

Basic Occupational Health Services in Agriculture: a strategy to increase interventions for rural workers and reduce health inequalities in rural areas

Claudio Colosio, José Manuel Lopez- Abuin^{1,2,4}, Michele Augusto Riva³, John Wynn Jones^{1,2,4}

1) Institute of Rural Health, 2) European Union of Rural and Isolated Practitioners (EURIPA); 3) University of Milano Bicocca, Milan, Italy; 4) WONCA World Working Party on Rural Practice



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- The past....
- The Present
- The global situation: some numbers
- OHS coverage in agriculture: existing data/estimates
- Health priorities in the sector
- Possible solutions

AGRICULTURE IN ANCIENT TIMES



AGRICULTURE IN ANCIENT TIMES



PRE-COLUMBIAN DEITIES OF AGRICULTURE

ORIGINS OF RURAL WORKERS PROTECTION

"[villicum sauciatum] in valetudinarium confestim deducat et convenientem ei ceteram curationem adhiberi iubeat".

"He [the farmer] should lead immediately [a wounded overseer] to hospital and request to treat him appropriately".

Columella, De Re Rustica XI, 1, 18



LUCIUS IUNIUS MODERATUS COLUMELLA

(4 – 70 AD)

MIDDLES AGES

Urbanization: epidemics, famines and wars led workers to move from countryside to urban centers

"A fame, peste et bello, libera nos Domine"



BENEDETTO ANTELANI
(1150 – 1230)
BAPTISTERY OF PARMA

EARLY MODERN AGE: DIET OF FARMERS

The New World
New food



BERNARDINO RAMAZZINI (1633-1714) - 1

Bernardino Ramazzini
"De Morbis Artificum" (1700)

"De agricolarum morbis" (# 39)

- ✓ List of diseases
- ✓ Possible causes
- ✓ Possible treatments



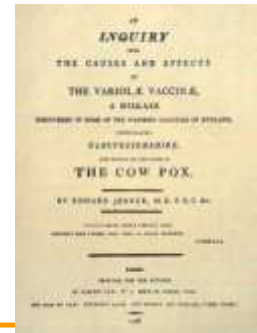
BERNARDINO RAMAZZINI (1633-1714) - 2

- "These illnesses basically have two causes: the weather and a poor diet"
- "It is almost ridiculous to suggest medical remedies for our farmers to avoid illness, since they hardly ever turn to a doctor, if at all, and if one is proposed, they paid no attention"
- "Their bodies, broken down by toil and a poor diet, must not be weakened by extensive and repeated blood-letting or purgatives"

AT THE ORIGINS OF THE PROTECTION - 1

Edward Jenner (1749-1823)

"I cannot take the smallpox,
for I have had the cowpox"



THE NEW AGRICULTURE REVOLUTION

The rise of mechanization: the tractor



UNDERSTIMATION AND NEW RISKS



AGRICULTURE: THE SPECIFICITIES

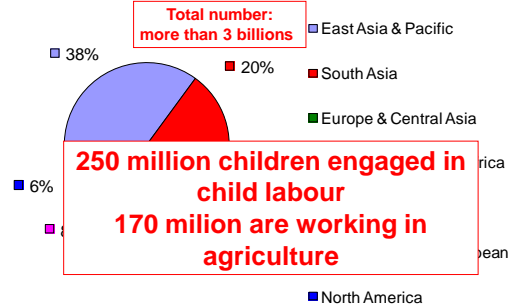
THE SPECIFICITY

Activity linked with the wellbeing of entire nations

- Risk of soil depletion and pollution
- Agricultural workers are a patrimony of their countries!
- Need of healthy, trained and well educated agricultural workers

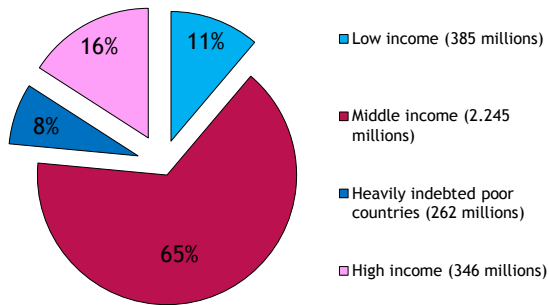
THE SCENARIO

ALL INCOME LEVELS (2009)



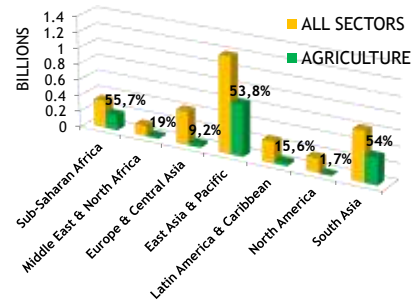
THE SCENARIO

Number of subjects economically active in the world:



THE SCENARIO

RURAL CONTRIBUTION

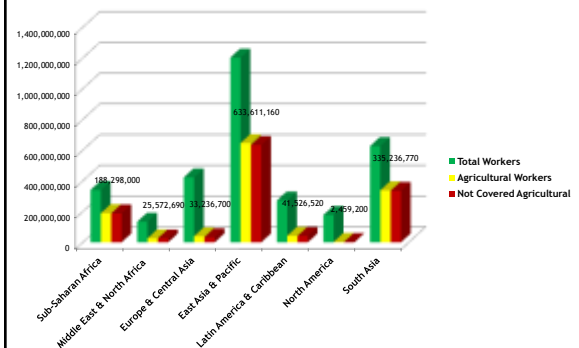


THE SCENARIO

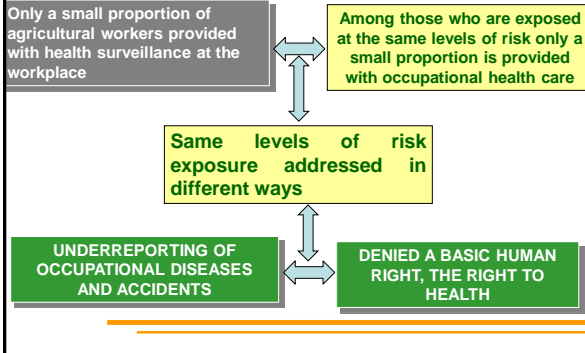
- In typical developing regions the OHS coverage ranges from 5 % to 10 % at best
- Agriculture, the self-employed, small-scale enterprises and the informal sector are usually not covered at all
- In European regions wide variation among countries: 5-90 %; Central and Eastern Europe: in transition
- USA, Canada, Japan, Australia, Israel: coverage comparable to Western Europe
- Agricultural and self-employed underserved
- The problem of family subsistence agriculture, daily paid labourers in plantations, seasonal or migrant workers and child labourers

Rantanen J. And Fedotkin I.A. (2002). Standards, Principles and Approaches in Occupational Health Services. Available at: http://www.ilo.org/safework/info/publications/lang-en/docName=WCMS_110439/index.htm
http://www.ilo.org/safework/brassofact/lang-en/WCMS_117367/index.htm

OHS Coverage in the World: some estimates



The «land of inequalities»



HEALTH RISKS IN AGRICULTURE

- Chemicals
- Biological agents
- Physical risks
- Muscle skeletal workload

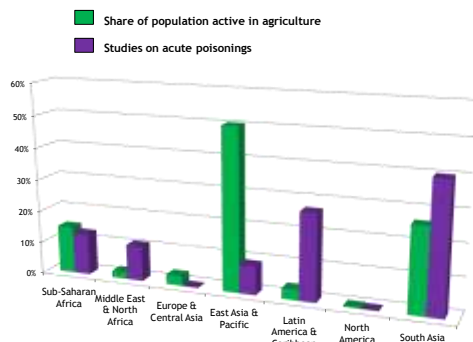
APP IN THE WORLD: SOME ESTIMATES

SOURCE	YEAR	WORLDWIDE ESTIMATE
WHO	1973	500,000 (5,000 deaths) in 1972
WHO (from Litchfield et al., 2005)	1985	1,000,000 (20,000 deaths)
Jeyaratnam	1985	220,000 (deaths)
Garcia et al	1998	500,000 – 1,500,000 (3,000 - 28,000 deaths)
Goel et al	2007	300,000 deaths

Patterns in APP

Where	Cases	Intentional	Accidental	Occupational	Source
India, Civil Hospital of Ahmedabad	190 cases of OP acute poisoning	67.4 %	15.8 %	16.8 %	Agarwal et al., 1993
Turkey, Afyonkarahisar district	220 patients admitted to the local hospital 1995 - 2004; diagnosis of APP	75.9 %			Yurumez et al., 2007
Turkey	63 cases of pesticide poisonings	53 (84 %)	10 (16 %)		Ozer et al., 2007
Jordan	144 fatalities due to pesticides recorded in a 4-year survey	64.3%	24.3% (accidental + homicidal)		Abdullat et al., 2006
Ethiopia, Tikur Anbessa Hospital	50 cases of OP poisonings in 6 years	94 %			Abebe M., 1991

STUDIES ON APPs IN AGRICULTURE



SOME THOUGHTS

Data from only a few countries
 Extrapolations from small-scale research
 Non-comparable data

Country	Incidence of occupational poisonings on all poisonings (%)	Source
USA	5-8%	(Blondell, 1997)
Costa Rica	38%	(Leveridge, 1998)
UK	25%	(Thompson et al., 1994)

Region	% POISONING REQUIRING HOSPITALIZATION
Sub-Saharan Africa	13%
Middle East	11%
India	59%
China	9%
Asia (other regions)	55%
Latin America	27%

But not only pesticides...

Reptile and insect bites and stings as significant cause of fatal acute poisoning in developing world and tropical countries

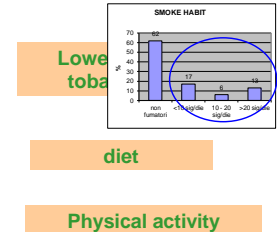
Scorpion sting: 15th cause of death in Mexico

(J. Morales, opening ceremony of the 30^o ICOH Congress)

Epidemiological data in agriculture: an overview

Mortality for all causes and neoplasms lower than expected. In particular:

- Lower mortality for cardiovascular diseases
- Lower mortality for malignancies:
 - esohagus,
 - Lung,
 - Bladder,
 - colon



Lower tobacco

diet

Physical activity

(Blair et al, Scand J Work Environ Health 1992, Pearce et al Am J Ind Med 1992)

Epidemiological data in agriculture...on the other hand....

• Higher incidence of:

- Hodgkin and non-Hodgkin lymphoma
- Leukemia
- Multiple myeloma
- Stomach cancer
- Prostatic cancer
- Melanoma
- Skin cancer
- Connective tissues cancer
- Brain cancer



No strong association with tobacco smoke



Immune deficit conditions

(Blair et al, Scand J Work Environ Health 1992, Pearce et al Am J Ind Med 1992)

OTHER RISK FACTORS IN AGRICULTURE

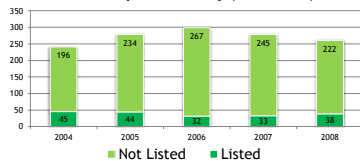
- Noise and vibrations (TRACTOR AND OTHER RURAL VEHICLES and tools): burden unknown
- Pesticides (high prevalence of acute poisonings, mainly in the developing world)

Hearing loss: some Italian data

Examined the official data showing the yearly number of hearing loss reports in agriculture

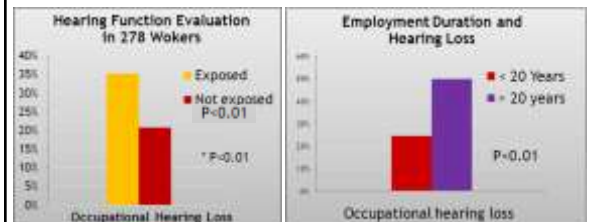


Cases Reported in Italy (2004-2008)



Questions: does it exist an underestimate of cases?

Hearing loss: results of active search of cases



ASBESTOS: OCCUPATIONAL RISK IN AGRICULTURE

- TRACTOR AND OTHER RURAL VEHICLES MAINTAINANCE (Brake maintenance)
- USE OF JUTA BAGS
- CEMENT-ASBESTOS ROOF OR RURAL BUIDINGS

(Alavanja et al, Scand J Work Environ Health 2005)

CANCER RISK FACTORS IN AGRICULTURE

- Ultraviolet radiation
- Mineral oils and solvents
- ONCOVIRUSES
- PESTICIDES
- ASBESTOS



HERBICIDES
INSECTICIDES
FUNGICIDES

(Morrison et al, J Natl Cancer 1992)

CANCER MORTALITY IN AGRICULTURE

CAUSE	NUMBER	SIR (IC 95%)
All neoplasms	2587	0.88 (0.84-0.91)
Lips Sun	25	1.43 (0.93-2.11)
Biliary tract	8	2.26 (0.97-4.45)
Ovary triazine	8	2.97 (1.28-5.85)
Prostate fumigants	1046	1.26 (1.18-1.33)
Thyroid	29	1.29 (0.77-1.76)
Multiple myeloma	43	1.34 (0.97-1.81)
Melanoma Sun	67	1.64 (1.27 - 2,09)

(Alavanja et al, Scand J Work Environ Health 2005)

BALTIMORA UNION POULTRY COURT

- MORTALITY STUDY REALIZED ON A COHORT OF 2580 POULTRY ABATTOIRS WORKERS

Neoplasm	OBS	SMR	PMR
All malignancies	187	1 (0.9-1.2)	0.9 (0.8-1)
Oral cavity and pharynx	3	5.3 (1.1 - 15.6)	5.6 (1.5-20.8)
Nose, nasal sinuses	2	8.7 (1.91, 1)	8.1 (1.8-37.3)
Oesophagus	4	4.1 (1.1 - 10.6)	2.9 (1.2-7.5)



(Johnson ES et al, Cancer Causes Control 2010)

POSSIBLY CARCINOGENIC AGENTS

- RETROVIRUSES: AVIAN LEUKOSIS/SARCOMA VIRUSES, RETICULOENDOTHELIOSIS VIRUSES, ...
- PAPILOMA VIRUS
- VAPORS EMITTED BY PACKAGING MACHINERY (PVC WELDING)
- POLICYCLIC AROMATIC HYDROCARBONS EMITTED IN FOOD SMOKING PROCESSES
- NITROSAMINES (FOOD AND FEED PRESERVATION)
- WOOD DUSTS
- FORMALDEHYDE

(Johnson ES et al, Cancer Causes Control 2010)

Pesticides and Cancer

Conclusions of the Symposium on "Agricultural exposures and cancer", Oxford, UK, November 2002

".. to date the results of epidemiologic studies have been inconsistent."

Alexander et al., 2005)

PESTICIDE: OPEN POINTS

- Absence of an acceptable evidence of increased cancer risk (apart from carcinogenic agents such as arsenicals)
- Reduction of overall mortality and cancer

prenatal / childhood exposure?

Vinson et al, 2011: Exposure to pesticides and risk of childhood cancer: a meta-analysis of recent epidemiological studies (OEM 2011)

Mannetje et al, 2011: Farming, growing up on a farm, and haematological cancer mortality (OEM 2011)

(studies mostly from developed countries)

- the issue is not an "emerging", one, but...

FURTHER PROBLEMS

- Emerging of new risks
- Emerging of new diseases
- Unheeded signals

EXAMPLE 1: Cow Milker's Nodule



Pseudopoxvirus infection in human

DIAGNOSIS: reached in close collaboration with the agricultural enterprise veterinarian



Pseudopoxvirus infection in cow



EXAMPLE 2

"Tulip Finger": frequent contact dermatitis consequent to sensitization against tulipine α : students, housewives, e migrants



Slide created by Dr. Gert van der Laan and shown at the Third International Congress on Rural Health in Mediterranean and Balkan Countries, Tirana, Albania, 22-25 September 2010

EXAMPLE 3: POLYNEUROPATHY AMONG PIG ABATTOIRS



15 cases in one plant, followed by 8 cases in another plant

Source: Lachance et al. An outbreak of neurological autoimmunity with polyneuropathy in workers exposed to aerosolized porcine neural tissue: a descriptive study. *Lancet Neurology* 2010 (9): 55-66.

EXAMPLE 4: the emerging risk "HEV"

RNA hepatitis virus

Types 3-4: possible zoonotic agent

Main reservoirs: pigs and wild boars

HEV in pigs faeces: from 5-6% to 75% in farms with more than 4,000 pigs

Anti HEV IgG positive pig breeders: up to 40% (USA)

Our study on 103 agricultural workers

IgG anti HEV (Kit 1): 1/103 positive

Same group tested with kit 2: 23/103

In South France: 52% positive

Among HEV effects: 25% mortality in pregnant women; PERIPHERAL NEUROPATHY; synergy with hepatotoxicity.

SPECIFIC HIGH CONCERN ISSUES IN AGRICULTURE

- Occupational injuries
- Acute poisonings from chemicals, or insect and reptile biting
- Allergic dermatitis
- (Early) miscarriage
- Infectious diseases
- Musculo-skeletal disorders
- Neoplasms (brain, leukemia, lip, non Hodgkin lymphoma, multiple myeloma, skin, stomach, kidney, prostate, soft tissues sarcoma....)
- Neurobehavioral impairment
- Reproductive health
- Respiratory diseases (asthma, allergic alveolitis, chronic bronchitis)

A QUESTION: HOW TO MANAGE???

- Prevalence of self-employed workers against employees
- Remoteness
- Small number of workers per enterprise
- Family work, elderly and retired at work
- Child labor
- Instability of conditions
- Multiple exposures

THE CONTEXT: PRIMARY HEALTH CARE

Essential health care

Practical, scientifically sound and socially acceptable methods and technology

Universally accessible to individuals and families in the community through their full participation

Cost that community and country can afford

First level of contact between national health system and individuals, family and community

Brings healthcare as close as possible to where people live and work.

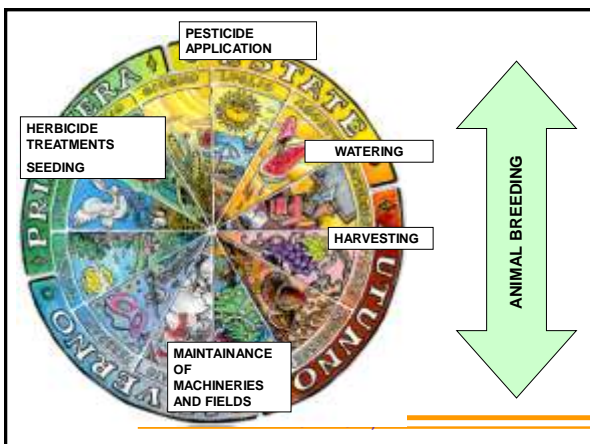
Alma-Ata Declaration, 1978



Courtesy of Nemoz Tolipov, Uzbekistan

Principles of PHC for workers (WHO)

- Responsiveness to specific workers' health needs
 - prevention of occupational diseases and work accidents
- Quality-oriented
 - Interventions that have been proven to be effective, catalyze for change
- Government accountability
 - Involvement of workers', employers and civil society in planning and evaluation of national programmes



Principles of PHC for workers (WHO)

- Social justice
 - those workers that have the highest risks and least access to health services
- Participation
 - workers and employers need to be involved in planning and delivery of services
- Intersectorality
 - the closest link between the health sector and other sectors

A SOLUTION: REACHING RURAL WORKERS AT THE WORKPLACE

- Minimum set of instruments
- (ECG; hearing and respiratory function evaluation kits; biological specimens collection kits)
- Adequately trained personnel
- Support from employers and employees...and

Involvement of rural GPs, often the only providers of PHC to agricultural and rural workers

- Developing pilot experiences of collaboration

SOME KEY WORDS FOR THE FUTURE

- Creating a net of BOHSs in rural areas
- Incorporating Occupational Health in Primary Health Care
- Developing collaboration between OHS physicians and Rural GPs
- Providing training and education specifically addressed to the different actors of prevention in agriculture

A though: occupational health and safety must be implemented where it is necessary, not where it is more comfortable or more paid.....

***Thank you for
your attention***