work on scientific paper about challenges of Precision Beekeeping implementation in Ethiopia and Indonesia has started.
- 3) SAMS website is updated and new sections were added.
- 4) Deliverable D4.1 (Report on data management) is prepared and submitted to the EU.

In near future, a workshop for LLU students is planned where SAMS monitoring systems will be assembled and tested. The workshop will be organised in cooperation with Sascha Fiedler from the University of Kassel in Germany.

By UNILV

DW development progress:

The data warehouse is fully operating and data from the SAMS monitoring systems are coming to it. The data warehouse user interface is updated and modified for better usability.

For better user experience and data sharing between end-users, so called workspaces are implemented within SAMS DW. It is planned to continue work on DW user experience improvement by adopting the interface for

mobile devices, implement decision support module which will help to identify the most important bee colony states.

By UNILV

2. Conferences and Events

07.2019 - Event - Öko FELDTAGE 2019, Grebenstein, Germany

SAMS was presented at the Organic Field Days in Grebenstein on July 3 2019 by our partner University Kassel. The SAMS technology for bee monitoring was demonstrated with a showcase on site. More than 11,000 visitors experienced the innovative power and diversity of organic agriculture on the 3rd and 4th of July at the Hessische Staatsdomäne Frankenhausen, the teaching and testing facility of the University of Kassel. This event combines a unique combination of practice and research in organic farming and animal husbandry. It is the ideal platform for exhibiting innovations and discussing current topics with farmers and representatives from politics and business. More informations: <https://www.oeko-feldtage.de/?lang=en>



Picture: <https://www.oeko-feldtage.de>, 20.09.2019

By UNIKAS

07.2019 - TV report - Hessenschau - Bees collect data for research, Witzenhausen, Germany

Researchers from the University of Kassel were interviewed for television. The test site of the Agricultural and Biosystems Engineering department in Witzenhausen was visited and the SAMS technology was demonstrated. An overview of the project was given by the project coordinator Angela Zur. Hessischer Rundfunk Frankfurt broadcasted the recordings under the title: "Bees collect data for research" in the Hessenschau TV showed on 5 July 2019 at 8:17 pm. The show is available on the Hessenschau website. The report can be watched here:

<https://www.youtube.com/watch?v=kosuO11RK6Q>.

By UNIKAS

09.2019 - 46th Apimondia Conference, Montreal, Canada

The SAMS poster was presented by the University of Graz at the [Apimondia](#) International Apicultural Conference, which took place from September 8 to 12 in Montréal, Canada. Approximately 5000 interested visitors attended the conference. We were able to present the SAMS project and to establish new, promising contacts.

If you are interested in our SAMS abstract, please read the [conference proceedings](#)



By UNIGRA

09.2019 - Researchers' Night, Jelgava, Latvia

On 27th of September, the Researchers' Night took place at the University of Life Sciences and Technologies. In concept European Researchers' Nights are public events dedicated to bring researchers closer to the public. The idea is to showcase the diversity of research and highlight the impact of research on our daily lives. During this event Vitalijs Komasilovs presented the SAMS project by demonstrating the project poster and by giving a talk. More than 100 visitors were interested in the SAMS project and got information about the developed system and colony monitoring. Visitors were mostly interested in beekeeping in Ethiopia and Indonesia. One of the mainly asked questions by beekeepers was about practical implementation costs and system maintenance.

By UNILV
