TTÜ TARTU KOLLEDŽ
TEADUS- JA ARENDUSTEGEVUSE AASTAARUANNE 2013

1. Struktuur

TTÜ Tartu Kolledž, Tartu College of Tallinn University of Technology
Kolledži direktor Lembit Nei

- Keskkonnakaitse õppetool, Department of Environmental Protection, Mari Ivask
- Maastikuarhitektuuri õppetool, Department of Landscape Architecture, Nele Nutt
- Säästva tehnoloogia õppetool, Department of Sustainable Technology, Aime Ruus
- Üldainete õppetool, Department of Basic Studies, Jaak Sikk

2. Teadus- ja arendustegevuse (edaspidi T&A) iseloomustus

2.1 **Mullabioloogia uurimisgrupp.**
Soil biology research group.

Uurimisgrupi juht: Prof. Mari Ivask

Uurimisgrupi teadustöö kirjeldus:
Project: Soil biota studies on human affected areas: models, reactions, food webs (B02, project leader A.Kuu, ETF G9258). The data were collected for describing and modeling the structure and function of soil communities on areas damaged by human activities (opencast mining, contaminated industrial areas in the North East of Estonia). In recultivated mining area field inventory of major soil biota groups was carried out. The field and laboratory studies for investigation of soil, forest litter and floor layer were carried out to find the relationships between plant successions, litter characteristics, and abundance and diversity of soil invertebrates as well as activities of soil microbial community.
Project: Spatial distribution of soil biota and post-flooding recolonization of floodplain and coastal meadows in Matsalu National Park (ETF G 9145, project leader M.Ivask). Based on the measurements, the Forecast Model of flooding dynamics on Kasari floodplain was created. The net of 14 sensors for monitoring the water level, temperature and electroconductivity was established (Solinst Levellogger Junior 3001, one hour interval of measurements). Study areas were selected using the altitude- and flooding model by principle that some areas are recolonized more quickly and some are covered by flooding water for very long time. We collected material from the non-flooded meadows adjoining flooded areas and from the refugia located on flooded area but never covered by water (methods: hand sorting of soil, using vermifuge, ekstraction by Tullgren' Funnels, pitfall-traps). The taxonomical and ecological structure of soil communities and changes in communities after flooding were analyzed.
Project: Assessment of soil biodiversity by abundance and species composition of Collembolas and earthworm communities (Lep13130). Assessment of soil biodiversity (indicators collembolas and earthworms) on fields, where the non-tillage management was applicated, and on field with conventional tillage. The relationships between agricultural activities, soil parameters and soil communities parameters were found.
Project: Laboratory testing and research of natural resources potentially applicable in building and energetics by Tartu Rural Development Association and Võrtsjärve Region (Lep13157).

Investigation of microbial communities on straw and reed as ecological building material and its potential energetical value.

Uurimisgrupi aruandeaastal saadud tähtsamad teadustulemused *(inglise keeles);*

1. New knowledge of diversity, systematics and ecology of soil biota in Estonia.

2. On recultivated mining areas, the maximal diversity and abundance of different soil decomposers communities differ in time depending on succession of plant communities.

3. In Matsalu wetland, the abundance of soil invertebrates was the highest in non-flooded areas and after withdrawing of flood the spread of invertebrates groups depends on duration of flood (spiders, earthworms), salinity of water (beetles, mites, earthworms) or they didn't spread from refugia (millipede, centipede).

4. Elaboration of vermicomposting technologies for several waste materials.

Uurimisgrupi kuni 5 olulisemat publikatsiooni aruandeaastal:

1. Mari Ivask, Eve Aruvee, Kristjan Piirimäe. 2013. Chapter 5. Database of environmental decision support tools. In: Kenward R.E., Papathanasiou J, Eds. Transactional Environmental Support System Design: Global Solutions. IGI Global Publishers, p.70-96

2. Kenward, RE, Casey, N, Walls SS, Dick, JM, Smith, R, Turner, S, Watt, AD, Papathanasiou, J, Andreopoulou, Z, Arampatzis, S, Papadopoulou, O, von Bethlenfalvy, G, Carvalho, CR, Morgado, R, Sharp RJA, Tederko, Z, Szemethy, L, Gallo, J, Székely, D, Piirimäe, K, Ivask, M, Aruvee, E, Navodaru, I, Avcioglu, B, Gem, E, Ewald, JA, Sotherton, N. 2013. Chapter 20. Design of a Transactional Environmental Support System. In: Kenward R.E., Papathanasiou J, Eds. Transactional Environmental Support System Design: Global Solutions. IGI Global Publishers, p.209-245.

3. Rzanny, Michael; Kuu, Annely; Voigt, Winfried, 2013. Bottom–up and top–down forces structuring consumer communities in an experimental grassland. Oikos, Vol.121, 967-976.

4. Haiba, E.; Lillenberg, M.; Kipper, K.; Astover, A.; Herodes, K.; Ivask, M.; Kuu, A.; Litvin, S.V.; Nei, L. 2013. Fluoroquinolones and sulfonamides in sewage sludge compost and their uptake from soil into food plants. African Journal of Agricultural Research, 8 (23), 3000-3006.

5. Kuu, A; Ivask, M; Kutti, S; Timusk, L. 2013. Soil biota on afforestation oil-shale mines in Northeastern Estonia. Protection of soil functions- challenges for the future. Puławy, Poland:, 2013, 178 - 180.

2.2 Loetelu struktuuriüksuse töötajate rahvusvahelistest tunnustustest.

2.3 Loetelu struktuuriüksuse töötajatest, kes on välisakadeemiate või muude oluliste T&A- ga seotud välisorganisatsioonide liikmed .

2.4 Soovi korral esitatakse aruandeaastal saadud T&A-ga seotud tunnustused (va punktis 2.3 toodud tunnustused), ülevaade teaduskorralduslikust tegevusest, teadlasmobiilsusest ning hinnang oma teadustulemustele.

Teaduskorralduslik tegevus:

Mari Ivask – Eesti Maaülikooli Loodusteaduste ja Rakendusbioloogia doktorinõukogu lisaliige (30.05.2013, M.P.Estrada)
Mari Ivask – ajakirjade toimetuskollegiumi liige (International Journal of Sustainable Agricultural Management and Informatics, Acta Architecturae Naturalis, Agronomy Research).
Mari Ivask. IUCN juures tegutseva Europaean Sustainable Use Specialists Group, juhtkomitee liige (kuni sept. 2013).

Teadlasmobiilsus:

1. Mari Ivask – konverents Biohydrology 2013, Landau/Pfalz 20.-24.05.20134, posterettekanne (Mari Ivask, Mart Meriste, Annely Kuu. Dynamics of soil invertebrates abundance on flooded meadows in Matsalu).
2. Mart Meriste - konverents Biohydrology 2013, Landau/Pfalz 20.-24.05.20134, ettekanne (Mart Meriste, Mari Ivask, Annely Kuu. Frequently flooded coasts are most spider rich habitats in small islets of Väinameri (Baltic sea, Estonia)).
3. Jane Peda, Sander Kutti - konverents Vermicomposting and Vermiculture as basis of ecological landownership in XXI century – problems, outlooks, achievements, Minsk 10-14. June 2013, ettekanne (Jane Peda, Sander Kutti. Decomposition of bioplastic bags under different environmental conditions of vermicomposters).
4. Mari Ivask - konverents Vermicomposting and Vermiculture as basis of ecological landownership in XXI century – problems, outlooks, achievements, Minsk 10-14. June 2013, posterettekanne (K. Kalda, M.Ivask, A. Kuu, J. Peda, S.Kutti. Earthworms in waste heaps of oil-shale industry.
5. Annely Kuu - osalemine konverentsil „Protection of soil functions- challenges for the futuure“, Puławy, Poola, 15.-18.10.2013, Posterettekanne (Kuu A., Ivask M., Kutti S., Lorens T. 2013. Soil biota studies on afforestation oil-shale mines in Northeastern Estonia).

Research group of Ecological building materials and energy efficient housing

Uurimisgrupi juht: dots. Aime Ruus
Uurimisgrupi teadustöö kirjeldus:

Project Energy Efficient and Ecological Housing (VIR 516)
Two market research in Finland, Estonia and Latvia regarding heating boilers and energy efficient housing. Seminars for public on recent developments of Energy Efficient and Ecological Housing" for public (one in Finland , Estonia and Latvia). Two workshops in Finland, Estonia and Latvia including site vistis. Development and testing the consumer-directed web-based advising model for consumer of energy. Guidebook of energy efficient housing

Project: Energy efficiency of house based on Durisol and Steico products (LEP13084)
The energy efficiency of building was estimated. Thermal bridges were evaluated by measurement and calculation comaparitevely, thermal transmittance of boarders was estimated

Kohalik ressurss energeetikas ja ehituses“ (443013780073).

Project: Determination of ventilation rate in loose housing naturally ventilated cattle barns (KIK12090)
Monitoring of air speed, direction Air speed and direction is measured in 10 points. Air temperature, relative humidity and CO2 are measured at 4 points in animal zone. Ventilation rate m3/h per cow is calculated. Correlations between parameters can be found. More exact evaluation of ventilation rate enables to calculate emissions of harmful gases to the environment.

Ülikoolidevaheline uurimisgrupp
Research group for education history
Uurimisgrupi juht: dots. Epi Tohvri

Enlightenment Educational Ideas applied by Georges Frédéric Parrot and Thomas Jefferson and the Interpretations of these Educational Conceptions in the 21. Century
ETF 9362

Uurimisgrupi aruandeaastal saadud tähtsamad teadustulemused *(inglise keeles);*

1. New knowledge about acting of thermal bridges in houses built from *Durisol* and *Steico* products.
2. As the ventilation rate and air speed in the cowshed are not in correlations, it seems, that mass diffusion aspect must also to be taken into account in calculation ventilation rate and emissions of harmful gases, which release is depending on air speed is less intensive than expected by calculated by ventilation rate.

Uurimisgruppide kuni 5 olulisemat publikatsiooni aruandeaastal:

1. Tohvri, Epi (2013) Liivimaa Üldkasuliku ja Ökonoomilise Sotseteedi esimene põhikiri ning selle ideelised allikad. Tartu Ülikooli Ajaloo Küsimusi, XL,11-30.
2. Tohvri, Epi, Udumäe, Kaisi (2013). Planning in a Vacuum: Tartu University Hospital and Urban Development of the City of Tartu in the Second half of the 20th Century. Transylvanian Review of Administrative Sciences, 201-211.

2.2 Loetelu struktuuriüksuse töötajate rahvusvahelistest tunnustustest.
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Teaduskorralduslik tegevus:

Teadlasmobiilsus:

1. Epi Tohvri - working in archive The Special Collection of Amsterdam University (17.-22.10)
2. Epi Tohvri – working in archives of in St. Petersburg In Academy of Sciences and *Russian State Historical Archive* (9.-15.11)
3. Ants Soon, Aime Ruus – The 12th International Conference on Engineering Graphics BALTGRAF 2013 June 5-7, 2013, Rīga, Latvia. Presentations:
    a. Ants SOON, Aime RUUS From Learning Outcomes to the Team of Advisers

b. Harri LILLE, Aime RUUS Engineering Graphics Education as the Foundation of Intercultural Engineering Communication

4. Aime Ruus – conference Science in the Service of Animal Welfare: Priorities around the world UFAW International Animal Welfare Science Symposium, Universitat Autònoma de Barcelona, Barcelona, Spain 4-5th July 2013, poster presentation: Ruus A, A Kaasik and M Maasikmets Ventilation rate as one basic aspect for gas emissions and animal welfare in loose housing cowshed'