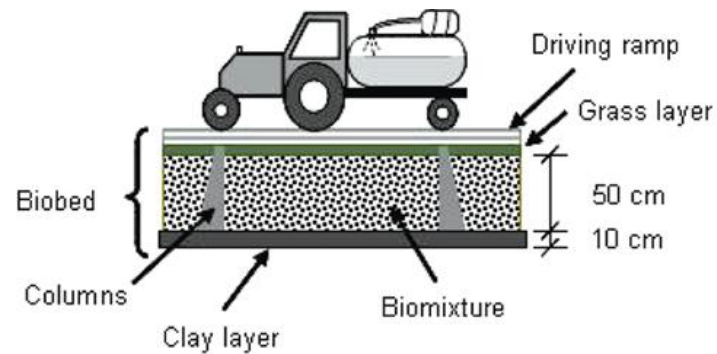


Swedish biobeds revisited.

State of the art on their 20th anniversary.



Leticia Pizzul¹, Maria del Pilar¹ Castillo and Eskil Nilsson²

¹ JTI - Swedish Institute of Agricultural and Environmental, Uppsala, Sweden

² Visavi God Lantmannased AB, Vellinge, Sweden

1993: first biobed is built in Sweden



2013: how are they built?
how are they maintained?
how are they functioning?
what do farmers think of them?

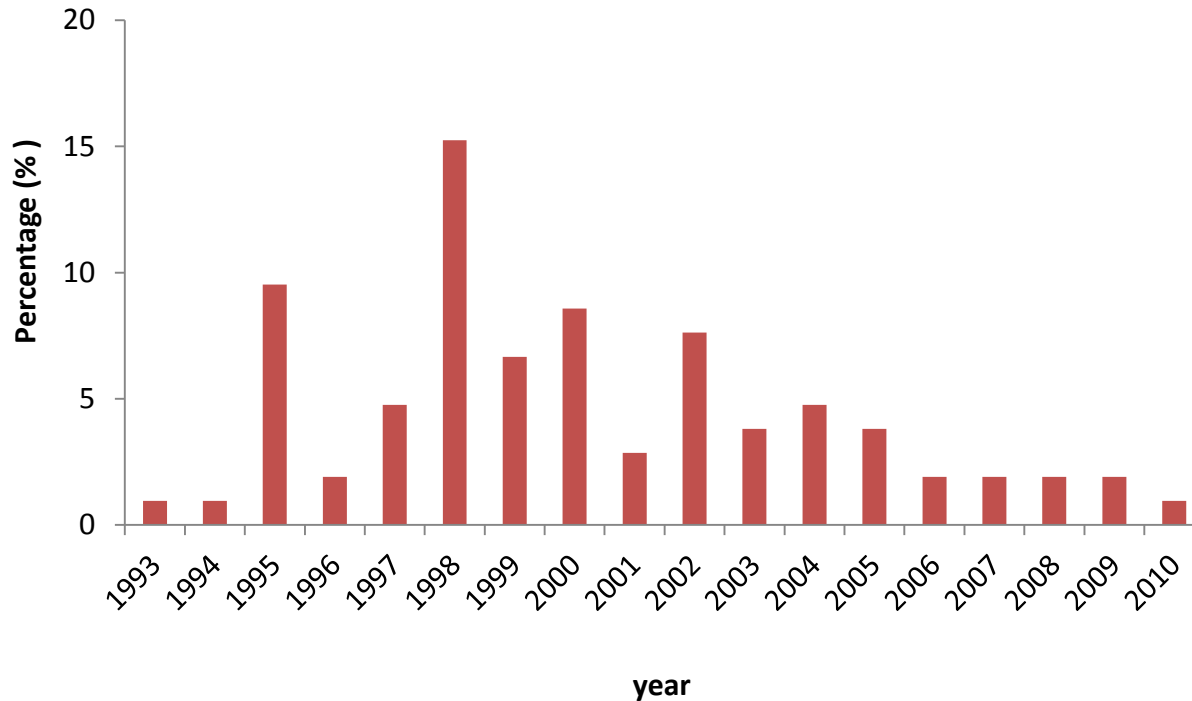
Material and method

- Anonymous questionnaires
- Sent to 22 offices of the County Administrative Board
- 2010, 2011 and 2012
- Pooled and only questions with answers were considered in the analysis

Results

Results

When was the biobed built?

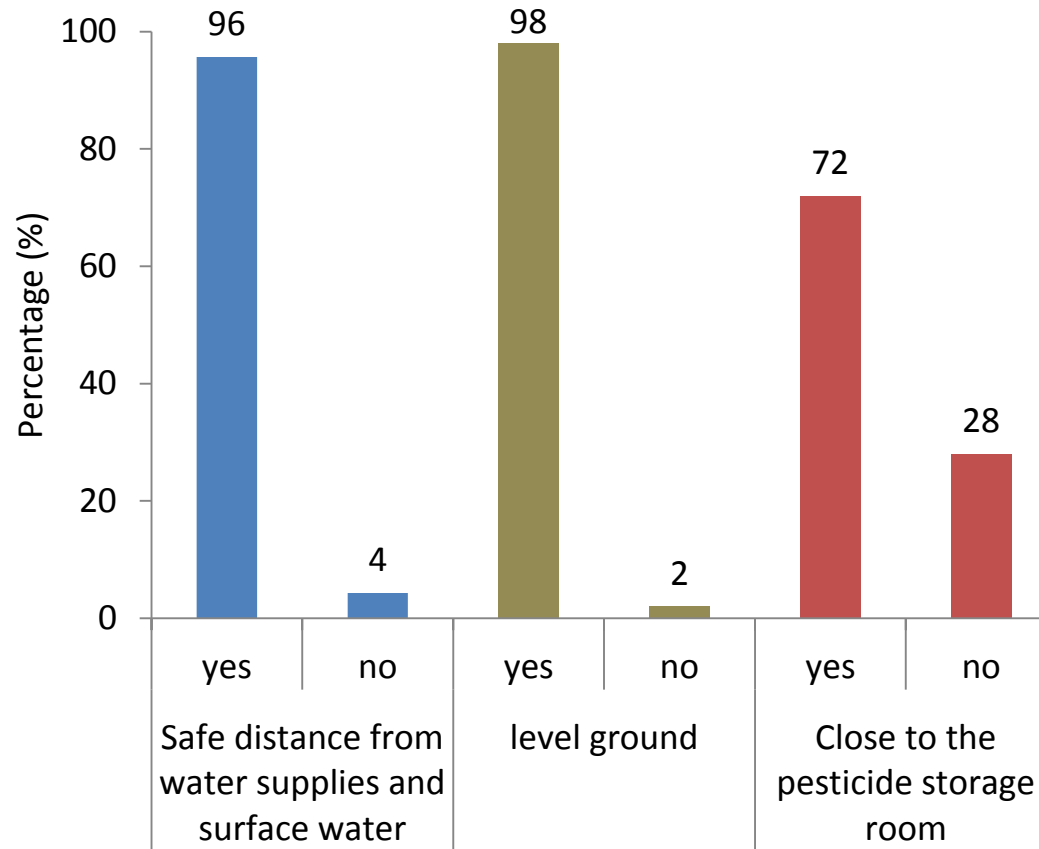


Recommendation

Evaluation

- Minimum 15 meter safety distance to watercourses, water supply, drainage wells and at level ground
 - A short distance to the pesticide storage room
-

Where in the farm?



Recommendation

Evaluation

- Minimum 15 meter safety distance to watercourses, water supply, drainage wells and at level ground

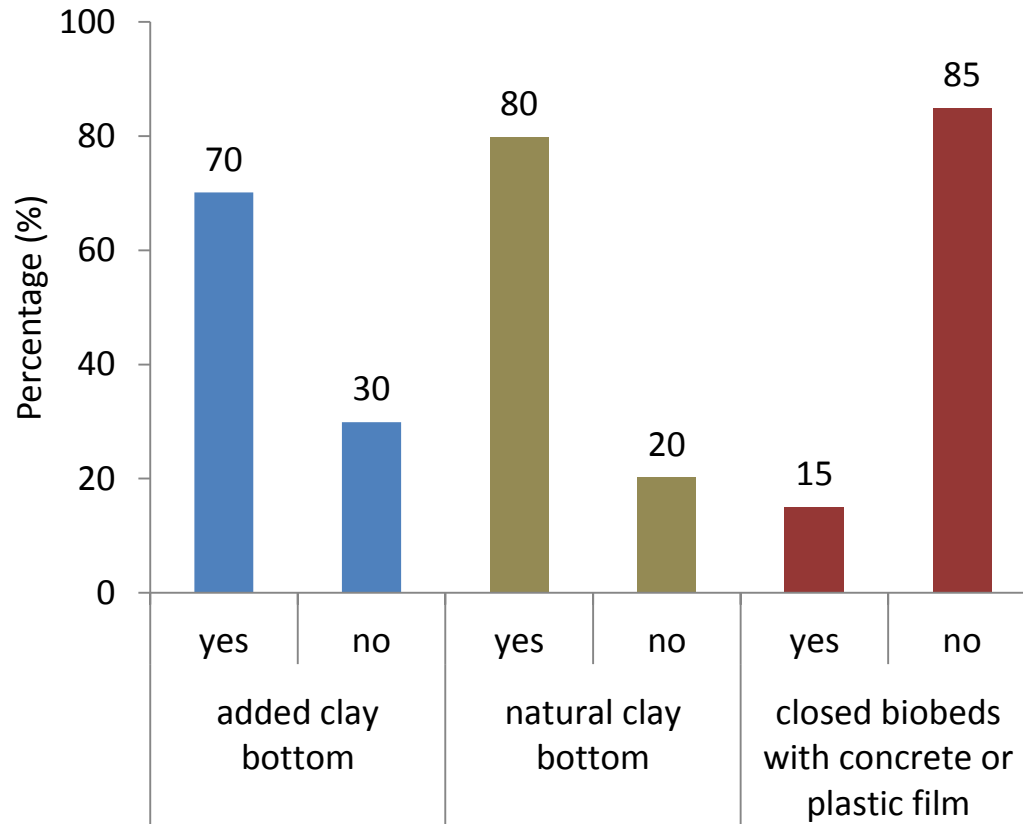
✓

- A short distance to the pesticide storage room

✓

- Presence of a natural clay layer on the bottom or added clay

Is the clay layer present?



Recommendation

Evaluation

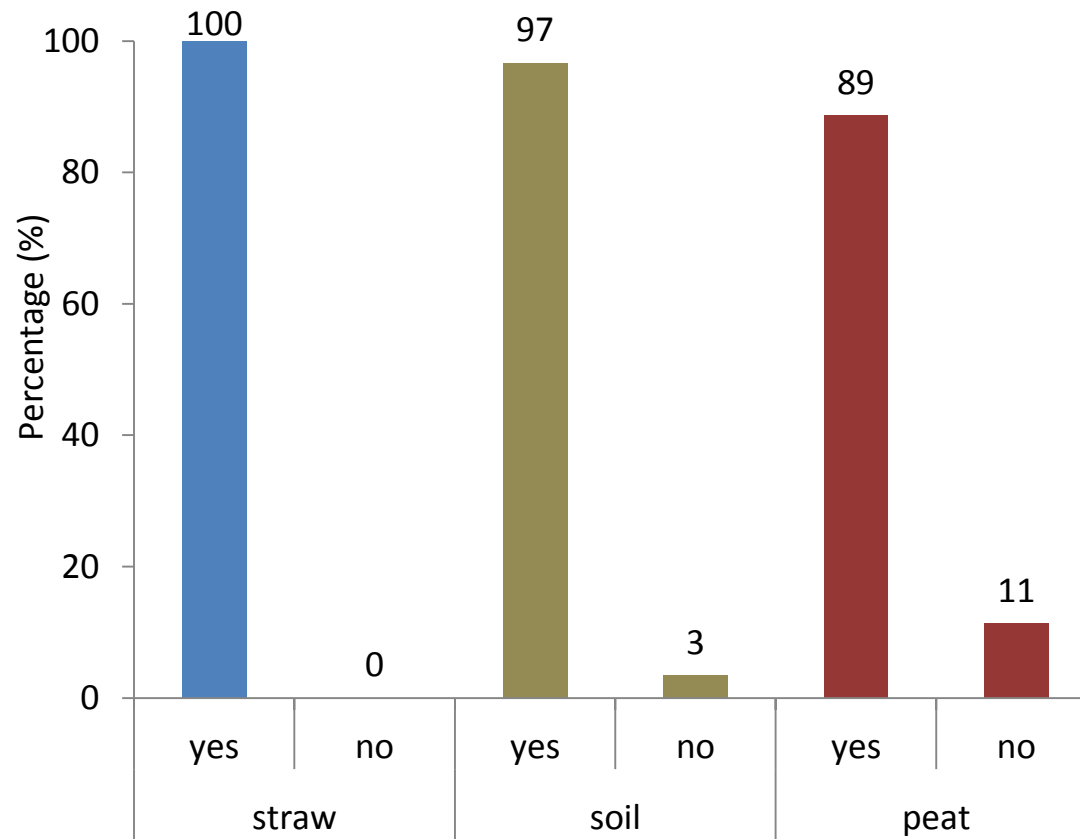
-
- Minimum 15 meter safety distance to watercourses, water supply, drainage wells and at level ground
 - A short distance to the pesticide storage room
 - Presence of a natural clay layer on the bottom or added clay
 - A mixture of soil, peat and straw (25:25:50)
-

✓

✓

✓

Biomixture: are all the components present?



Recommendation

Evaluation

- Minimum 15 meter safety distance to watercourses, water supply, drainage wells and at level ground

✓

- A short distance to the pesticide storage room

✓

- Presence of a natural clay layer on the bottom or added clay

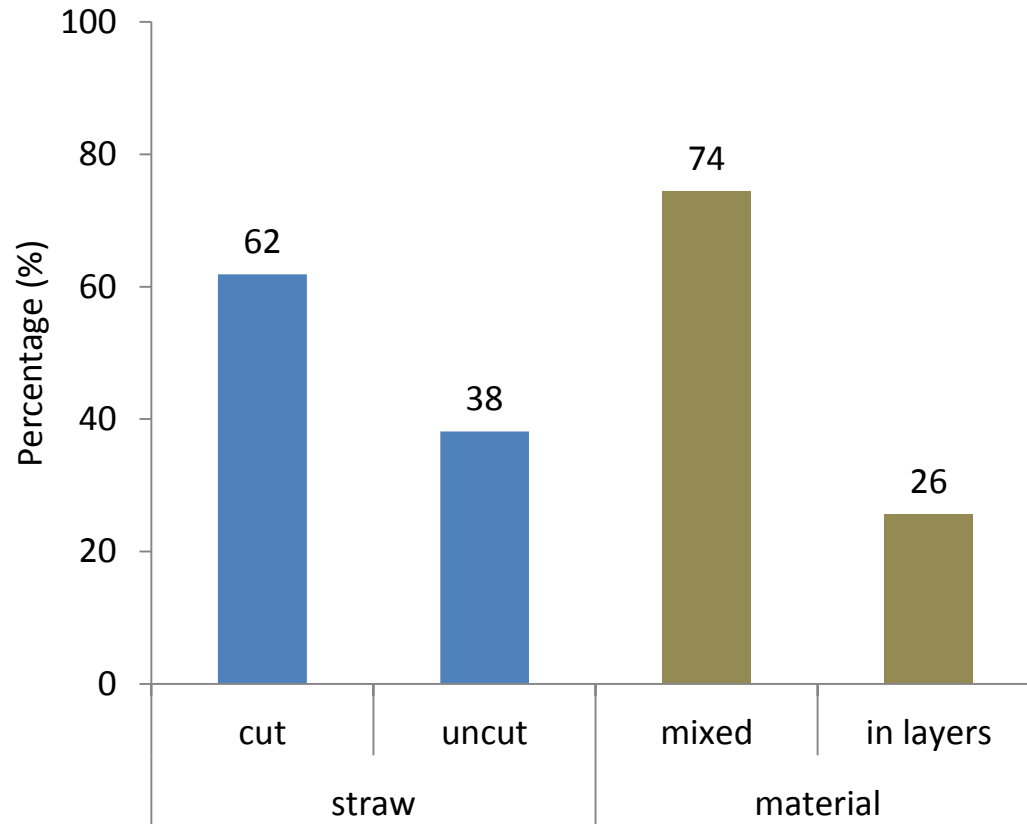
✓

- A mixture of soil, peat and straw (25:25:50)

✓?

- Chopped straw (5 cm) and mixed material

Biomixture: is the straw chopped? Is the material mixed?



Recommendation

Evaluation

- Minimum 15 meter safety distance to watercourses, water supply, drainage wells and at level ground

✓

- A short distance to the pesticide storage room

✓

- Presence of a natural clay layer on the bottom or added clay

✓

- A mixture of soil, peat and straw (25:25:50)

✓?

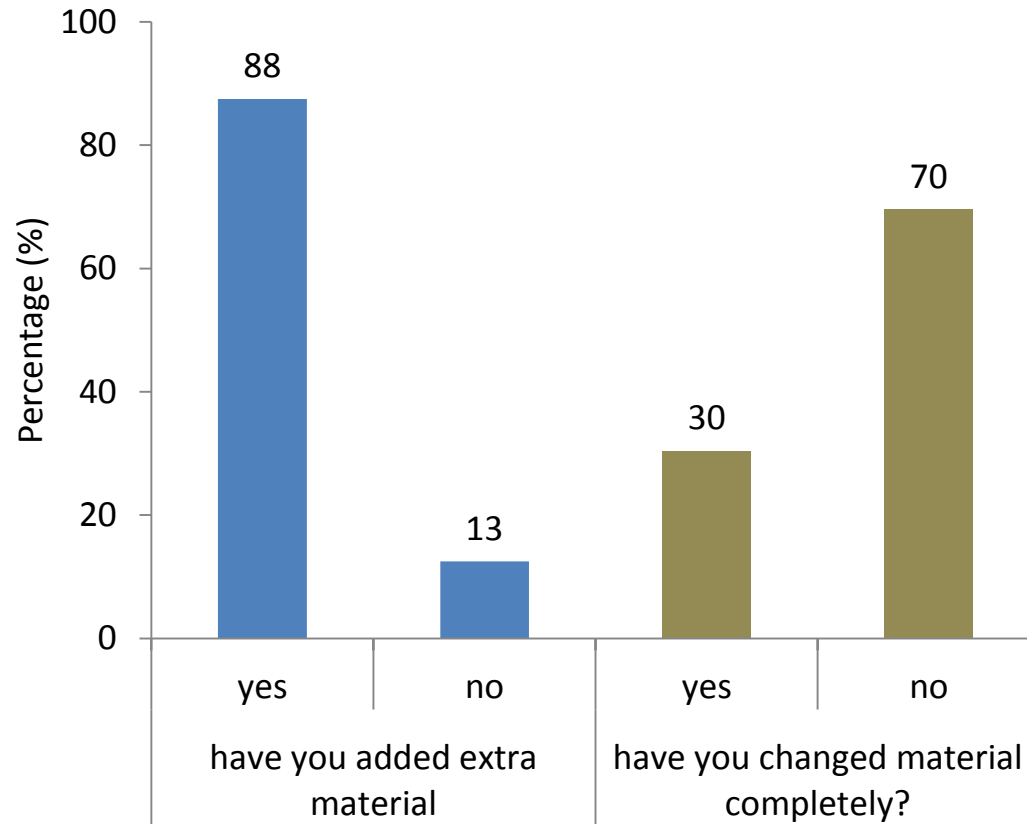
- Chopped straw (5 cm) and mixed material

!

- New biomix or straw has to be added yearly.

- Complete change of biomix must be done after 5-8 years.

Changes of biomixture

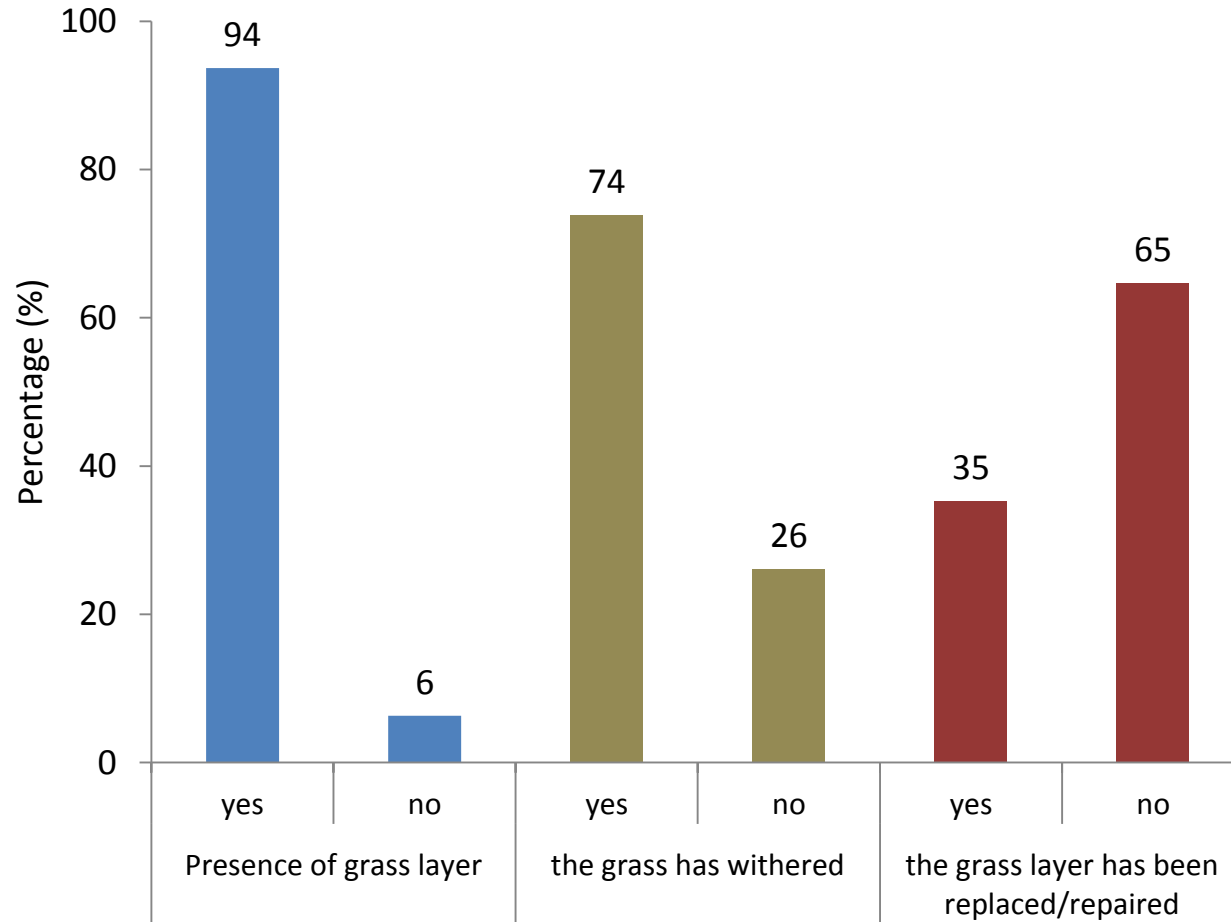


Recommendation

Evaluation

-
- Minimum 15 meter safety distance to watercourses, water supply, drainage wells and at level ground ✓
-
- A short distance to the pesticide storage room ✓
-
- Presence of a natural clay layer on the bottom or added clay ✓
-
- A mixture of soil, peat and straw (25:25:50) ✓?
-
- Chopped straw (5 cm) and mixed material !
-
- New biomix or straw has to be added yearly. ✓
-
- Complete change of biomix must be done after 5-8 years. !
-
- Grass layer kept always green
-

Grass layer

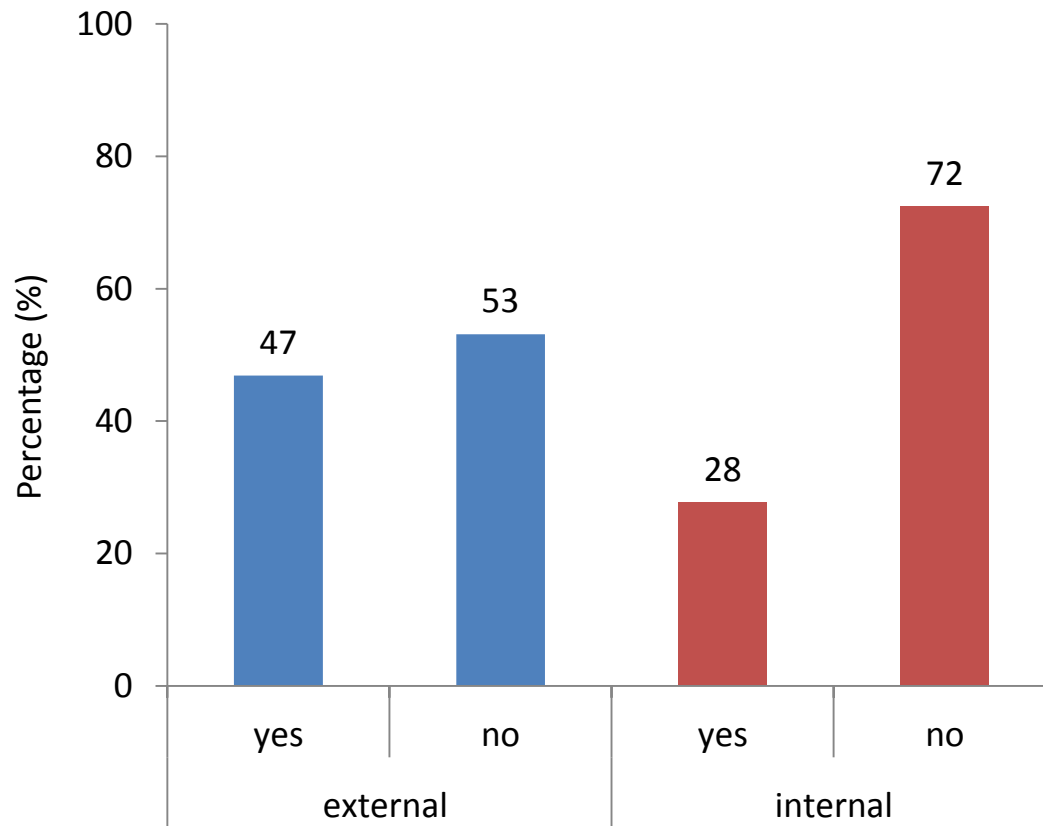


Recommendation

Evaluation

-
- Minimum 15 meter safety distance to watercourses, water supply, drainage wells and at level ground ✓
-
- A short distance to the pesticide storage room ✓
-
- Presence of a natural clay layer on the bottom or added clay ✓
-
- A mixture of soil, peat and straw (25:25:50) ✓?
-
- Chopped straw (5 cm) and mixed material !
-
- New biomix or straw has to be added yearly. ✓
-
- Complete change of biomix must be done after 5-8 years. !
-
- Grass layer kept always green ✓?
-
- Swedish biobeds are designed as a filling place and not for the treatment of big volumes of water
-

Is the sprayer washed on the biobed?



Recommendation

Evaluation

• Minimum 15 meter safety distance to watercourses, water supply, drainage wells and at level ground	✓
• A short distance to the pesticide storage room	✓
• Presence of a natural clay layer on the bottom or added clay	✓
• A mixture of soil, peat and straw (25:25:50)	✓?
• Chopped straw (5 cm) and mixed material	!
• New biomix or straw has to be added yearly.	✓
• Complete change of biomix must be done after 5-8 years.	!
• Grass layer kept always green	✓?
• Swedish biobeds are designed as a filling place and not for the treatment of big volumes of water	!

Recommendation

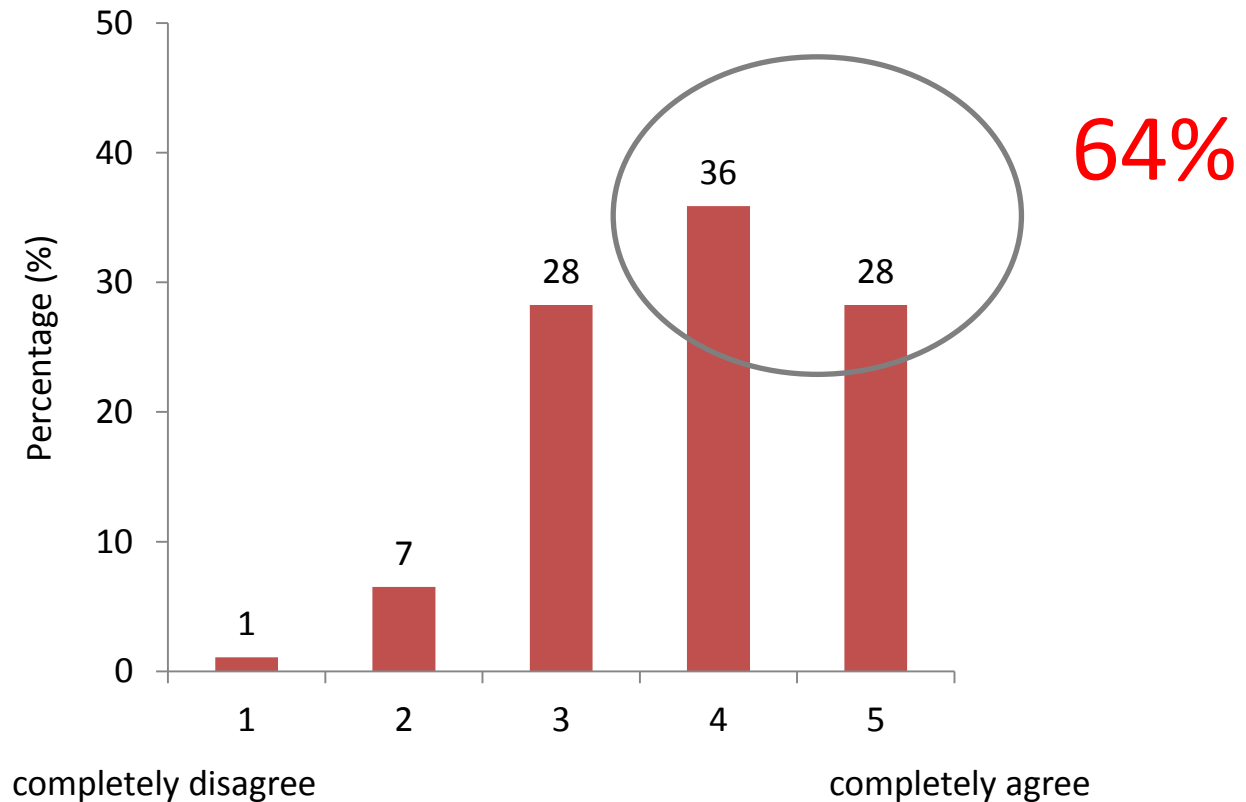
Evaluation

-
- Minimum 15 meter safety distance to watercourses, water supply, drainage wells and at level ground ✓
-
- A short distance to the pesticide storage room ✓
-
- Presence of a natural clay layer on the bottom or added clay ✓
-
- A mixture of soil, peat and straw (25:25:50) ✓?
-
- Chopped straw (5 cm) and mixed material !
-
- New biomix or straw has to be added yearly. ✓
-
- Complete change of biomix must be done after 5-8 years. !
-
- Grass layer kept always green ✓?
-
- Swedish biobeds are designed as a filling place and not for the treatment of big volumes of water !
-
- Biobeds should be big enough to include the spraying equipment and a working area. ✓?

Recommendation	Evaluation
• Minimum 15 meter safety distance to watercourses, water supply, drainage wells and at level ground	✓
• A short distance to the pesticide storage room	✓
• Presence of a natural clay layer on the bottom or added clay	✓
• A mixture of soil, peat and straw (25:25:50)	✓?
• Chopped straw (5 cm) and mixed material	!
• New biomix or straw has to be added yearly.	✓
• Complete change of biomix must be done after 5-8 years.	!
• Grass layer kept always green	✓?
• Swedish biobeds are designed as a filling place and not for the treatment of big volumes of water	!
• Biobeds should be big enough to include the spraying equipment and a working area.	✓?

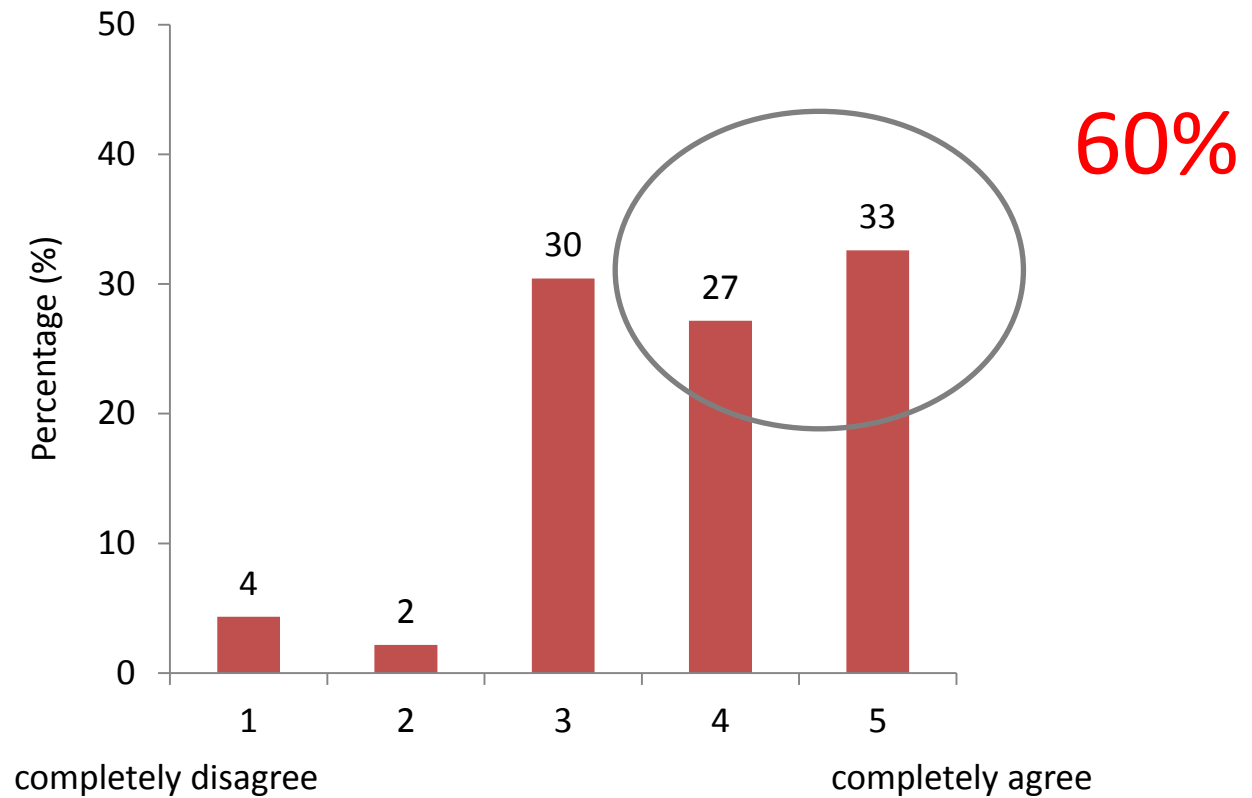
The farmer's view

Biobeds are **easy to build**



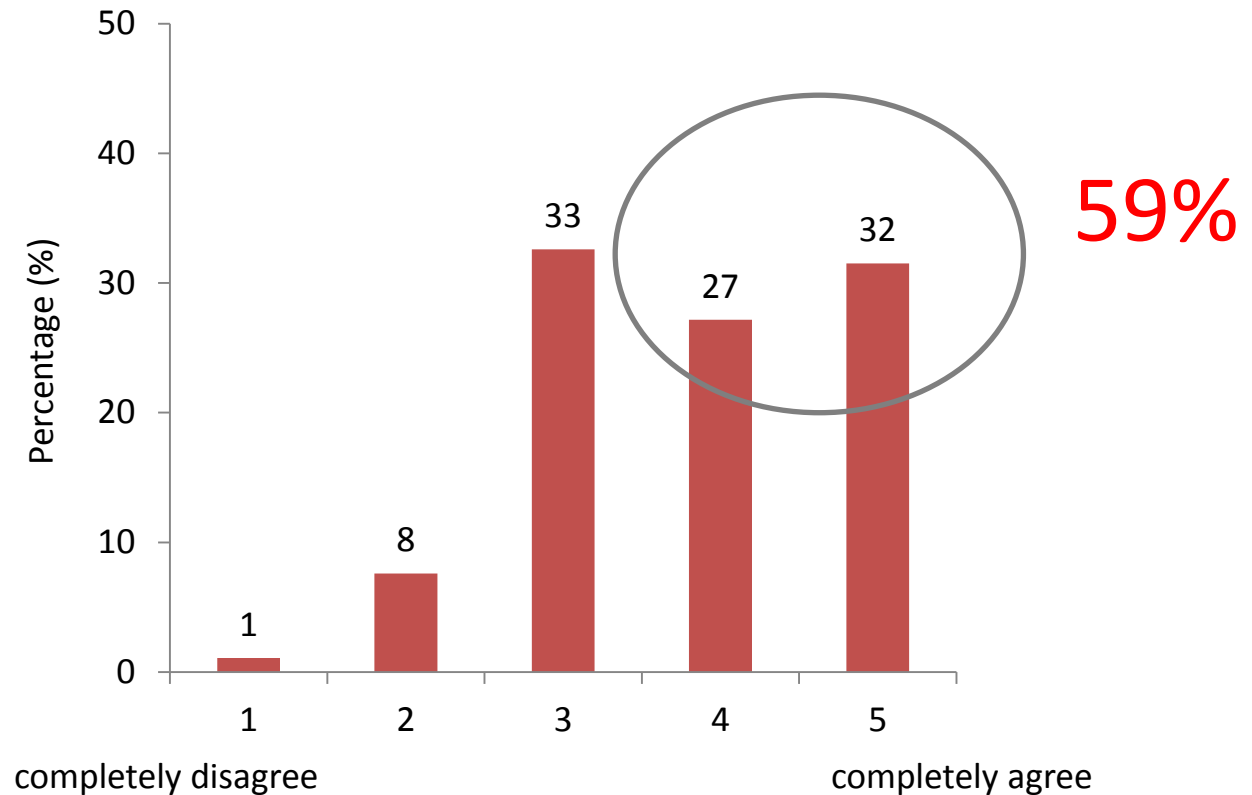
The farmer's view

Biobeds are **environmentally safe**



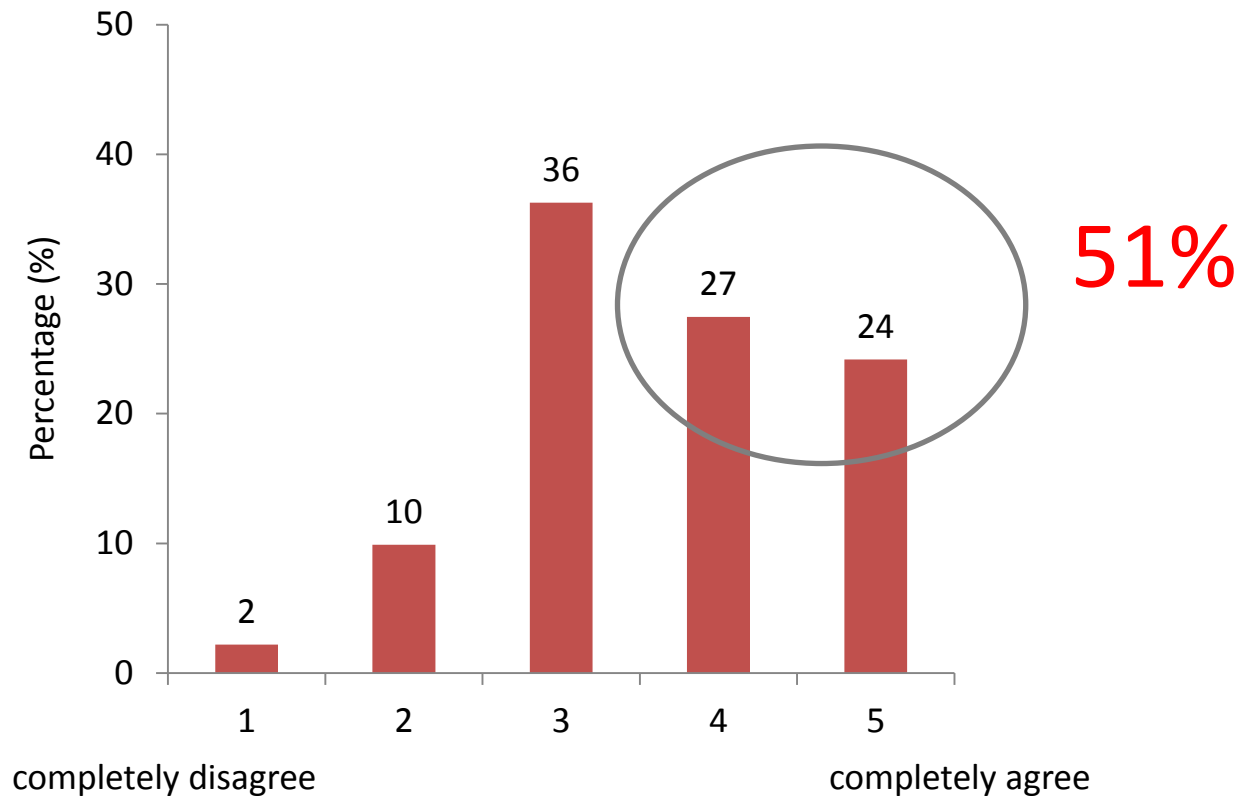
The farmer's view

Biobeds are **cheap to build**



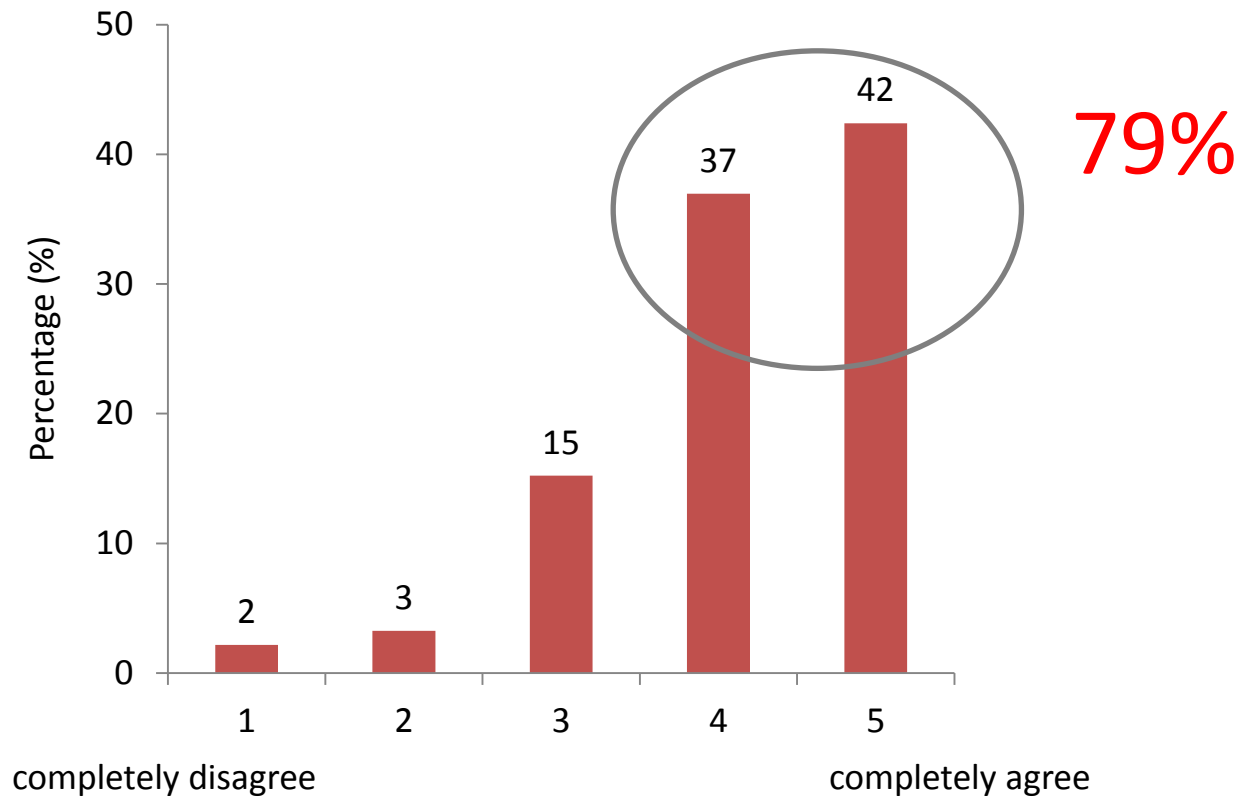
The farmer's view

Biobeds are **easy to maintain**



The farmer's view

Biobeds are practical to use



Conclusions and future perspectives

- Biobeds are a good system to handle pesticides, practical and cheap and easy to build
- Biobeds are considered environmentally safe by the farmers
- In general they are built and run properly
- In some cases incorrect preparation, unintended use and lack of maintenance

Conclusions and future perspectives

- Improve how information is communicated and distributed
- Introduction of other types of biobeds (e.g. lined biobeds for higher water loads)
- Evaluate the capacity of the existing biobeds to retain and degrade pesticides

Thank you for your attention