

# Role of farmers in improving the sustainability of sanitation systems

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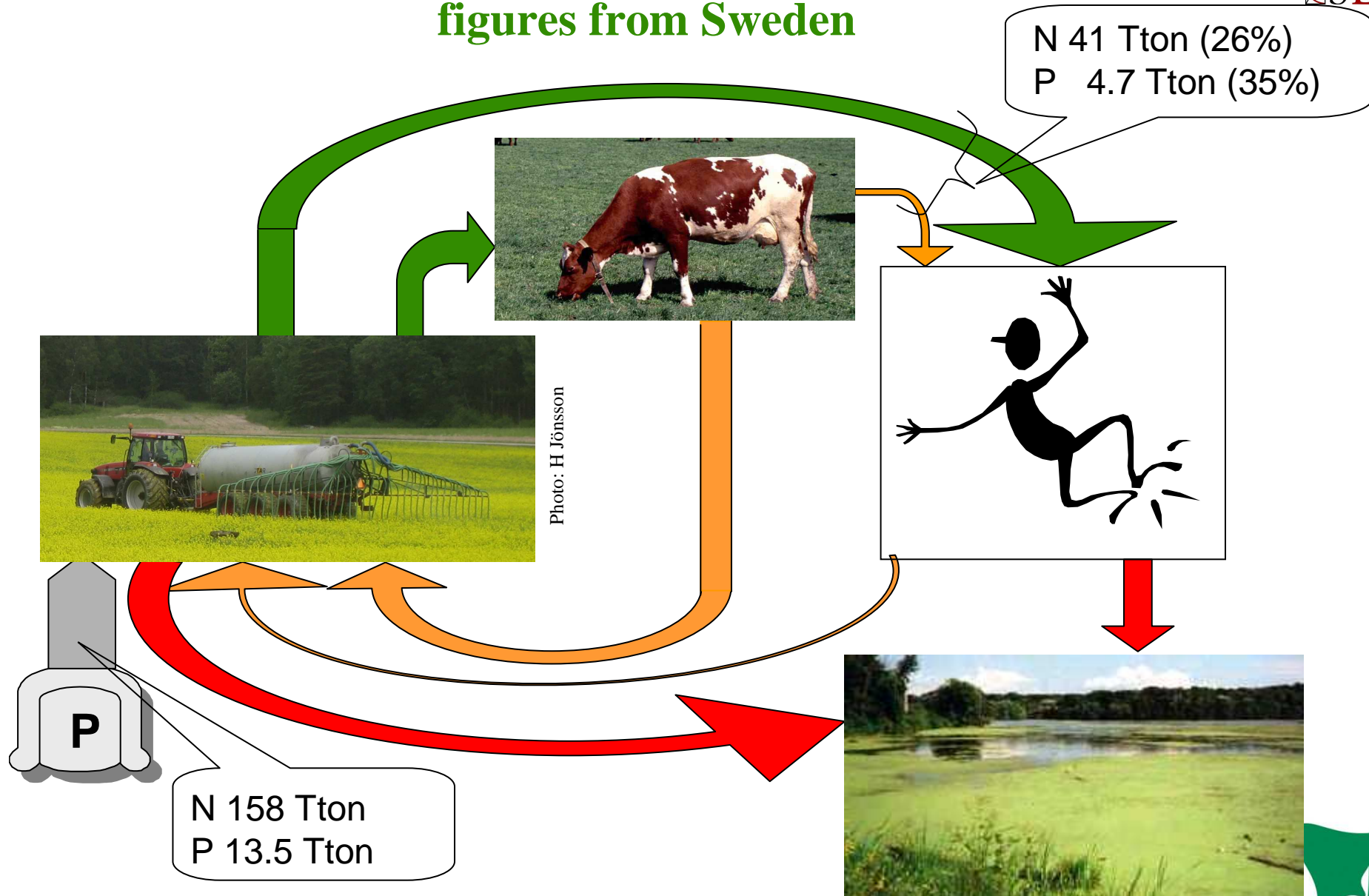
Photo: WME Ecology



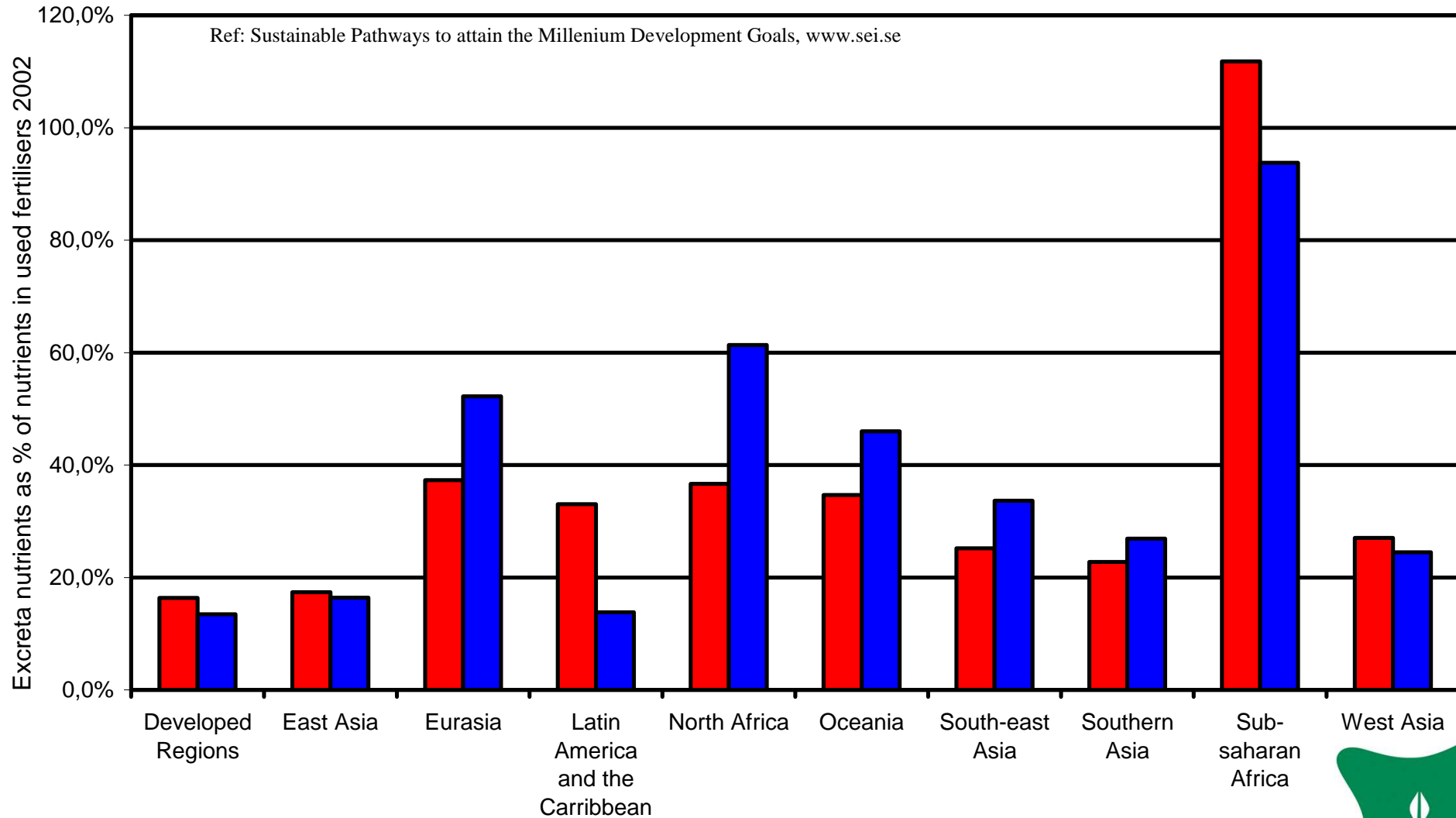
Photo: H Jönsson



# Excreta nutrient flows are major figures from Sweden



## Similar relative size in most regions far larger in Sub-saharan Africa



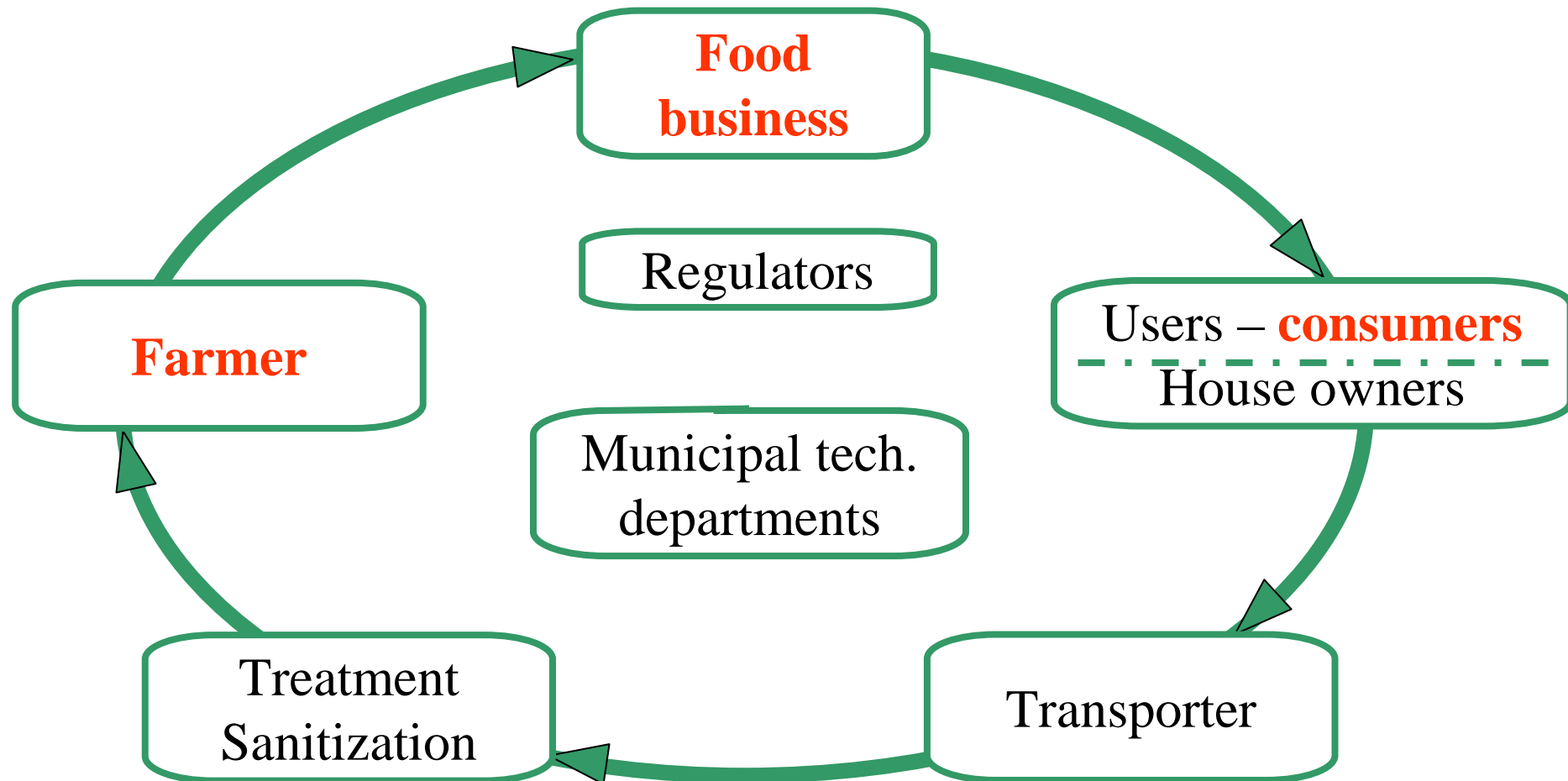
# Well designed and implemented recycling sanitation systems have big advantages

- Decrease water emissions
- Save chemical fertilizers
  - Can give subsistence farmers access to nutrients
- Save energy
- According to many environmental systems analyses

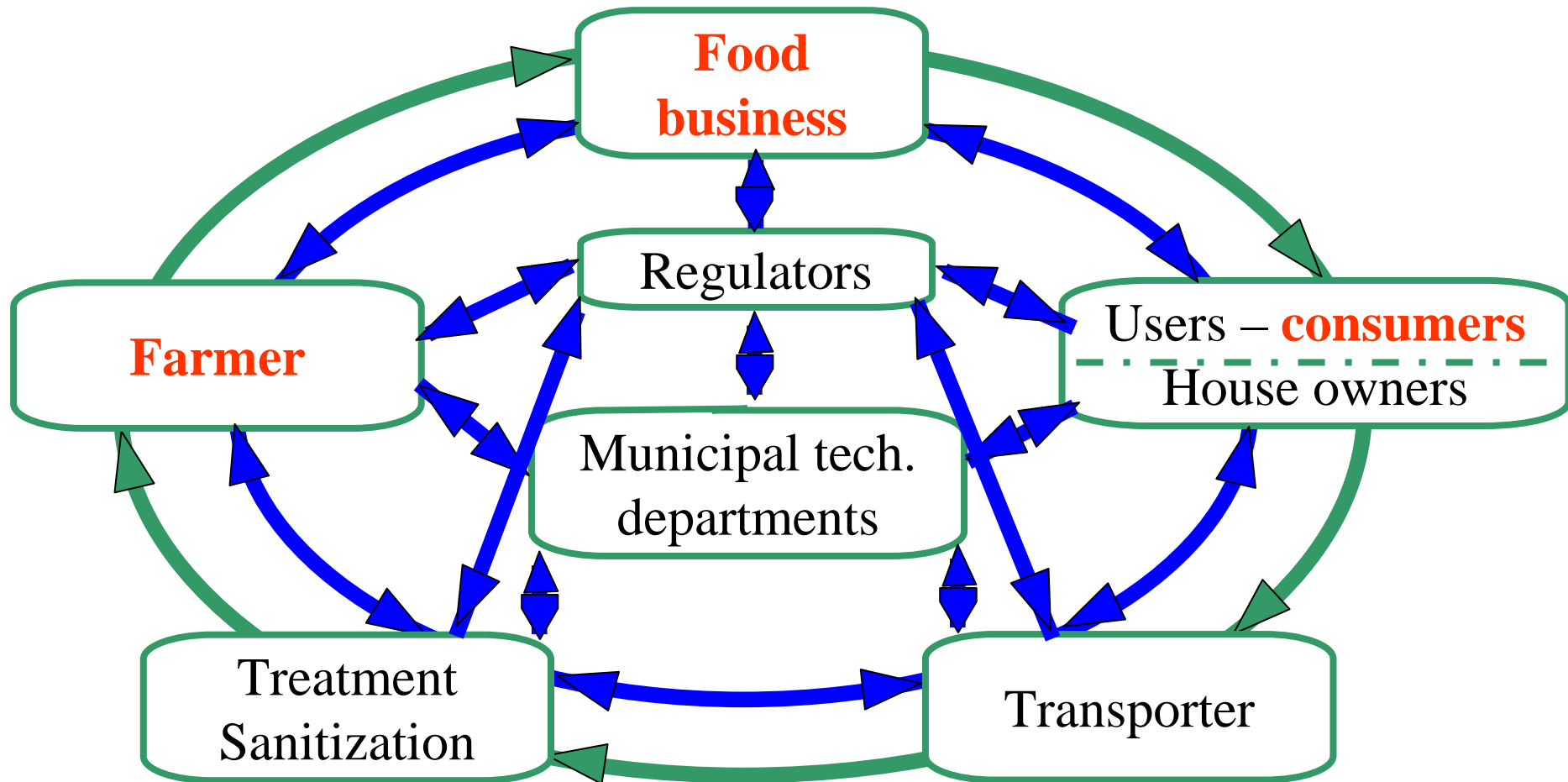
# Reuse needed for system to be sustainable

- Large systems built by housing companies in Sweden in the 90-ies
  - In some systems, no reuse was achieved – urine overflowed to the “other” sewage system.
  - Several of these have been changed back to conventional systems (examples Ekoporten, Ekohuset, etc.)
- Håga by, a system with reuse, but no replacement of chemical fertilizer partly (50-70%) changed back to conventional
  - **Problems with the toilet**
  - No replacement of chemical fertilizers
  - Extra cost of urine spreading
  - But decreased emissions and saved money for municipality

# But many stakeholders



# Trust, information and a common vision and understanding!



# Which are the drivers of the stakeholders? Is there a common vision?

- Study of 7 functioning recycling systems in Sweden
  - 3 systems recycling urine
  - 2 systems recycling blackwater
  - 1 system urine and blackwater
  - (1 system sewage sludge)
- Semi structured interviews of 1 farmer and the system coordinator of each system
- Published in *Tidåker, P. (2007) Integrating farming and wastewater management. Doctoral diss. Dept. of Biometry and Engineering, SLU. Acta Universitatis Agriculturae Sueciae vol. 2007:85.*
- In addition, experiences from many other projects and systems



# Drivers of the municipalities – system coordinators

- Replacement of chemical fertilizers
- Decreased eutrophying emissions
  - Being able to develop difficult housing areas
- Recycling of sewage phosphorus (60% national goal)
- Municipality responsible for handling household waste according to waste hierarchy

# Drivers of farmers

- New concept – interesting new business alternative
- Decreased eutrophying emissions
- Low, or no priority to replacement of chemical fertilizers (except sludge user)
  - It was only in two systems where the system coordinator had full control that full replacement was achieved + farm with sludge.

## Why low priority to replacement?

- In most cases, the nutrient content was not declared
  - Farmers do not usually analyze the manure
  - Conservative approach is then not to replace chemical fertilizer – you still get additional yield
- Nutrient flows with the urine and blackwater were small compared to the total flows on the farm
  - Sufficient for some 1-10 ha per year – hardly worth while to readjust the chemical fertilizer spreader. (Urine from about 40 persons needed per ha)
- Blackwater was very dilute – small effect even from highest doses with a spreader
  - Irrigation needed to get sufficient nutrient doses.

# How can we build the trust and a common vision and understanding?

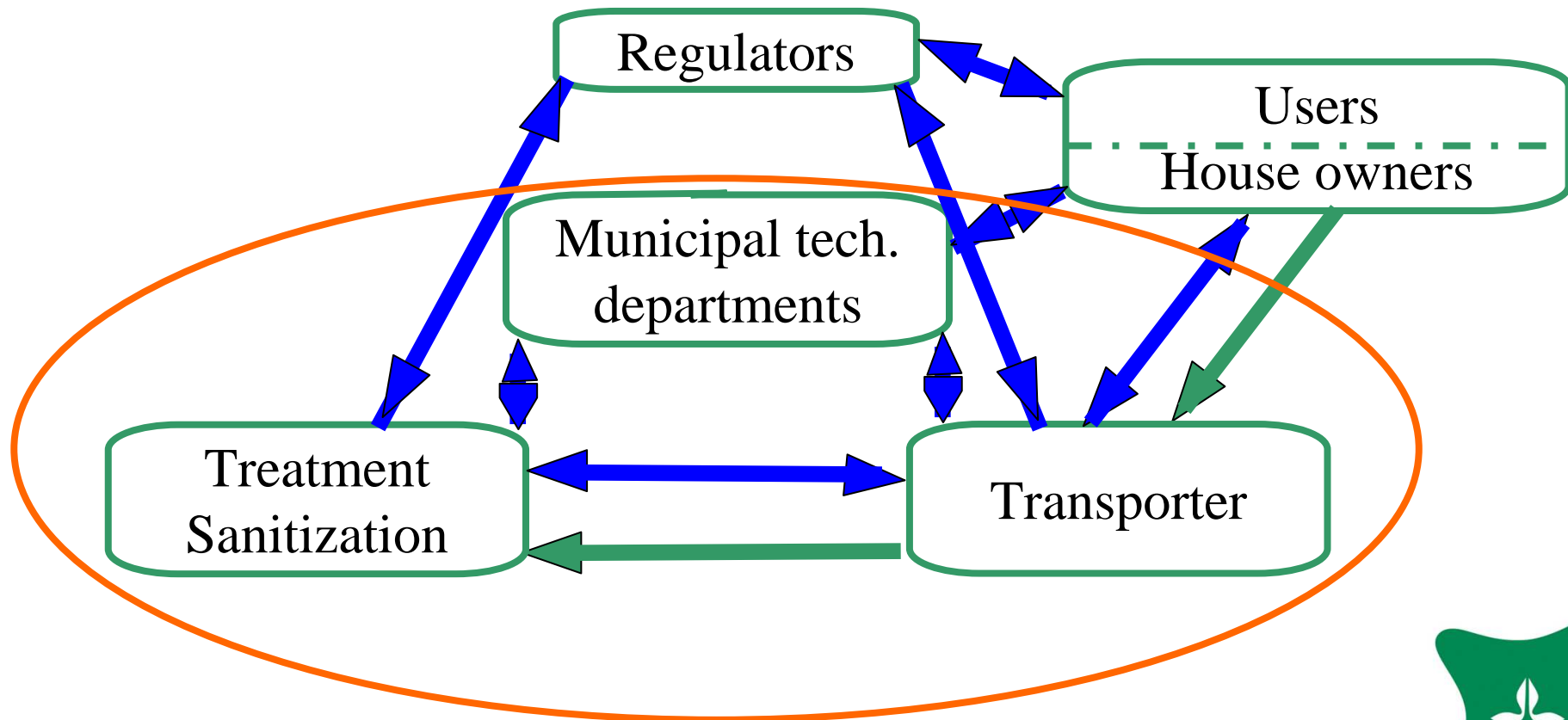
## Promote ownership and let it take time

- Involve the farmers, just as the other stakeholders already in the initial planning
- Minimize the number of stakeholders
- Be a good example – show trust in the system
- Create an arena of communication

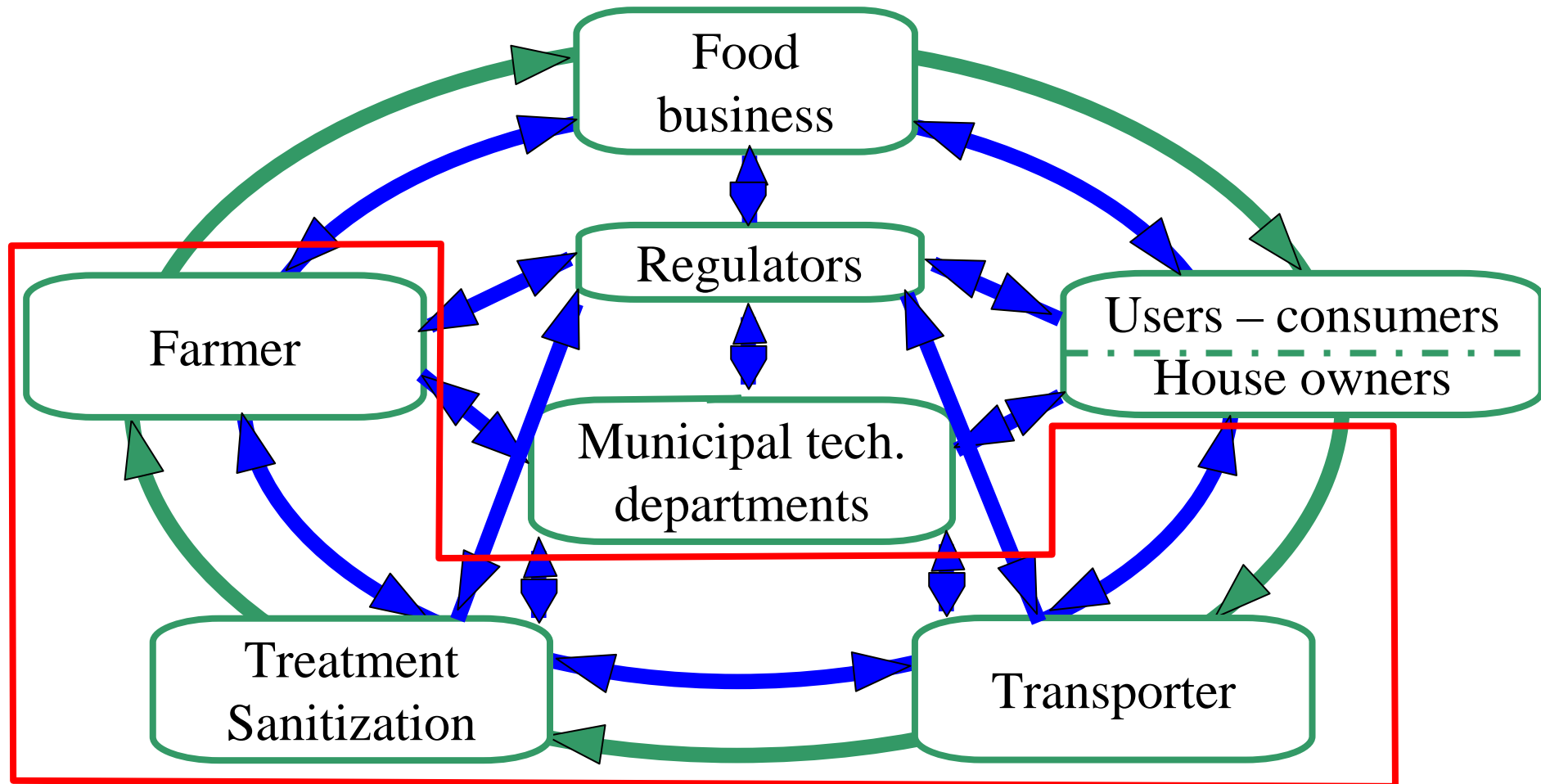
# Restrictions to reuse on farms

- Limited acceptance of urine and blackwater reuse by food business
  - Usually no special rules for urine and/or blackwater, thus treated as sewage sludge (Catch 22)
  - Sewage sludge is not accepted
- No acceptance by EU in ecological farming (one system in Sweden has a national exemption)
- Urine and blackwater is mainly used for fodder and energy crops
- Hygiene requirements – sanitation is needed
- Access to machinery, storage and suitable soils and crops.

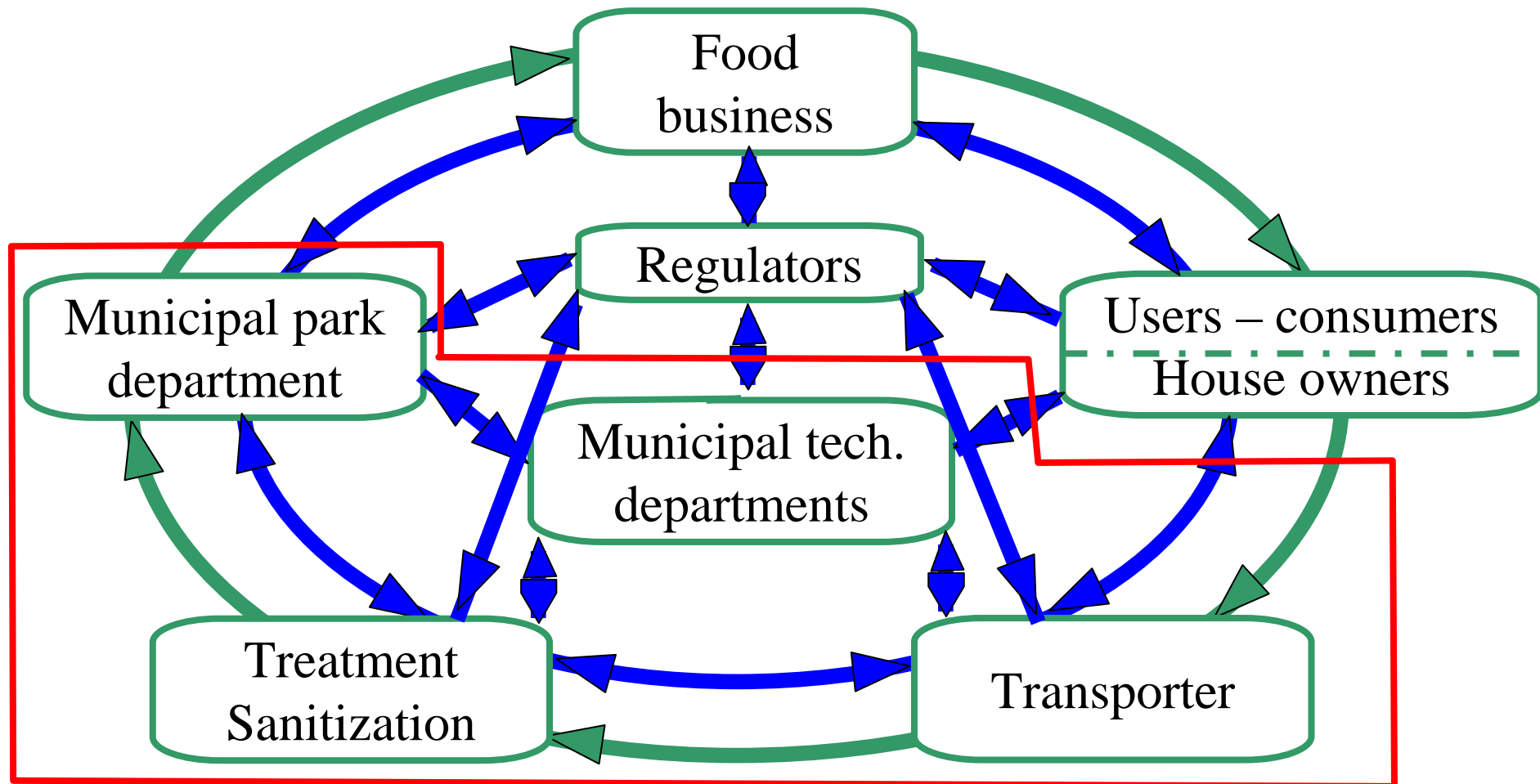
# Learn from the conventional system – minimize the no of stakeholders



# Use farmer as entrepreneur and minimize no of stakeholders

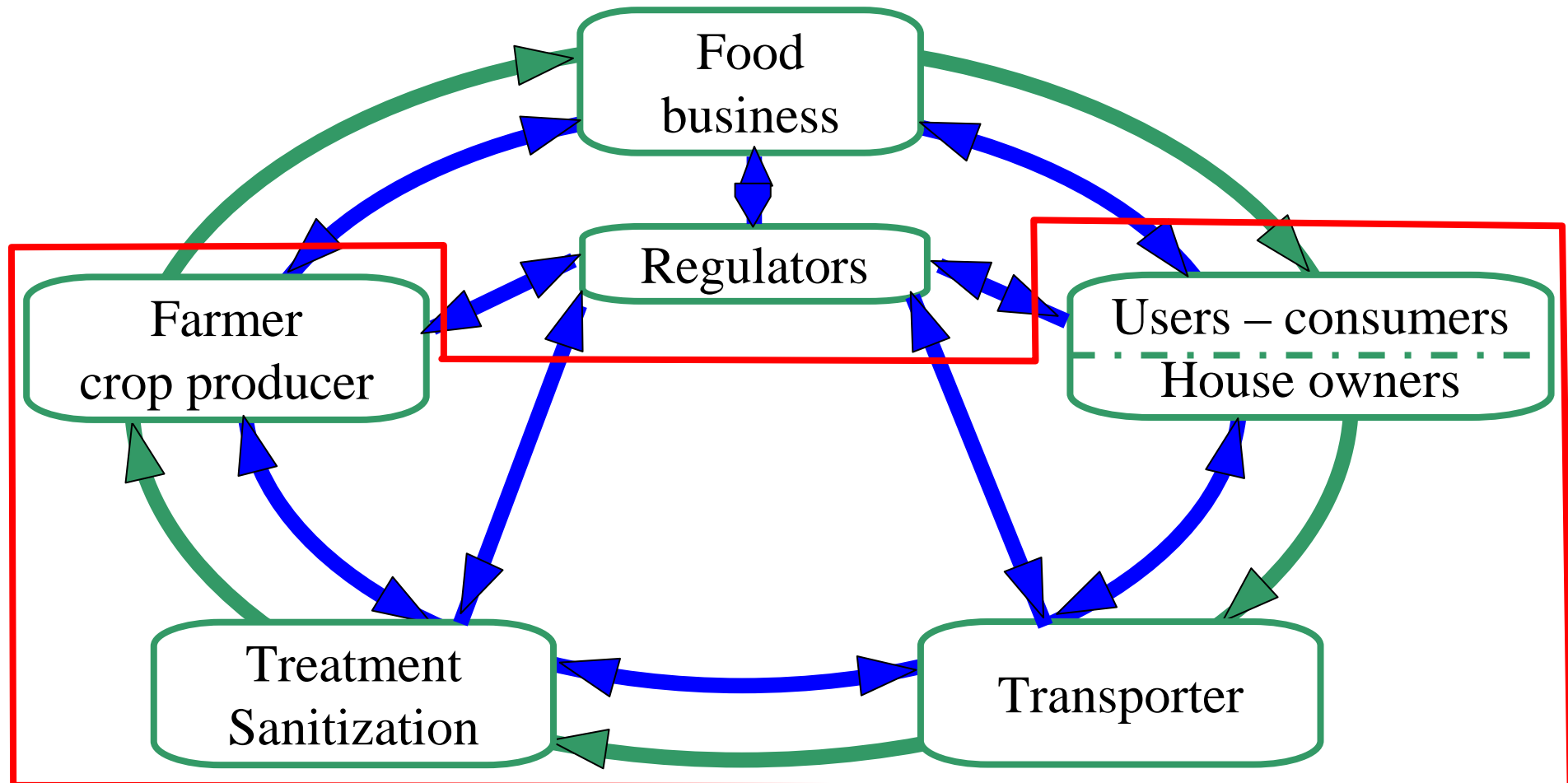


# Set a good example – promote reuse in municipality





# Set a good example – promote reuse on site



# Set a good example – promote reuse on site

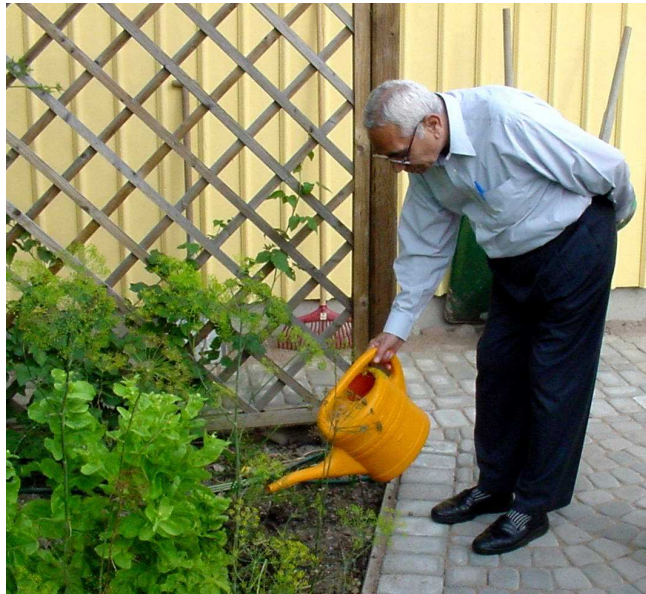
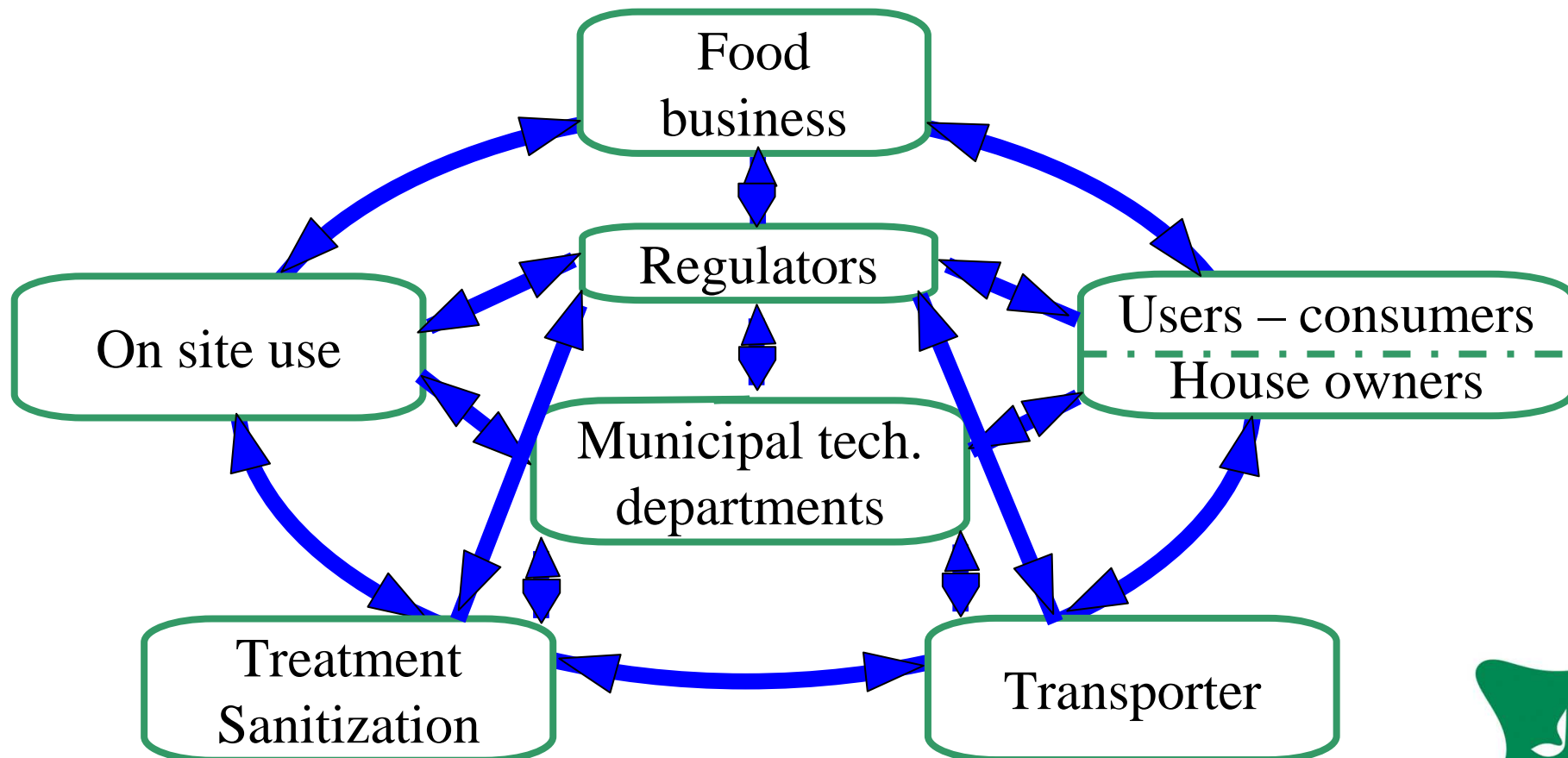


Photo: Håkan Jönsson

Photo: Peter Morgan

# Create an arena for communication

- Regular meetings
- Newsletter
- Internet forum



# Conclusions

To succeed with recycling of excreta nutrients

- The reusers are as important as the users!
- Involve all stake holders from the start!
- Use farmer as entrepreneur and businessman, not just as crop producer
- Set a good example – promote reuse on site and in municipality
- Create an arena for communication

# Thank you for your attention



Photo: Håkan Jönsson