

Assessing Good Agricultural Practice: Comparative Pesticide Impact In Five Latin-American Countries

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INTRODUCTION

Argentina, Brazil, Chile, Costa Rica and Ecuador participate in the IAEA Coordinated Research Project (CRP) D.5. 20.35 on: "Integrated Analytical Approaches to Assess Indicators of the Effectiveness of Pesticide Management Practices at the Catchment Scale. The CRP investigates a more holistic approach to food and environmental safety that focuses on prevention at the source to augment more costly end-product testing.

In Latin American pesticides remain an important tool for the management of insects, fungi and weeds of agricultural or public health significance. Assessing off-site pesticide transport provides a mechanism to further reduce risks under local conditions.

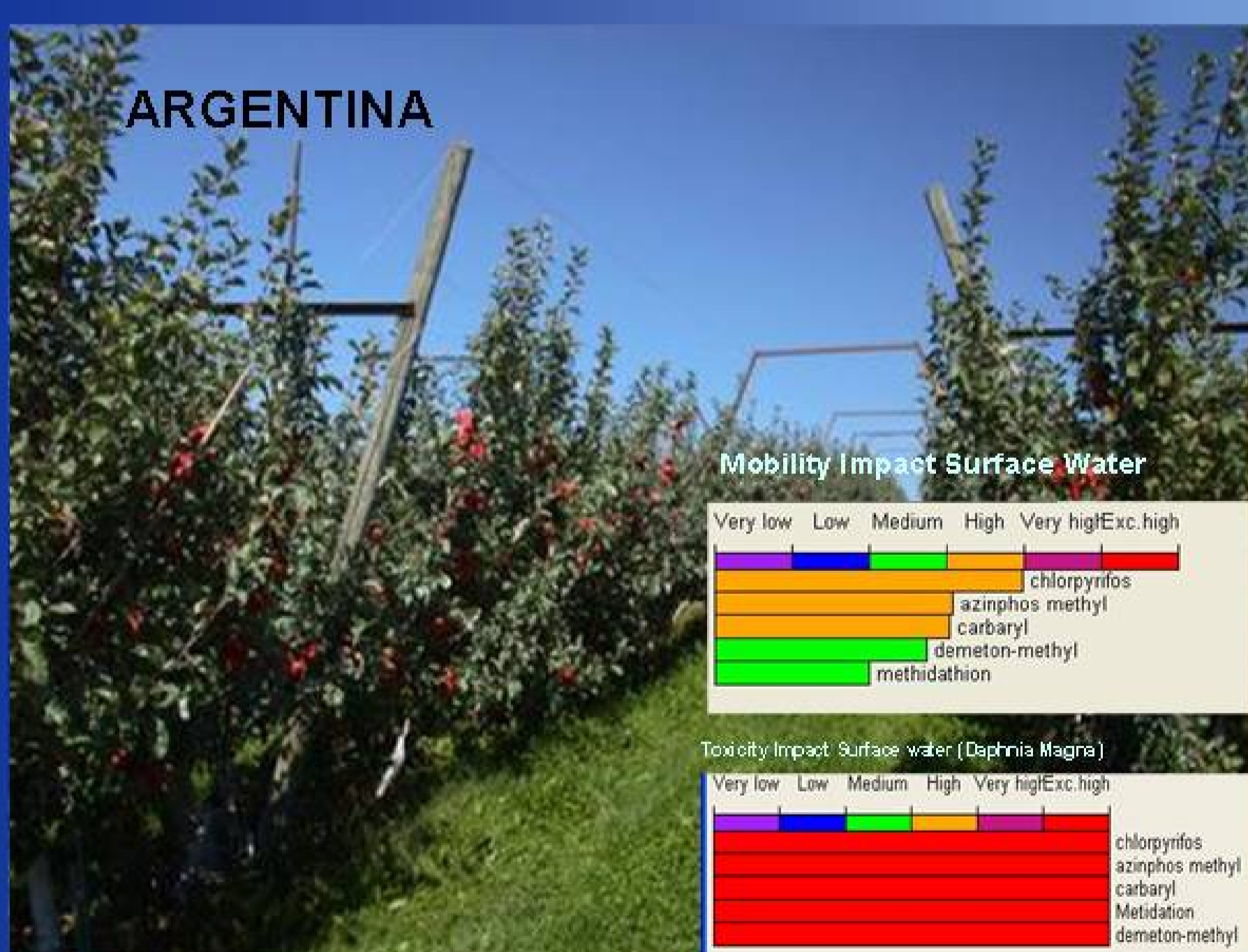


PARAMETER	LAND USE BY COUNTRY				
	Argentina	Brasil	Chile	Costa Rica	Ecuador
Soil	Loam	Clay	Sandy loam	Clay	Loam
Period of interest	October-March	October-April	Sep -March	May-Feb	Nov-Jan
LC 50	LC 50	LC 50	LC 50	LC 50	LC 50
Toxicity target	Daphnia Rainbow trout	Daphnia Rainbow trout	Daphnia	Rainbow trout	Rainbow trout
Depth to water table (m)	1.64	20	10	1	12
Ground covered	Bare	Bare	Bare	covered	covered
Soil moisture	Wet	Wet	-	dry	wet
Organic matter(%)	3.86	25.8	3.73	2.4	4.6
Rainfall (total mm)	84	1257	150	1882	632
Irrigation for period (mm)	830	0	30	0	400
Av. Min. T° for period (°C)	6	17.9	10.1	22.9	4
Av. Max. T° for period (°C)	23	30.9	25.5	32.8	20
Width of water body (m)	1.2	3	10	5	0.5
Distance edge crop-water (m)	5	0	10	100	2
Slope (%)	0.19	0.2	5-40	7	18
Width of buffer zone	0	0	30	2	1.5
Annual soil loss (tones/ha)	0.5	0.06	0.5	1	15
Days between appl and irrigation	1	0	1	8	1

OBJECTIVES

The aim of this work is to validate the use of integrated tools to monitor and assess pesticide impact in different sub-catchments, characterized by representative agricultural production. The analytical Laboratory, in this way, acquires a key role in strengthening IPM through monitoring environmental indicators, which would lead to improved GAP.

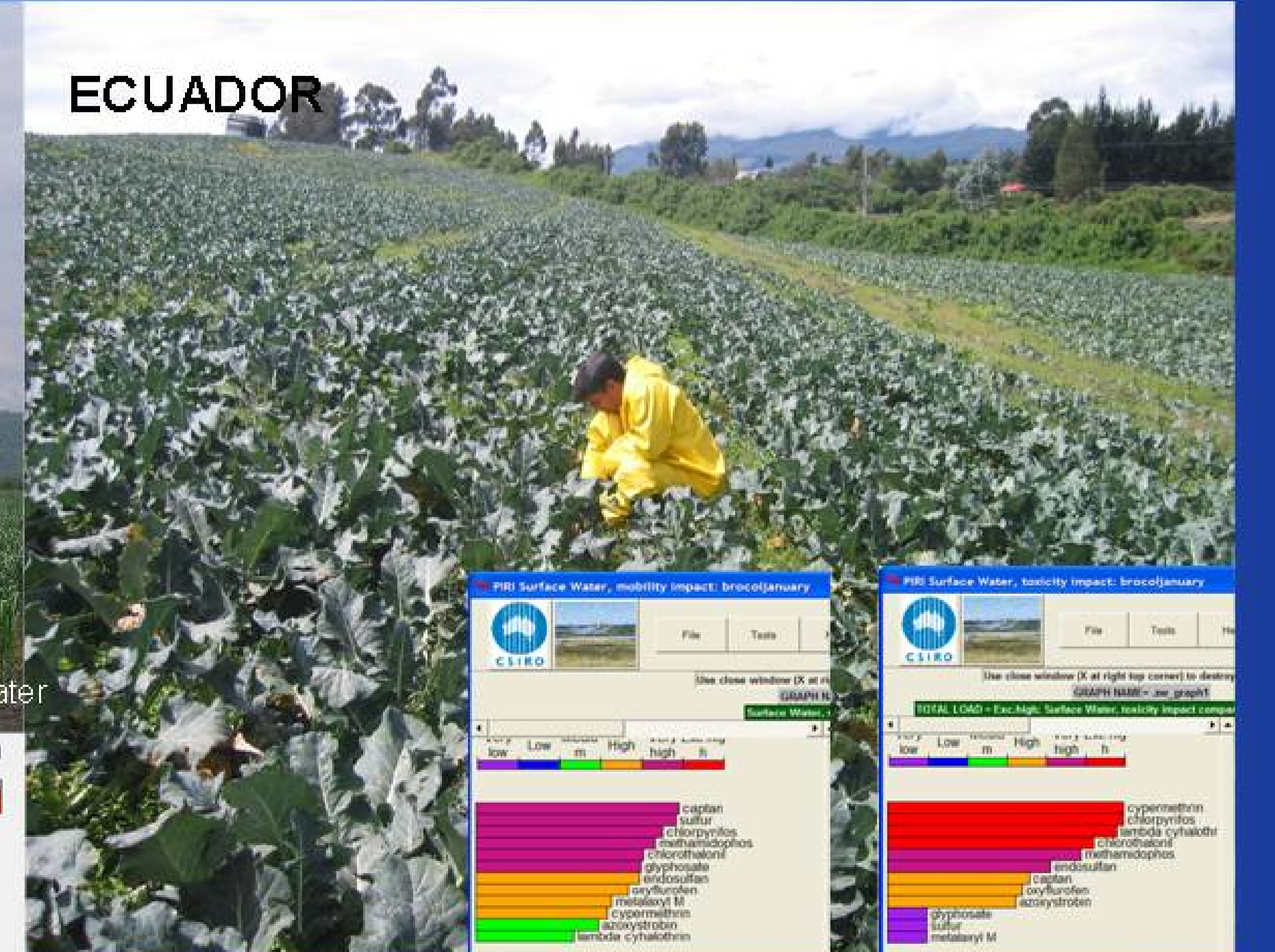
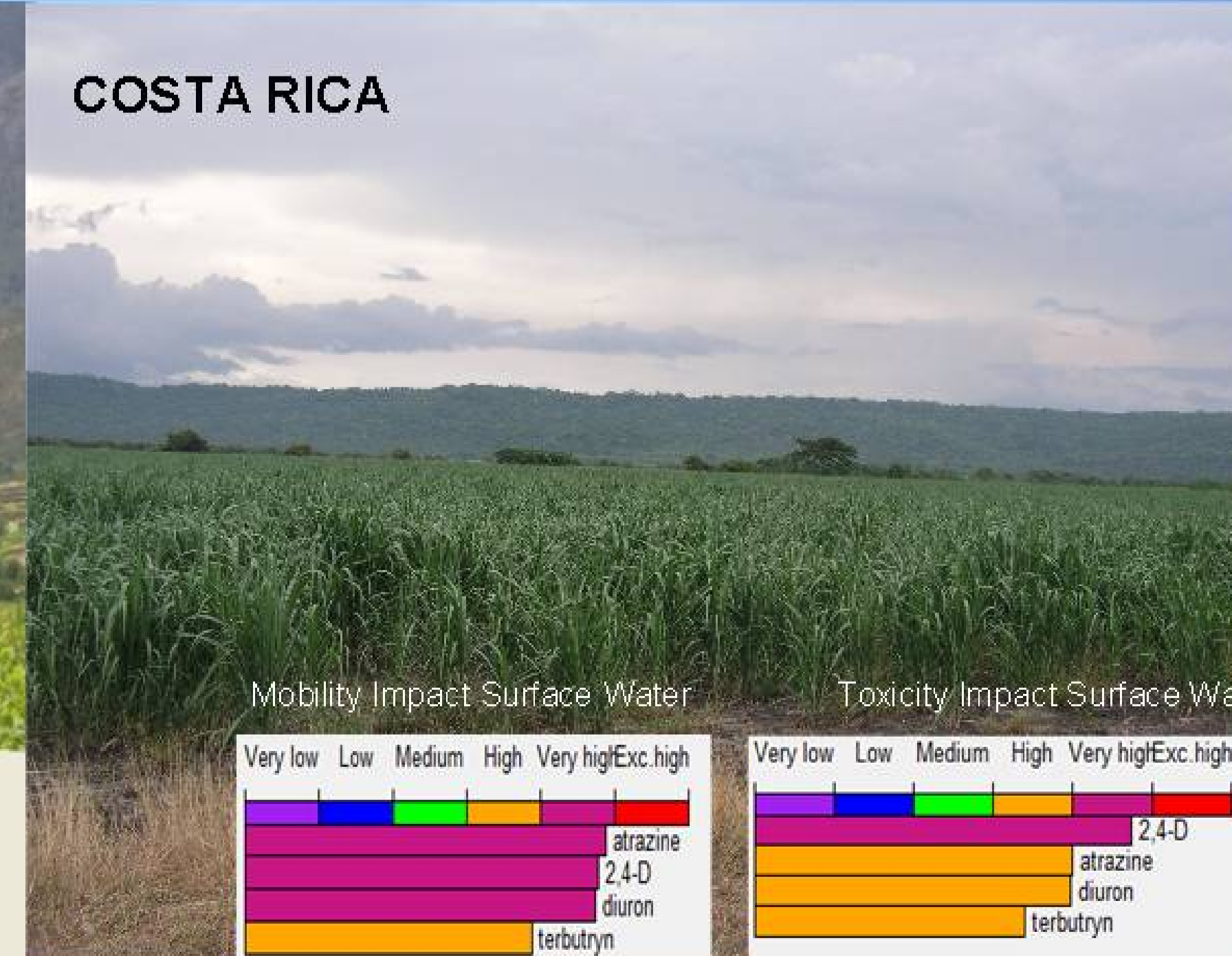
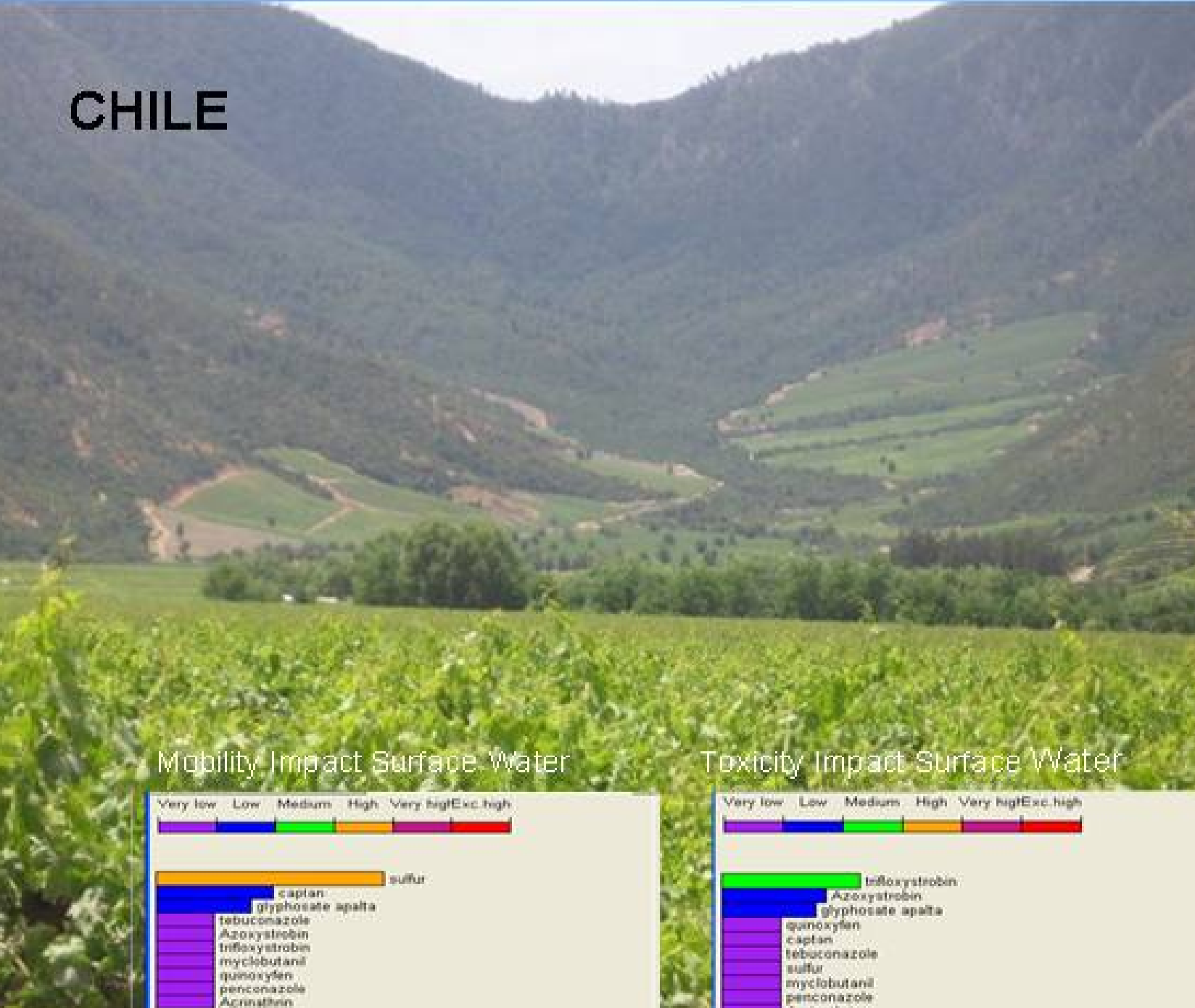
COUNTRY	LOCATION	CROP	PESTICIDES (times/period of interest)
ARGENTINA	Neuquen: Nueva España	Apple	Azinphos methyl(5); Carbaryl(2); Methidation(2); Chlorpyrifos(2-5); Demeton Methyl(2)
BRASIL	San Pablo: Ribeira River	Banana	Azoxystrobin(18); Propiconazole(18); Tebuconazole(18); Diuron(1); Carbaryl(18);Carbofuran(1); Terbutyn(1); Captan(18); Glifosato(1); Tebuconazole(18); Asoxitrobyn(18);
CHILE	Colchacagua Valley: Apalta	Vineyard	Trifloxistrobin(18); Myclobutanil(18); Quinoxifen(18); Penconazole(18); Acrinatrin(3)
COSTA RICA	PN Palo Verde: Quebrada La Mula	Sugar cane	Atrazine(3) ; 2,4 D(3) ; Diuron(3); Terbutryn(3)
ECUADOR	Valle de Machachi - Sector La Avanzada	Broccoli	Oxifluorten; Chlorpyrifos(9); Endosulfan(5); Chlorotalonil(7); Cypermetrin(6); Lambda cyalothrin(6), Captan(8); Metalaxil(2); Alachlor; Metamidofos; Glifosato(3)



METHOD

The first step of the Project involved sub catchment selection and characterization. At least two sites were identified: a drainage point and upstream (reference point). The second step applied a first-tier risk assessment namely the Pesticides Impact Rating Index (PIRI) program to evaluate the relative risk of pesticides or cropping systems in terms of their potential mobility and impact on surface water or groundwater quality. Each country collected data on land and pesticide use as well as site-specific data that would eventually enable estimation of pesticide load from each crop case study.

RESULTS: Pesticide Impact Rating Index^[1]



CONCLUSIONS

This presentation compares the results of the first-tier pesticide risk and lesson identified to date from Latin America. All case studies showed that pesticides fall in the range of high and very high surface mobility, mainly insecticides in Argentina, Chile and Ecuador, herbicides in Chile, Costa Rica and Ecuador and fungicides in Chile and Ecuador. Using *Daphnia Magna* and *Rainbow Trout* as indicator species suggest that these pesticides would have high impact indexes.

The PIRI results for 2007-8, indicate which pesticides to monitor in each sub-catchment. In addition PIRI simulations indicate which agricultural practices, in terms of land use and pesticide management, could be modified to minimize pesticide mobility in surface water or groundwater and impact to the aquatic environment.

[1] Rai Kookana and Ray Correll, CSIRO, Australia