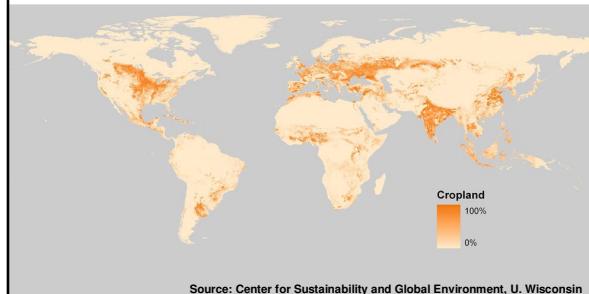
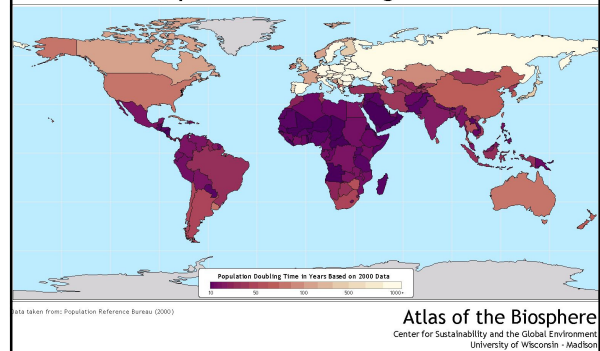


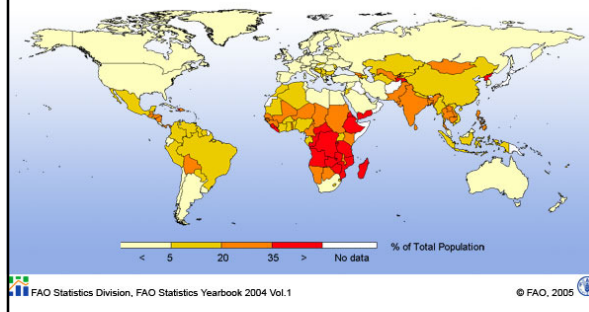
~12% of Earth's land surface is arable
(1.4 billion ha)



Population Doubling Time



Food security:
>800 million undernourished people



What can farmland contribute?



Waterbirds on Working Lands

Where has research been focused?
What crops are used by birds?
How do birds use crops?

What value do they provide?
How can value be improved?
Identify areas for future research
Propose farming solutions



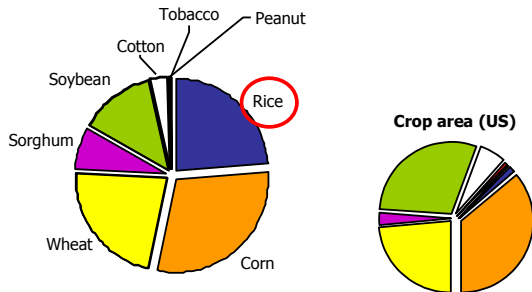
Systematic review

North American focus
146 wetland-associated bird species

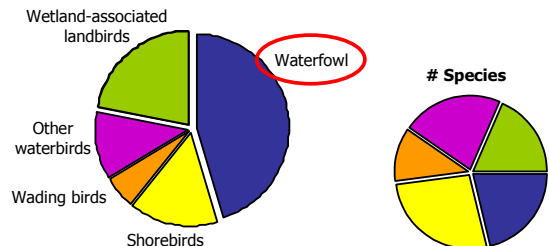
Nine major row crops
(rice, spring wheat, winter wheat, corn, soy, sorghum, cotton, peanut, tobacco)

Web of Science	}	527 articles 349 North America
Agricola		
Wildlife & Ecology Studies Worldwide		
Birds in Agricultural Areas		
Birds of North America		
Ad-hoc reviews & peer review		

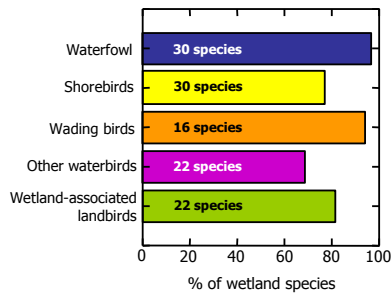
Which crops have been studied?



Which species have been studied?



Which species use row crops?



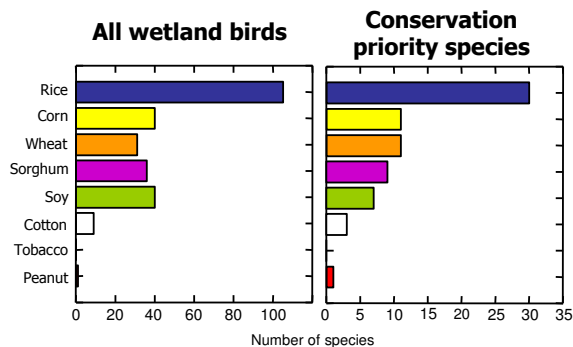
120/146 species use at least one crop

Which species use row crops?

36 "conservation priority" species



Which crops are best?



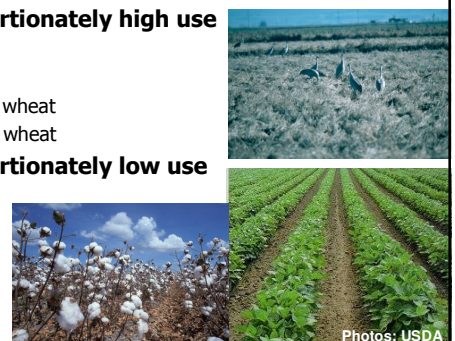
Which crops are best?

Disproportionately high use

- rice
- corn
- spring wheat
- winter wheat

Disproportionately low use

- soy
- cotton



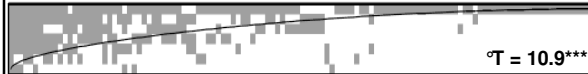
Which crops are best?

Crop use is highly nested (all seasons)

69 spp use 2+ crops

43 spp use 3+ crops

More filled cells above the line: more nested



Which crops are best?

Crop use is highly nested (all seasons)

69 spp use 2+ crops

43 spp use 3+ crops

Species rich crops do not exclude subsets of overall richness

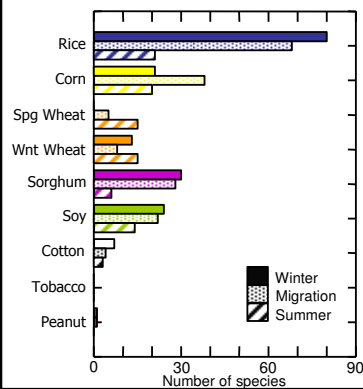
THIS:



NOT THIS:



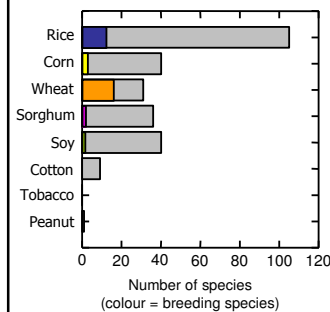
When are crops used?



Most use is during winter and migration

But some use during the breeding season (mostly for feeding)

What are crops used for?



Most use is for foraging

Wheat and rice are most commonly used for nesting

Caveat emptor

Habitat use \neq High quality habitat

Most research predates biotech crops

But, evidence suggests that even intensively farmed land can play a key role in waterbird conservation planning

