Suomen Ekolannoite Oy

IWAMA Interactive Water Management

Interreg Baltic Sea Region

EUROPEAN UNION

EUROPEAN REGIONAL DEVELOPMENT FUND

Sludge treatment as soil improver for agricultural purposes

Jyri Koivisto, EMBA
Chairman of the board
Suomen Ekolannoite LTD

Nutrient reduction and recovery 13-15.06.2018
Calmar, Sweden

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Company Suomen Ekolannoite ltd

- Founded 2011
- Ownership privately owned company
- Turnover 1,5M€
- 10 people 25 subcontructors
- 25 year experience in sludge treatment
- 40 year experience farmering

FIELD OF OPERATION:

Turn key sludge treatment operator including

- Design, reseach
- Operate
- Transportation
- Final disposal

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Challenges in Finnish farmers

- Finnish farmers has a lack of organic humus
- Chemical fertilizers prices has been rising during past years
- EU funds are getting limited
- 1960-1980 farmer got 6000kg grop/ha
- Farmering are getting tough in Finland because tightening demands
- 2010-2018 average yeld has dropped to 4000-4500 using only chemical fertilizers.

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Ekolannoite treatment solution

Treats all municipal sludge in Mikkeli and surrounding area (population > 60 000)

Extremely small footprint

Patented solution: chemical treatment combined with efficient mixing.

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Sludge treatment in a nutshell

Principal operation

Disinfection of sludge into a fertilizer in 1 hour chemical treatment process

Marketing of the end product (disinfected sludge) to agricultural purposes (dry solid 30%)

Main objective

Reduce the need of chemical fertilizers at least by 50%

Ekolannoite chemical treatment helps separate Phosforus recover from ferric sulfade

Saves the Environment

Disinfected sludge contains a lot of organic humus, Phosphorous, Nitrogen and other nutrients which has reduced the need of fertilizer use in Finland at least 50% last 2 years.

The use of disinfected landfill enables to improve the condition of rivers and lakes suffering from overflow of nutrients

Mixing Vessel

Movable equipment fitted to the back of a tractor, batch process. Fixed installation also possible.

Chemicals added to the reactor (in the picture below), where they are mixed with the sludge. The pH and temperature are monitored during the process.

Overview of the process...

- Alternatively sludge can be transported from WWTP to a composting plant , where the disinfection process will be done
- Or Sludge can be treated in the plant by using Ekolannoite solution
- Process is based on batch treatment. Scalability of the method is large 1 machine can treat 150 tons /day.
- 15 tons of sludge can be treated in 1 hours.
- After treatment manure will be transported directly to farmers fields.

Benefits of the process

Microbiological safety - treated sludge is practically free of pathogenes (E.coli and salmonella)

High pH (between 10-12) – phosporous can be utilized

High calcium concentration of the end product

Increased organic matter and amount of soluble nitrogen also increase over 25 %

The dry solids content of the sludge increases by 3-5% through treatment

Solution is cost effective and has a small footprint

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Reference: Sludge treatment case Mikkeli WWTP 60 000 inhabitants,flow 16000m3/

Date	*E. coli* (cfu / g)
5.12.2011	4 800 000
5.12.2011	10
5.12.2011	< 10
7.12. 2011	< 10
8.12.2011	280 000
8.12.2011	10
8.12.2011	< 10

Situation before SEL treatment

SEL treatment in use

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Official medical residue tests

Eurofins

Tutkimustodistus

Projekti: 170304/39

Pvm: 16.1.2018
1/2

eurofins

Eurofins Viljavuuspalvelu Oy

PL 500
50101 MIKKELI

Tutkimuksen nimi: Kevätvehnä / Reima Pyy, lääkeainejäämätesti

Näytteenottopiste: Kevätvehnä

Näytteenottopvm:
Näyte saapui: 29.11.2017
Analysointi aloitettu: 29.11.2017

Tutkimustulokset

Määritys	17SS04544	Yksikkö	Menetelmä	
Lääkeaineet ja hormonit	ok	mg/kg ka	EF4047	L
Atenoli	<0,010	mg/kg ka	EF4047	L
Beklometatsoni	<0,010	mg/kg ka	EF4047	L
Betsafibraatti	<0,010	mg/kg ka	EF4047	L
Bisoprololi	<0,010	mg/kg ka	EF4047	L
Diklofenaakki	<0,010	mg/kg ka	EF4047	L
Doksisykliini	<0,010	mg/kg ka	EF4047	L
Enalaprilli	<0,010	mg/kg ka	EF4047	L
Entakaponi	<0,010	mg/kg ka	EF4047	L
Felodipiini	<0,005	mg/kg ka	EF4047	L
Fenbendatsoli	<0,010	mg/kg ka	EF4047	L
Flubendatsoli	<0,010	mg/kg ka	EF4047	L
Fluoksetiini	<0,010	mg/kg ka	EF4047	L
Furosemidi	<0,10	mg/kg ka	EF4047	L
Gemfibrotsiili	<0,010	mg/kg ka	EF4047	L
Hydroklooritiatsidi	<0,050	mg/kg ka	EF4047	L
Hydrokortisoni	<0,010	mg/kg ka	EF4047	L
Ibuprofeeni	<0,10	mg/kg ka	EF4047	L
Ifosfamidi	<0,005	mg/kg ka	EF4047	L
Iopamidoli	<0,010	mg/kg ka	EF4047	L
Iopromidi	<0,010	mg/kg ka	EF4047	L
Ivermektiini	<0,10	mg/kg ka	EF4047	L
Karbamatsepiini	<0,010	mg/kg ka	EF4047	L
Ketokonatsoli	<0,010	mg/kg ka	EF4047	L
Ketoprofeeni	<0,010	mg/kg ka	EF4047	L
Klenbuteroli	<0,010	mg/kg ka	EF4047	L
Klofibriinihappo	<0,010	mg/kg ka	EF4047	L
Kofeiini	<0,010	mg/kg ka	EF4047	L
Metoprololi	<0,010	mg/kg ka	EF4047	L
Metotreksaatti	<0,010	mg/kg ka	EF4047	L
Metronidatsoli	<0,010	mg/kg ka	EF4047	L
Metyyliprednisoloni	<0,050	mg/kg ka	EF4047	L
Naprokseeni	<0,010	mg/kg ka	EF4047	L
Noretindroni	<0,010	mg/kg ka	EF4047	L
Norfloksasiini	<0,10	mg/kg ka	EF4047	L
Ofloksasiini	<0,10	mg/kg ka	EF4047	L
Oksitetrasykliini	<0,010	mg/kg ka	EF4047	L
Parasetamoli (asetaminofeeni)	<0,010	mg/kg ka	EF4047	L

Eurofins

Tutkimustodistus

Projekti: 170304/39

Pvm: 16.1.2018

Paroksetiini	<0,010	mg/kg ka	EF4047	L
Penisilliini G bentsatiini	<0,010	mg/kg ka	EF4047	L
Propranololi	<0,010	mg/kg ka	EF4047	L
Salbutamoli (albuteroli)	<0,010	mg/kg ka	EF4047	L
Simvastatiini	<0,50	mg/kg ka	EF4047	L
Siprofloksasiini	<0,10	mg/kg ka	EF4047	L
Sitalopraami	<0,010	mg/kg ka	EF4047	L
Sotaloli	<0,010	mg/kg ka	EF4047	L
Sulfametoksatsoli	<0,10	mg/kg ka	EF4047	L
Syklofosfamidi	<0,010	mg/kg ka	EF4047	L
Terbutaliini	<0,010	mg/kg ka	EF4047	L
Tetrasykliini	<0,010	mg/kg ka	EF4047	L
Trimetopriimi	<0,005	mg/kg ka	EF4047	L
Tylosiini	<0,005	mg/kg ka	EF4047	L
Varfariini	<0,010	mg/kg ka	EF4047	L
17a-Etyyniestradioli (EE2)	<0,005	mg/kg ka	EF4047	L
17b-Estradioli (E2)	<0,005	mg/kg ka	EF4047	L
Estrioli (E3)	<0,025	mg/kg ka	EF4047	L
Estroni (E1)	<0,005	mg/kg ka	EF4047	L

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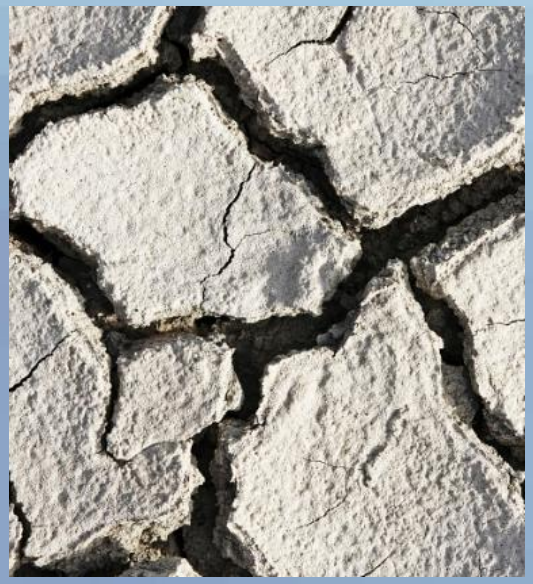
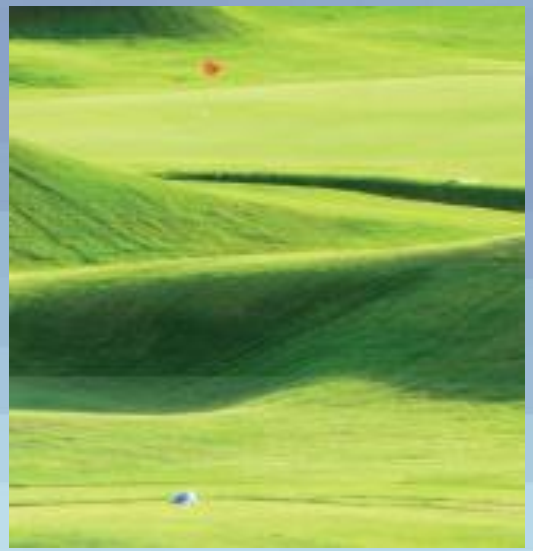
End product

Excellent, safe fertilizer

- Hygiene level guaranteed
- As good, or better fertilizer than traditional industrial fertilizers
- Crop is safe from medical residues
- Improves soil quality by humus



Helps fighting against erosion



Perfect for building green areas

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Sludge Tracking System

Jyri Koivisto
Suomen Ekolannoite Oy

Suomen Ekolannoite Oy

WWW.EKOLAARI.FI

A system for monitoring fertilizer preparation and

reporting on deliveries

With EKOLAARI system, fertilizer manufacturer are able to:

Keep a record of the amounts of the agricultural fertilizer, its features, recipients, and recieving locations.

The contractor shall store the information on the delivered fertilizer batches as required by law.

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Current references

HSY sludge treatment Operator since 2013 for 800 000Pe

Mikkeli city sludge treatment operator since 2011 60 000Pe

Vihti city sludge treatment operator since 2012 30 000Pe

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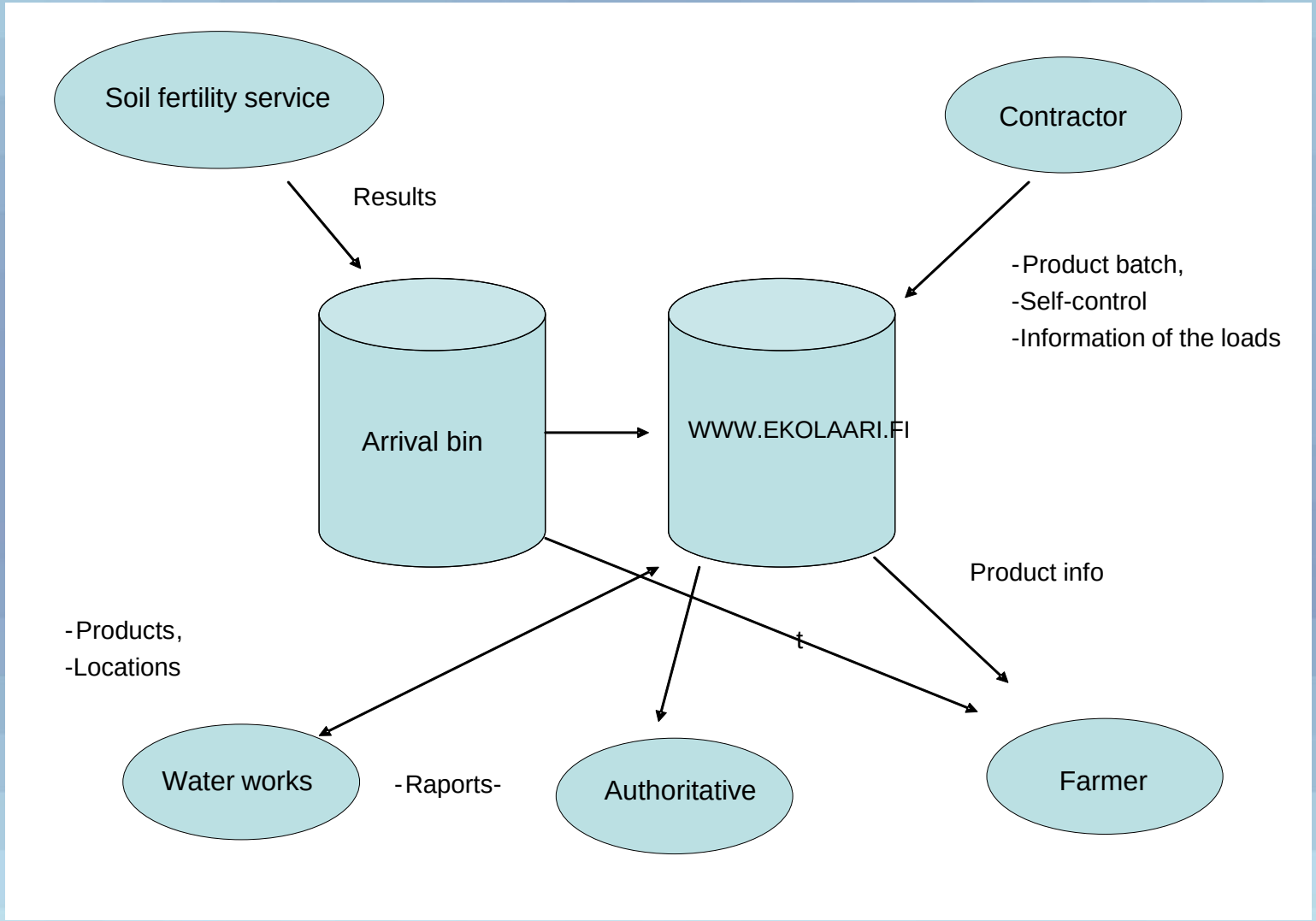
EKOLAARI.FI-service



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Recordable Data

Saved Data Content

- The type name of the fertilizer
- Trade name of the fertilizer

Supply contracts

- The recipient's name
- The recipients address
- Supplied fertilizer and delivery date
- Amount of the fertilizer
- Unloading location: Address, Block- ID , GPS-cordinates

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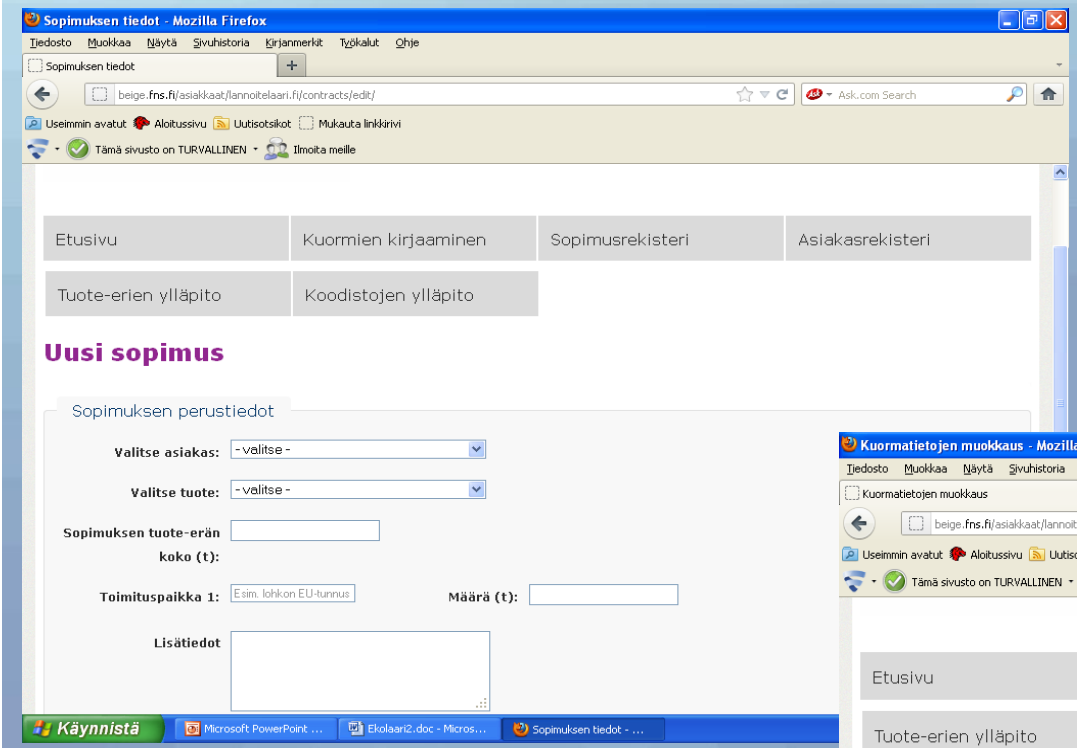

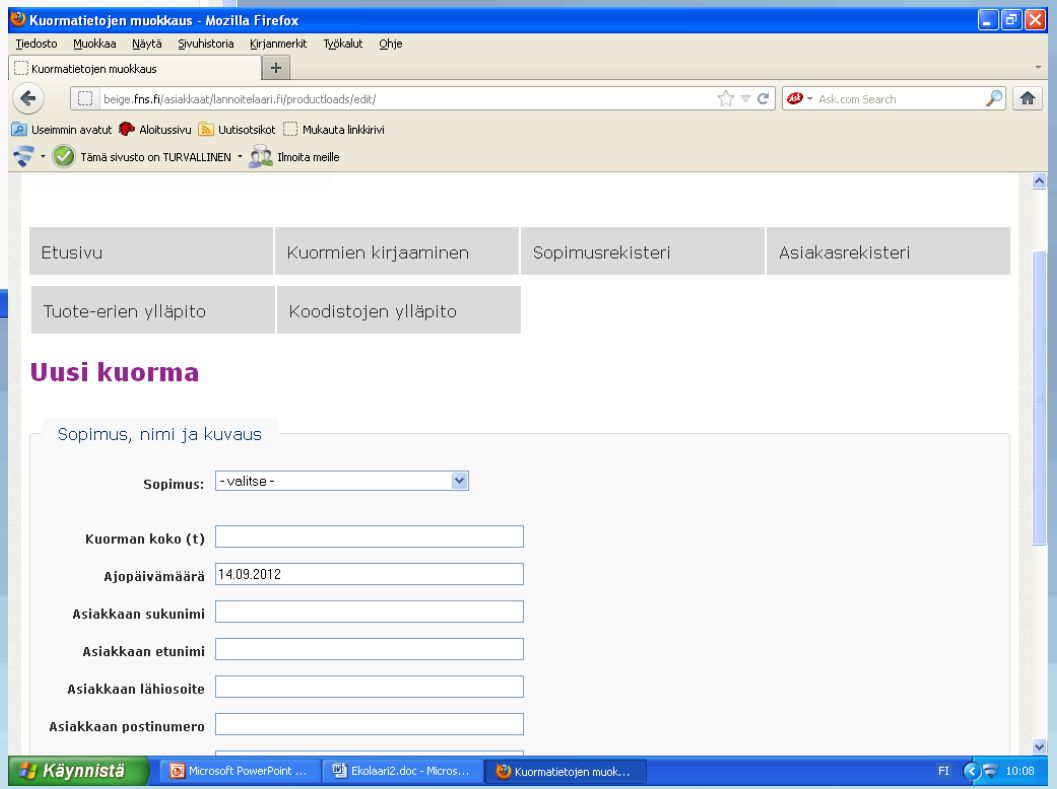

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www.tuloslaari.fi service

- From www.tuloslaari.fi service you can find laboratory data for every fertilizer batch.
- In addition, information on the nutrient content, and product descriptions.

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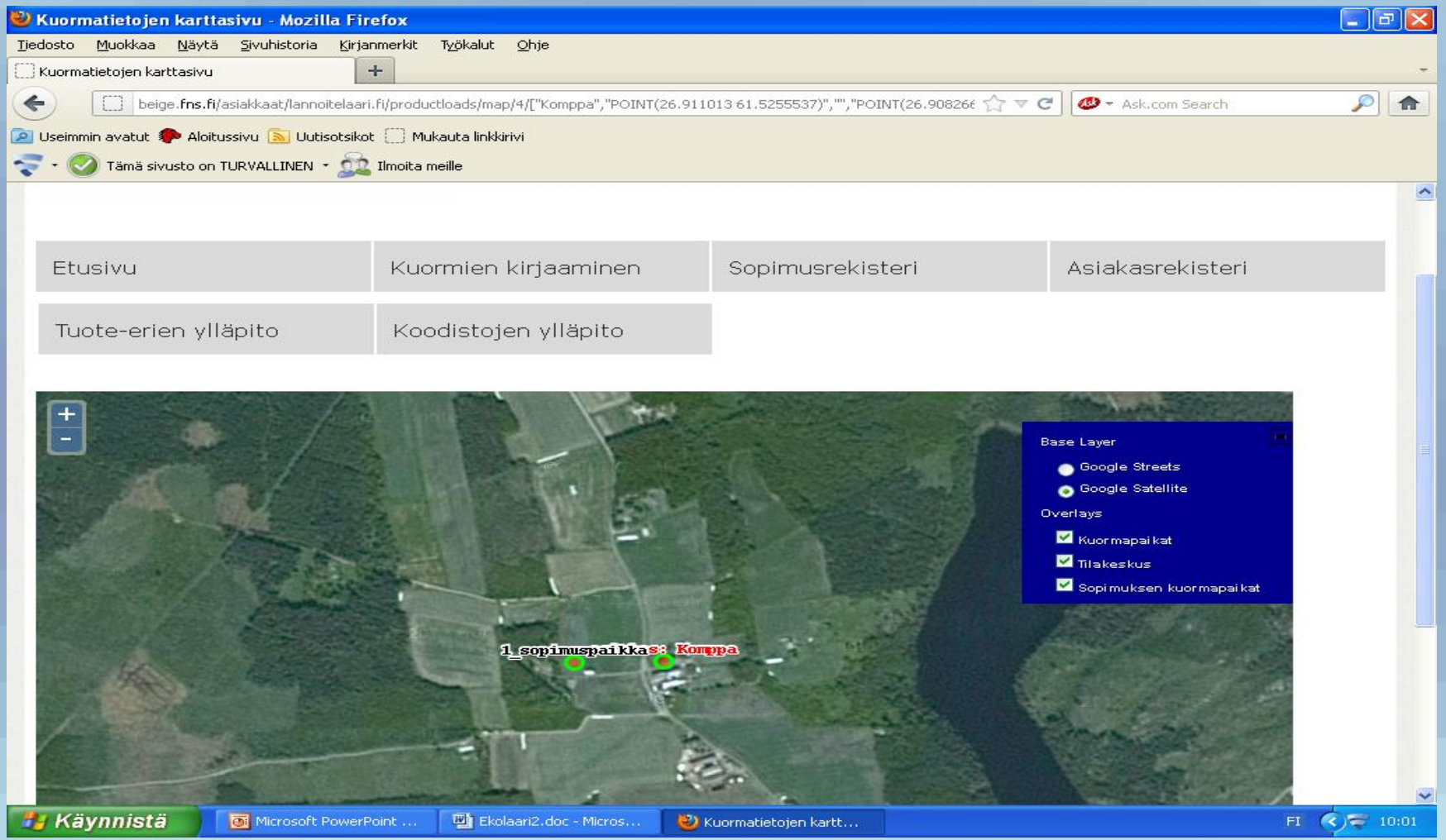
The delivery location on a map is displayed eg. With a Google Maps service



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Customer case in Finland using Suomen Ekolannoite sludge treatment solution year 2012 & 2013

Farm field 1 , near city of Mikkeli, Finland using SEL treated sludge

2012 Organic fertilizing (Sludge + Saltpeter

2012 sludge was used 17-20 tn/ha both field and saltpetre (Suomen salpietari) 80 kg/ha Cost of using sludge was 80 € /ha

Yield: Barley 4500kg/ha

Fertilizing cost total/year 2012: 76 €/ha

Fertilizing cost total/year 2013: 60 €/ha

Alternative cost: traditional solution using Yara's mineral fertilizers

YaraMila Pellon Y 5 fertilizer 410 kg/ha, cost of fertilizer ca. 0,40 €/kg = 164 €/ha (V.A.T. 0 %)

SAVINGS FROM AQUAZONE SOLUTION 88 €/ha or 54% in 2012

SAVINGS FROM AQUAZONE SOLUTION 104 €/ha or 64% in 2013

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Cost of Equipment

Total treatment machinery cost for example 70 000 people plant 250 000€

Including

- License from Suomen Ekolannoite ltd
- Mixing vessel
- Tractor (from the client)
- Chemical dosing station
- Need for 100-200m2 area => very small foot print!
- Contruct with transportation company

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We offer 2 alternative solution for sludge treatment

1. Sludge management units ready for operation (turn-key-solution)
   - Equipment delivery & installation
   - Training
   - Consulting

2. Sludge management units + full operation as a service

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Farmer field used only SEL manure


Catros 5500
AMAZONE
TRIMA
T7050


Potkua pellolle!

tetään
alevittimellä

Sludge or digested sludge will return nutrients and humus back to the land

Additional Information, please contact us:

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