Mainstreaming the Environment in Aggregate Agricultural Support Measures

(*green PSE* indicator, a proposal)

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IAIA 2012 – Energy Future: The Role of Impact Assessment
Porto, 27th May – 1st June, 2012

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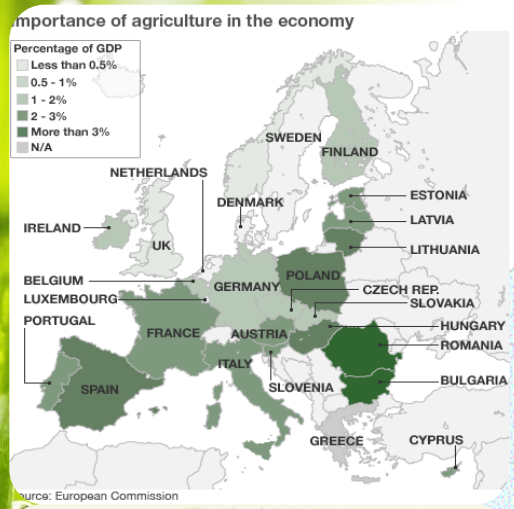
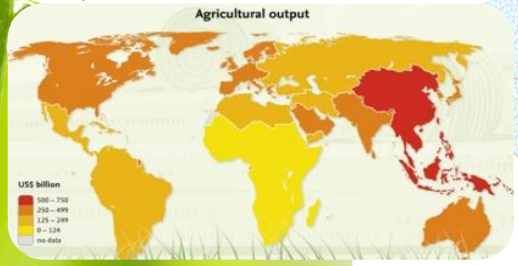
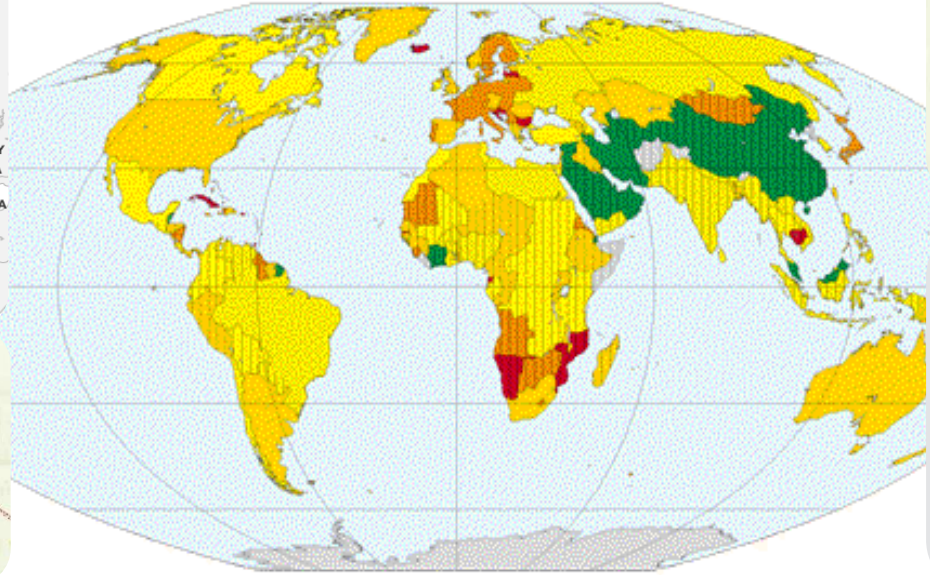
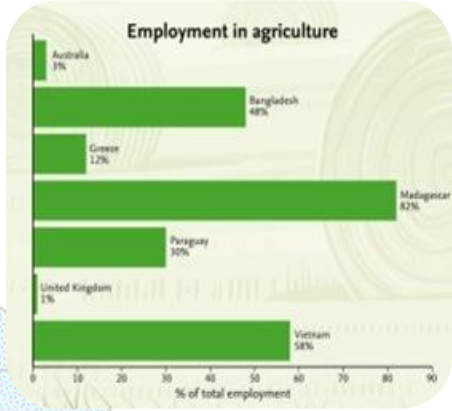
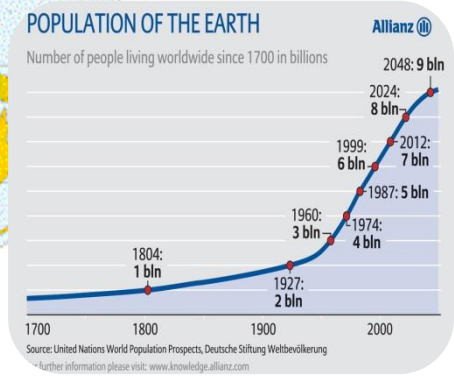
Agriculture resources in the world











Average annual growth rate in food production, 1970/72 to 93/95(%)

< 0 | 0 - 1 | 1 - 2 | 2 - 3 | 3 - 4 | > 4

Dietary energy supply per caput less than 2700 Calories (1992-94)

Other symbols

Data not available

Water bodies

Source: FAO

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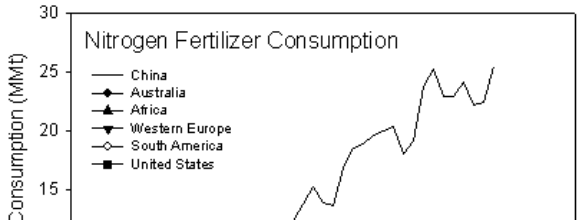
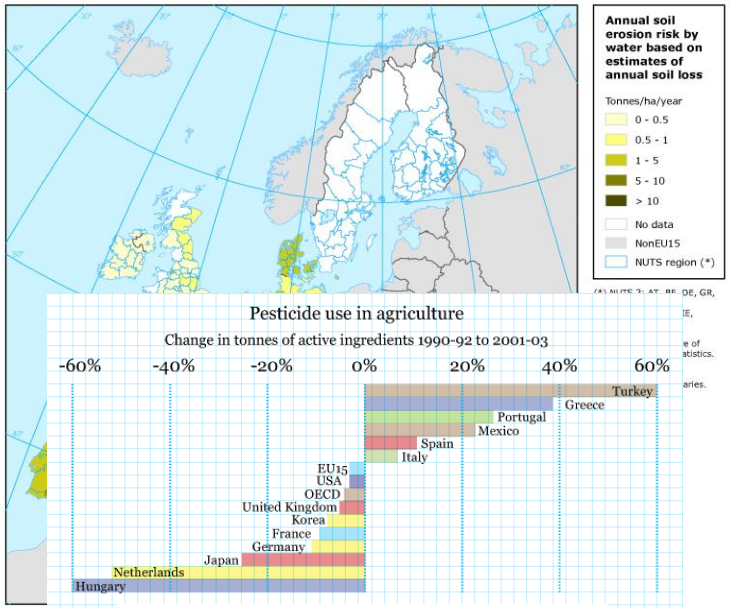
Is the agriculture supply-chain sustainable?

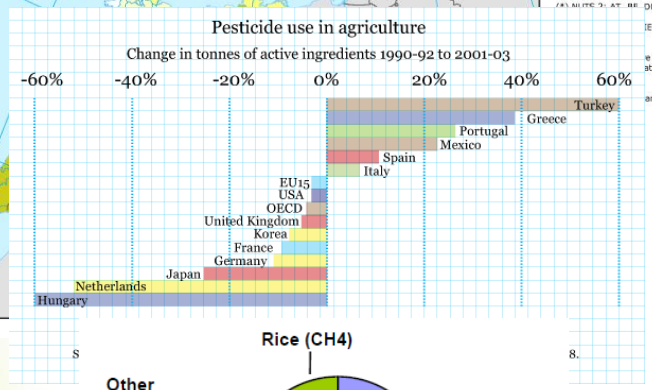
Water pollution constrains



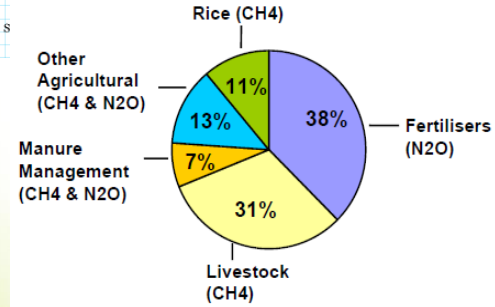
Soil Erosion problems



Pesticides contaminations



Air pollution constrains



Sources of non-CO_2 emissions from the agriculture sector (Stern, 2007)

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GOAL : To find an adjusted PSE, that incorporates environmental externalities from agricultural practices (the ***green PSE***)

PURPOSE: To demonstrate and evaluate how to internalise the environmental costs that agriculture activities may cause

QUESTIONS ADDRESSED:

1) Can environmental externalities resulting from agriculture be internalised/calculated?

2) How to ensure an accurate integration of agricultural burden in order to achieve a more sustainable balance between agriculture demands and environmental conservation?

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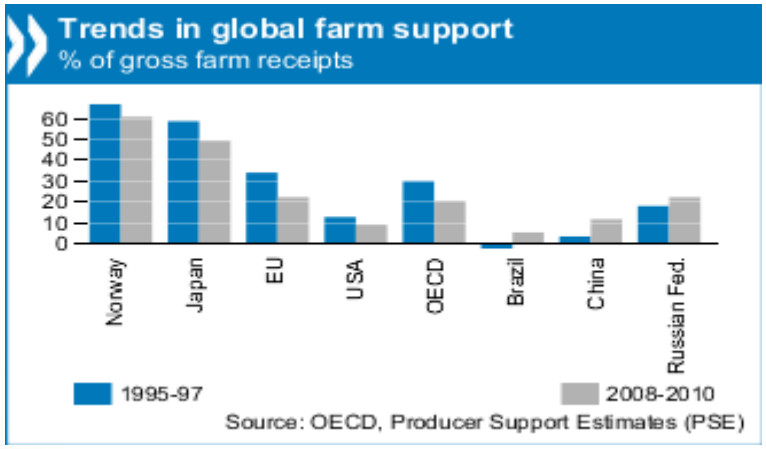
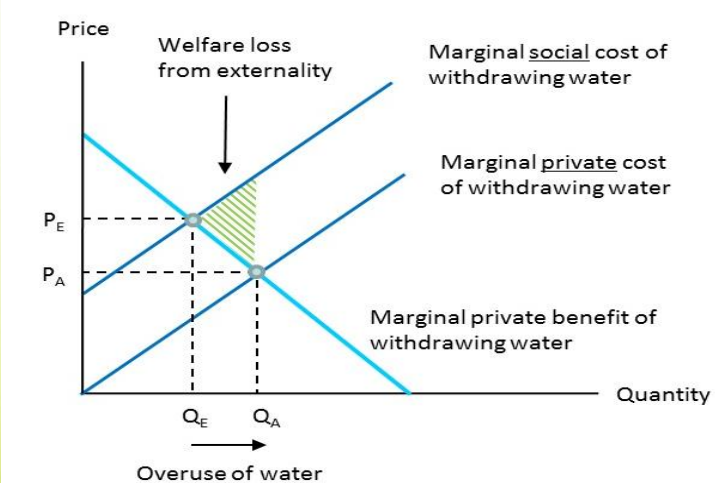
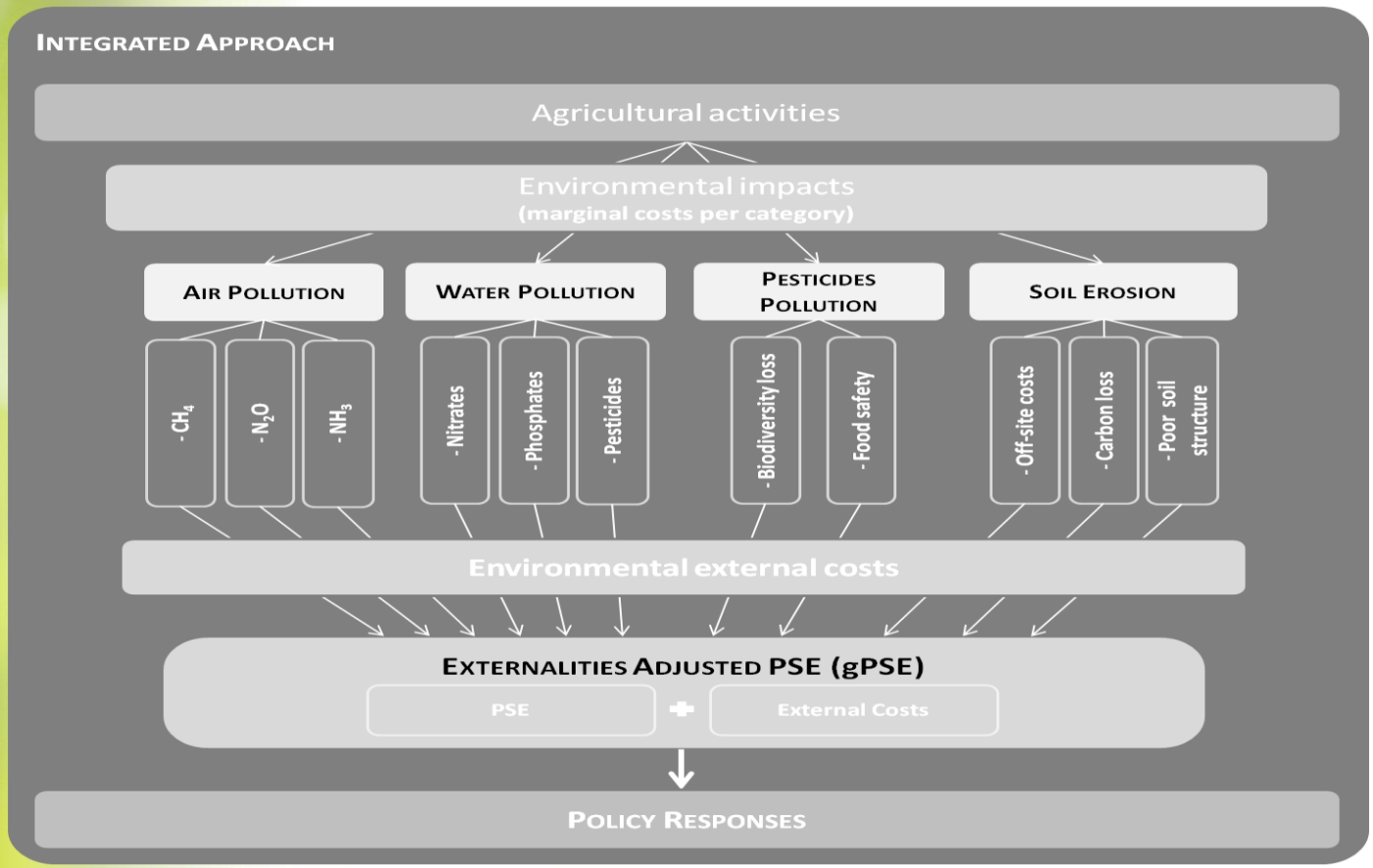
HOW TO ACHIEVE THIS? Some background definitions …

… **Producer Support Estimate (PSE):** OECD indicator of the annual monetary value of gross transfers from consumers and taxpayers to support agricultural producers (OECD, 1999).



… **Externalities:** Costs and values associated with economic activities that are not captured by market prices cultural producers (Goulder & Kennedy, 2009), both positive or negative **.**





HOW TO ACHIEVE THIS? Steps undertaken …

1. Assess main impacts, and their environmental consequences, resulting from agriculture activities
2. **Marginal external costs** calculation per pollution category
3. Agriculture **total external costs** estimation
4. Producer Support Estimate (**PSE**)
5. Externalities Adjusted PSE (***green PSE***) calculation (external costs + PSE)

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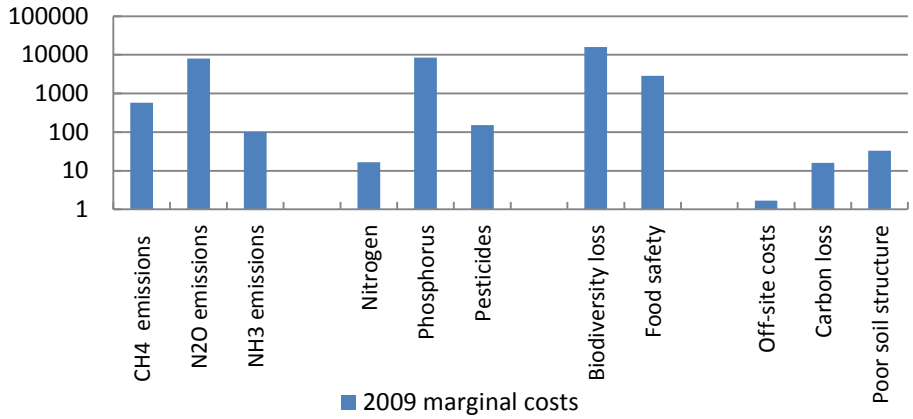
Steps undertaken …

a) Selection of pollution categories

	AUS	AUT
emissions (tonnes)		
AIR Pollution		
CO_2 emissions		
CH_4 emissions	3.108.499	171.205
N_2O emissions	62.797	12.966
NO_x emissions	18	6
NH_3 emissions		59.121
SO_x emissions	-	0,0009
WATER Pollution		
Pesticides	-	2939,94
Nitrates on drinking	459543,7	55766,9
Phospahate on drin	282472,16	7752,9
SOIL Erosion		
Off-site costs	42444,9	1233,9
carbon loss	42444,9	1233,9
poor soil structure	42444,9	1233,9
PESTICIDES		
human health	42444900	1233900
environmental loss	42444900	1233900

b) Marginal external costs estimation



c) External costs calculation
(=emissions x marginal external costs)

d) PSE (OECD database)

e) *green PSE* calculation

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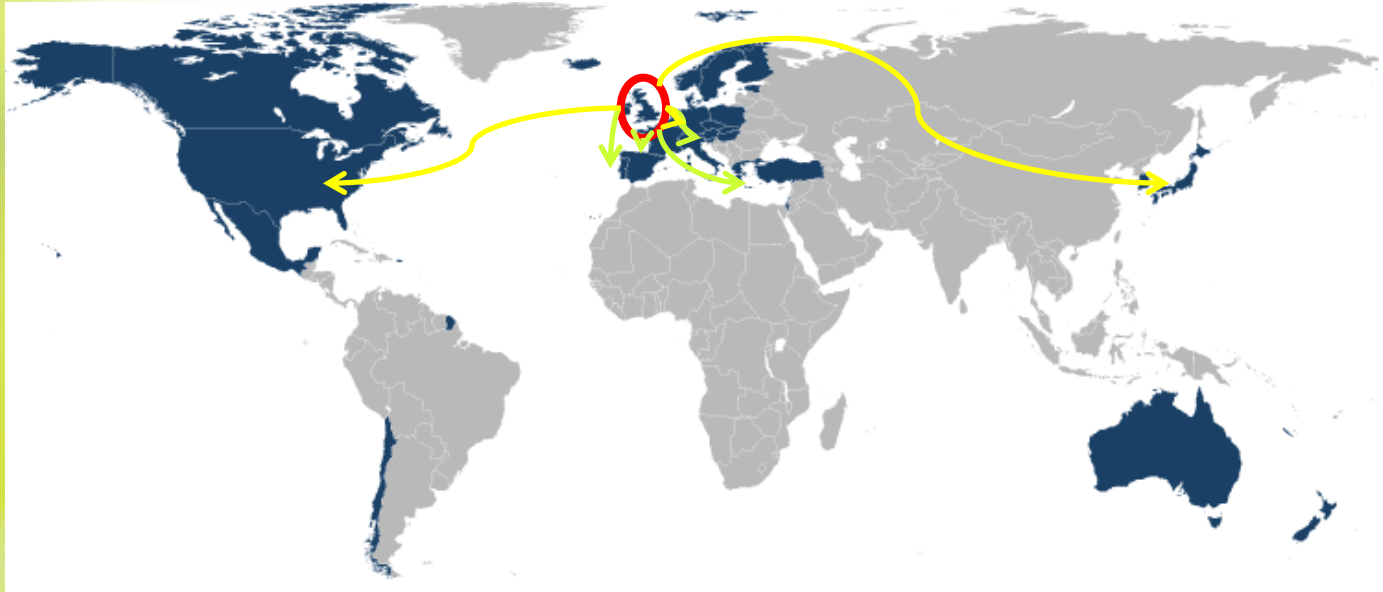
How to ensure an accurate integration of agricultural constrains in order to achieve a more equitative and efficient balance between agriculture demands and environmental conservation?

Points that require special attention:

1) differences in prices among countries could lead to an overestimation of the external costs when using **UK as the base country**, for some countries, while for others may be under-estimated



2) Becomes essential to integrate countries realities into *green PSE* calculation

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Can environmental externalities resulting from agriculture be internalised?

		AUS	CAN	CHL	EU	ISL	JPN	KOR	MEX	NOR	NZL	SWZ	TUR	USA	TOTAL
TOTAL External Costs (£ m)															
	2002	5033,6	1481,3	-	12497,8	2,8	339,5	516,2	152,4	60,1	377,5	92,5	780,8	13513,1	34847,4
	2009	2563,3	3589,4	875,2	21439,6	16,0	2380,8	677,1	5498,1	167,1	956,0	222,3	1974,2	21168,7	61527,7
TOTAL External Costs ($ m) [1]															
	2002	7669,4	2256,9	-	19042,4	4,2	517,3	786,5	232,2	91,5	575,1	140,9	1189,7	20589,3	53095,6
	2009	3919,4	5488,4	1174,2	32334,5	24,5	3102,4	1432,4	7279,5	251,1	1520,4	323,3	3652,9	37881,0	94079,0
PSE ($ m)															
	2002	1362,7	7114,8	-	149099,3	141,0	44597,1	36424,5	14037,2	2752,0	162,9	4897,1	16900,4	46811,5	324300,5
	2009	990,9	6721,9	383,8	119404,6	124,8	44784,4	17619,4	5572,1	3366,2	50,3	5847,0	20170,0	31423,2	256458,5
Externalities Adjusted PSE ($ m) [2]															
	2002	9032,2	9371,7	-	153823,1	145,2	45114,4	37211,0	14269,4	2843,5	738,0	5038,0	18090,1	67400,8	377396,1
	2009	4910,4	12210,3	1558,0	151739,1	149,2	47886,7	19051,8	12851,5	3617,4	1570,7	6170,3	23822,8	69304,2	350537,5

Note: 2009 prices, million

[1] Total external costs in £ were converted into $ using PPPs

[2] PSE plus Total External Costs

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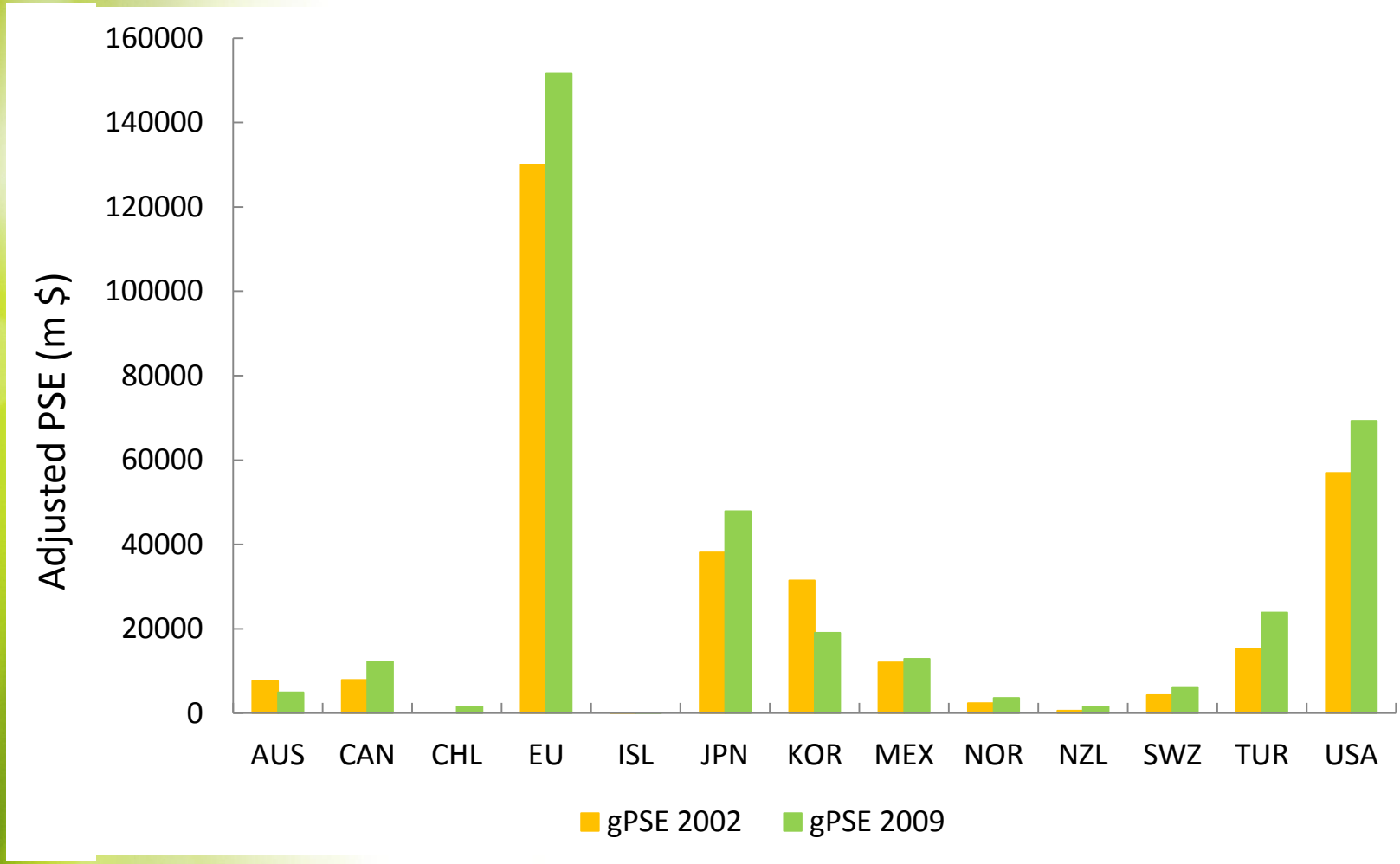

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	2009	4910,4	12210,3	1558,0	151739,1	149,2	47886,7	19051,8	12851,5	3617,4	1570,7	6170,3	23822,8	69304,2	3505

Note: 2009 prices, million

[1] Total external costs in £ were converted into $ using PPPs

[2] PSE plus Total External Costs

	TOTAL
TOTAL External Costs (£ m)	
2002	34847,4
2009	61527,7
TOTAL External Costs ($ m) [1]	
2002	53095,6
2009	94079,0
PSE ($ m)	
2002	324300,5
2009	256458,5
Externalities Adjusted PSE ($ m) [2]	
2002	377396,1
2009	350537,5

37% of PSE

16 to 37% of PSE from 2002 to 2009

Due to:

1) **Marginal costs** per emission increase
2) Inclusion of **more** environmental **pollution categories** to assess external costs
3) Inclusion of **more countries** in the analysis (e.g. Chile)

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Conclusions …

» ***PSE*** should a more equitable and efficient indicator, integrating also the environmental costs from the activity.

» Farmers and consumers should pay for the external costs coming from agricultural products, not society/taxpayers.

» ***green Indicators*** can provide better insights to policy-makers to find better strategies, policies and plans .

Thank you for your attention!

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