

XVth IWRA World Water Congress



SCARCITY, IRRIGATION EFFICIENCY AND THE PARACOMMONS OF SAVED RESOURCES

Bruce Lankford



UEA **Water
Security**

20 April 2012 Last updated at 11:48

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'Huge' water resource exists under Africa

COMMENTS (386)

By Matt McGrath

Science reporter, BBC World Service

Scientists say the notoriously dry continent of Africa is sitting on a vast reservoir of groundwater.

They argue that the total volume of water in aquifers underground is 100 times the amount found on the surface.

The team have produced the most detailed map yet of the scale and potential of this hidden resource.

Writing in the journal **Environmental Research Letters**, they stress that large scale drilling might not be the best way of increasing water supplies.

Across Africa more than 300 million people are said not to have access to safe drinking water.

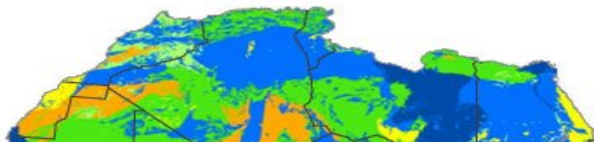
Demand for water is set to grow markedly in coming decades due to population growth and the need for irrigation to grow crops.

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A normal 'commons' or 'common pool resource' e.g. aquifer utilised by cities & agriculture

Researchers at British Geological Survey and University College London have found 0.66 million km³

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'Huge' water resource exists in irrigation

[COMMENTS \(386\)](#)By **Matt McGrath**

Science reporter, BBC World Service

- **Researchers have found 160 cubic kilometres of available freshwater water.**
- **Released by improving the management of inefficient irrigation systems**
- **Enough for 74 litres for every human every day**

By assuming a global irrigated area of approximately 330 million ha, of which approximately 85% is gravity/surface fed, we could for the purposes of demonstration, accept a 10% relative reduction in total consumption (via non-beneficial consumption and non-recovered losses). Assuming a cautiously low gross annual consumption of 600 mm (building on Doll and Siebert's (2002) figure of approximately 420 mm net crop water requirement globally) this 10% saving in consumption gives a reduction of consumption down to 540 mm, releasing 60 mm depth equivalent. Spread over 330 million hectares, this is equivalent to 0.54 cubic kilometres water per day, the same volume as providing 7.3 billion people with approximately 74 litres per day of water per person; a sizeable proportion of an individual's daily water requirement

My fake BBC
webpage!

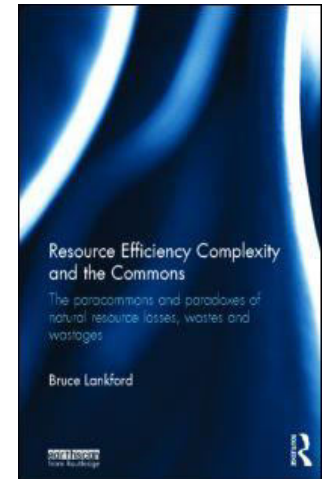
A freed-up and salvaged 'loss' is a 'paracommons'



- ✦ While there is 'spare' water in irrigation efficiency the problem is that understanding the science of irrigation efficiency (plus the role of language, humans and institutions) is not easy.
- ✦ 'Freeing' up water from irrigation is very difficult.

Book:

Lankford B.A. 2013. Resource Efficiency Complexity and the Commons: The Paracommons and Paradoxes of Natural Resource Losses, Wastes and Wastages.



Colorado River water pact could be model for other nations

BY HENRY BREAN
LAS VEGAS REVIEW-JOURNAL

Posted: Nov. 15, 2012 | 3:38 p.m.

A new Colorado River agreement between the United States and Mexico could serve as a model for other countries locked in conflict over water.

That was the message Thursday as the sweeping, five-year pact was approved by the Southern Nevada Water Authority and the Colorado River Commission of Nevada in a rare joint meeting.

The landmark deal won't become official until representatives for the United States and Mexico sign it on Tuesday, but water authority chief Pat Mulroy said she already has talked to several people from Africa, Asia and Australia who want to read and perhaps borrow from the water accord.



LAS VEGAS REVIEW-JOURNAL
LAS VEGAS REVIEW-JOURNAL

Tools

Preconfigurations of material benefits of efficiency gains

Savings made in Mexican irrigation “by lining canals and upgrading the way crops are irrigated” to be banked in Lake Mead



Commons: How much water in Colorado River and who gets it? **Paracommons:** How much water can be saved; how to reserve and relocate this saved water and who gets it? **The promise of gains in the future.**

Paradox and paracommons revealed



SUPREME COURT OF THE UNITED STATES

Syllabus

MONTANA *v.* WYOMING ET AL.

ON EXCEPTION TO REPORT OF SPECIAL MASTER

No. 137, Orig. Argued January 10, 2011—Decided May 2, 2011

Article V(A) of the Yellowstone River Compact ratified by Montana, Wyoming, and North Dakota provides: “Appropriative rights to the beneficial uses of the water of the Yellowstone River System existing in each signatory State as of January 1, 1950, shall continue to be enjoyed in accordance with the laws governing the acquisition and use of water under the doctrine of appropriation.” 65 Stat. 666. Montana filed a bill of complaint, alleging that Wyoming breached Article V(A) by allowing its upstream pre-1950 water users to switch from flood to sprinkler irrigation, which increases crop consumption of water and decreases the volume of runoff and seepage returning to the river system. Thus, even if Wyoming’s pre-1950 users divert the same quantity of water as before, less water reaches downstream users in Montana. Concluding that the Compact permits more efficient irrigation systems so long as the conserved water is used to irrigate the same acreage watered in 1950, the Special Master found that Montana’s increased-efficiency allegation failed to state a claim. Montana has filed an exception.

Norris (2011) “.. the United States Supreme Court’s recent decision in *Montana v Wyoming* brings to the forefront one of the most complicated and contested facets of irrigation efficiency: who owns the rights to the conserved water?”



Downstream Montana complained against Wyoming for introducing more efficient irrigation that reduced drainage on which it relied

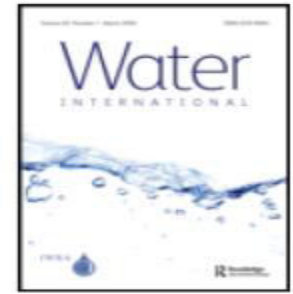
National expenditure on saving water: Who knows how to save water?



Lost in translation?
Water efficiency in
Spanish agriculture
E. Lopez-Gunna, P.
Zorrilla, F. Prietod,
M.R. Llamase



Lopez-Gunn (2012): During 2002 to 2010
Spain spent 5-7 billion Euros on the
National Irrigation Plan to make
2100 Mm³ in projected water savings via
drip systems and upgrading canals
But no valid base-line data and no post-project data
= cannot be certain how much water was 'saved' in real terms



Accounting argument in Water International over whether there is spare water to be 'saved' in irrigation

Pacific Institute then responded
Water International

Publication details, including instructions for authors and subscription information:
<http://www.tandfonline.com/loi/rwin20>

**Water-use efficiency and productivity:
rethinking the basin approach**

Peter H. Gleick, Juliet Christian-Smith & Heather Cooley
Version of record first published: 24 Nov 2011.

Frederiksen and Allen criticised this report by Pacific Institute,
Water International 2011

Publication details, including instructions for authors and subscription information:
<http://www.tandfonline.com/loi/rwin20>

A common basis for analysis, evaluation and comparison of offstream water uses

Harald Dixen Frederiksen ^a & Richard Glen Allen ^b

Then F and A responded again
<http://www.tandfonline.com/loi/rwin20>

Responses to Gleick et al. (), which was itself a response to Frederiksen and Allen ()

Harald Dixen Frederiksen ^a , Richard G. Allen ^b , Charles M. Burt ^c & Chris Perry ^d

Who gets the gain of material gain? Paracommons destinations of savings

- ✦ So the problem is that if *you* have saved a resource....
- ✦ It gets used by you later on
- ✦ It gets used someone close to you
- ✦ It gets used by someone you don't know for another economic purpose

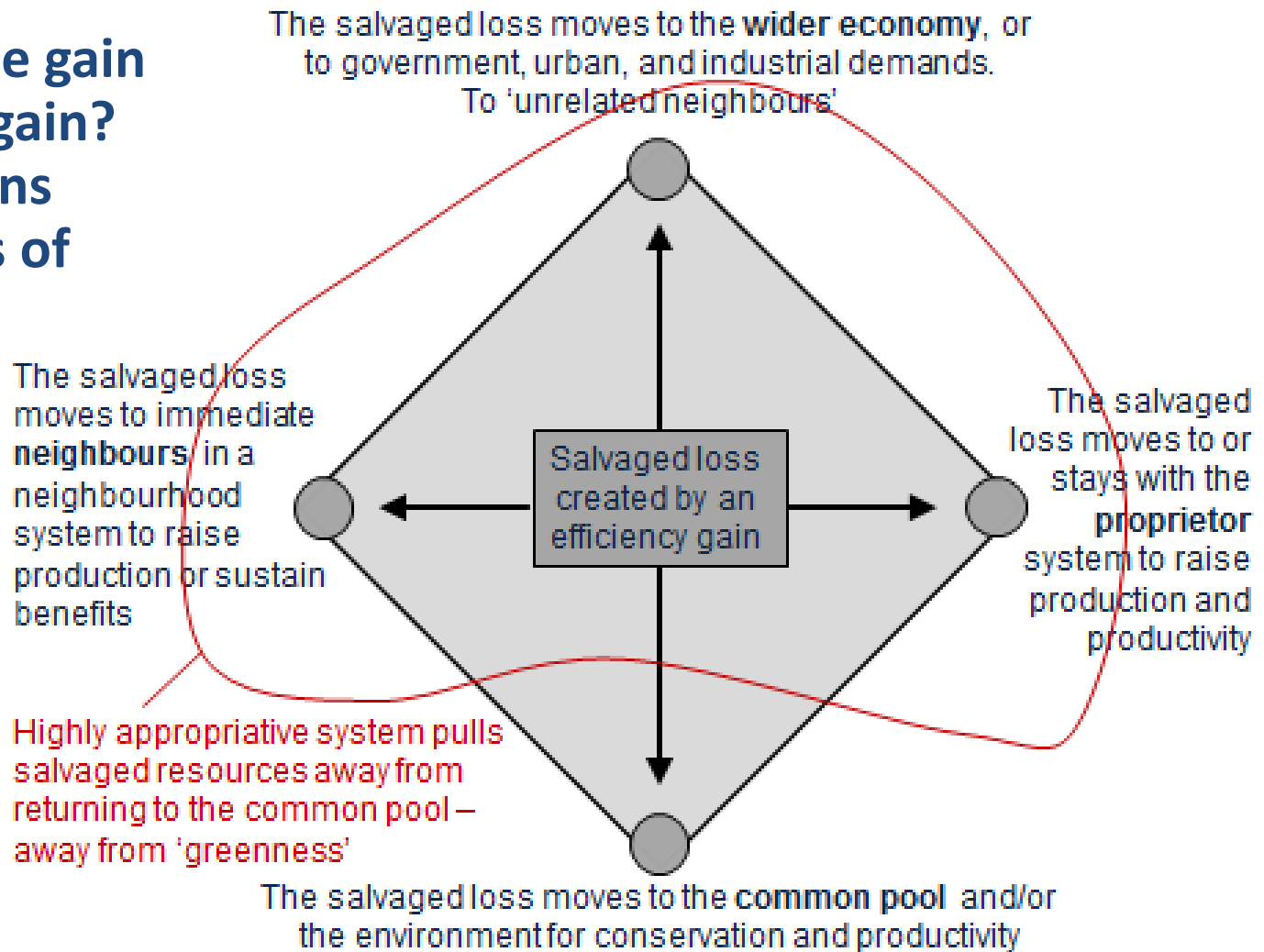


And therefore it might...

- ✦ Not end up conserved in nature



Who gets the gain of material gain? Paracommons destinations of savings



**Top-ender's
rice nursery**



**Tail-ender's
rice nursery**



Listening to farmers' knowledge: how to control & 'save' water



**Conclusions: Resource efficiency complexity.
Tracing gains = many methods to cross-check plus
empirical work 'field' and people centred**

