

# Antimicrobial resistance putting sustainable development at risk

- drivers, impacts, solutions -

World Water Week 2017

#WWWeek

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# Agenda

Karolina Skog, Minister for the Environment, Sweden

Carl Fredrik Flach, Gothenburg University

Speed presentations

Nicolai Schaaf, SIWI Swedish Water House (chair, conclusions)

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# Speed presentations

- Peter Hurst, Author and expert on Occupational Health and Safety in Agriculture
- Monica Priya, SaciWaters
- Steven Meszaros, Pfizer/ Pharmaceutical Supply Chain Initiative
- Anders Finnson, Swedish Water and Wastewater Association
- Adela Maghear, Health Care Without Harm
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# Karolina Skog

## Minister for the Environment, Sweden

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# The role of the environment in evolution and transmission of antibiotic resistant bacteria

Carl-Fredrik Flach

Centre for Antibiotic Resistance Research, CARE

Department of Infectious Diseases

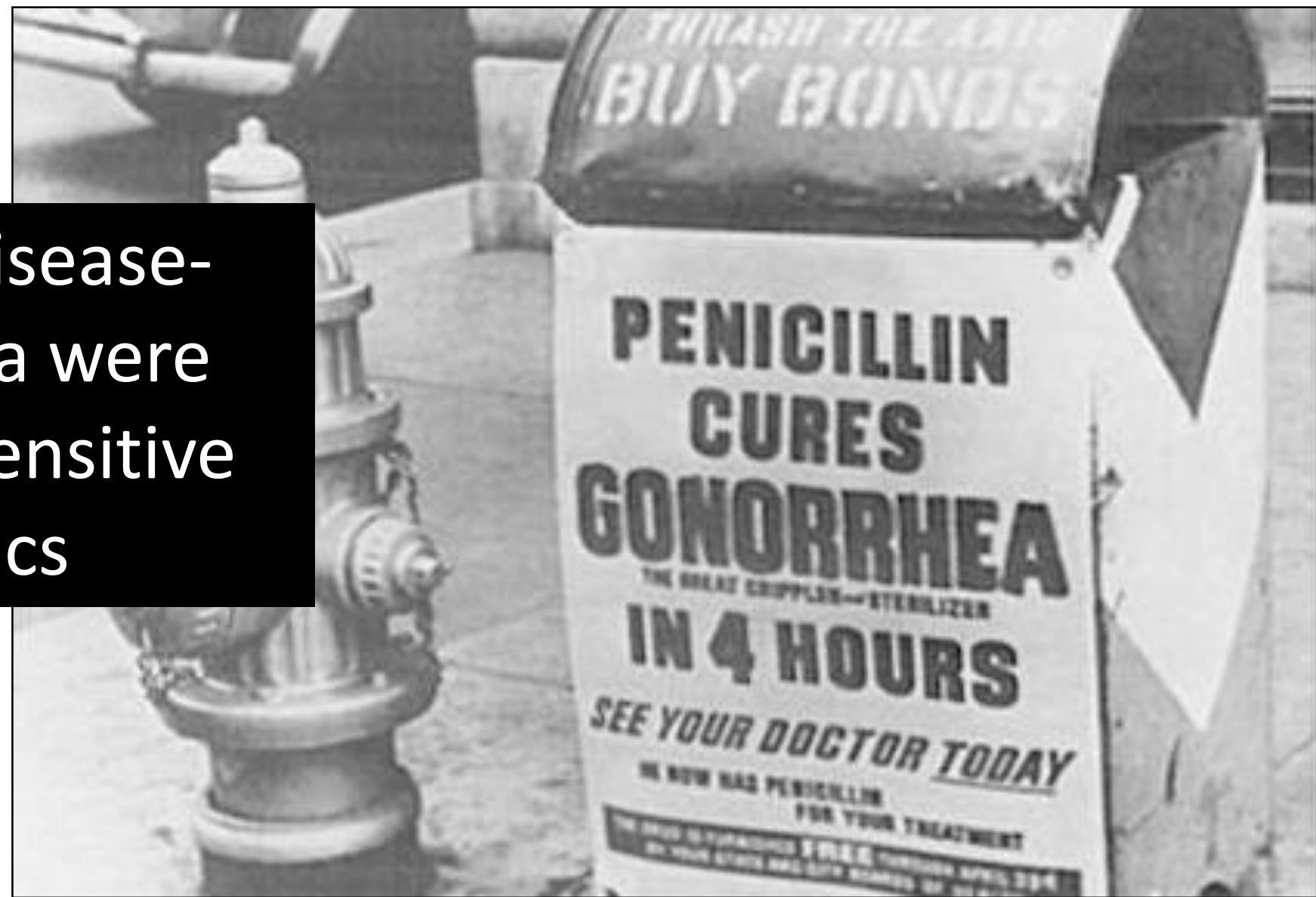
Sahlgrenska Academy at University of Gothenburg

*carl-fredrik.flach@microbio.gu.se*



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CARE   
[www.care.gu.se](http://www.care.gu.se)



75 years ago, disease-causing bacteria were almost always sensitive to antibiotics





# Antibiotic resistance is a major threat to global public health

*“Without urgent, coordinated action by many stakeholders, the world is headed for a post-antibiotic era, in which common infections and minor injuries which have been treatable for decades can once again kill.”*

World Health Organization, WHO, regarding the global challenge of antibiotic resistance

| Antimicrobial Resistance  
Global Report on Surveillance 2014



World Health  
Organization



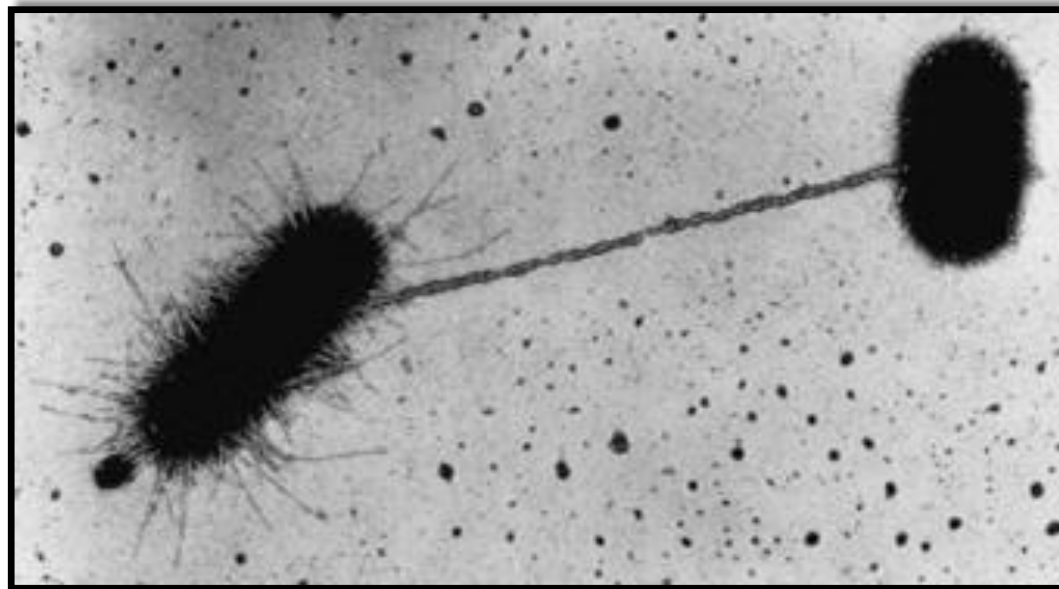
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# How do bacteria become resistant to antibiotics

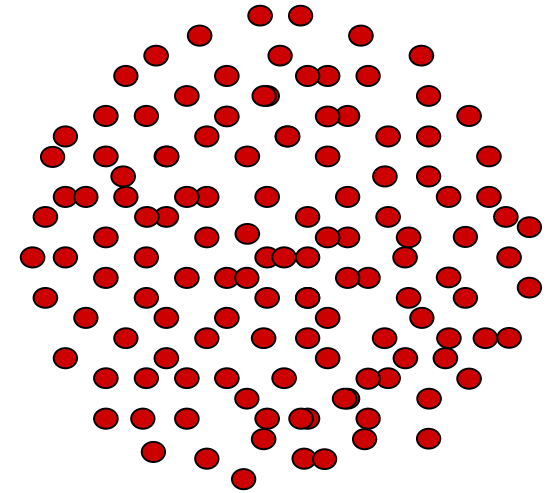
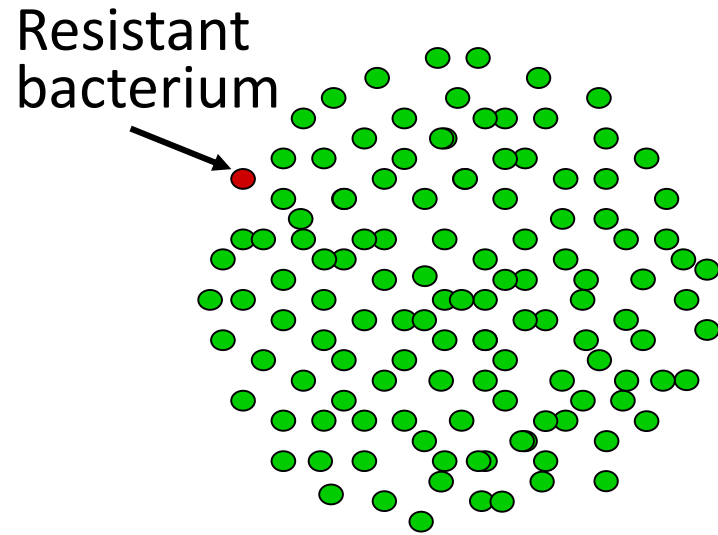
## Two main mechanisms:

- Changes in their pre-existing DNA
- Acquisition of new DNA from other bacteria in their surroundings
  - Environmental bacteria are involved in this process





# Selection of antibiotic resistant bacteria



# Where and when are bacteria exposed to our antibiotics

**BEFORE**



**Production**



**DURING**



**Usage**



**AFTER**



**Sewage / Waste water treatment plant**



**Water environments**



**Water environments**



# Where and when are bacteria exposed to our antibiotics

**BEFORE**



**Production**



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**Sewage / Waste water treatment plant**



**Water environments**



**Water environments**

# Where and when are bacteria exposed to our antibiotics

**BEFORE**



**Production**



**DURING**



**Usage**



**AFTER**



**Sewage / Waste water treatment plant**

**High risk for evolution of antibiotic resistant bacteria**

Water environments

Water environments



# The environment can also be a significant transmission route for antibiotic resistant bacteria

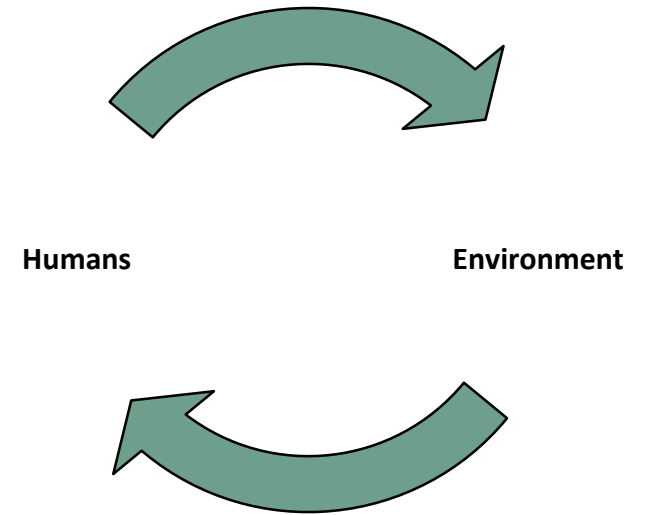


**ENVIRONMENTAL**  
Science & Technology

Viewpoint  
pubs.acs.org/est

Underappreciated Role of Regionally Poor Water Quality on Globally Increasing Antibiotic Resistance

David W. Graham,<sup>\*,†</sup> Peter Collignon,<sup>‡</sup> Julian Davies,<sup>§</sup> D. G. Ioakim Larsson,<sup>||</sup> and Jason Snape<sup>⊥</sup>





A close-up photograph showing a hand holding a white blister pack of pills. The blister pack is tilted, and a single white pill is falling from it into an open palm held below. The background is a soft, out-of-focus blue.

## Actions are needed

- Improved sanitation and wastewater treatment
- Incentives for greener production of antibiotics
  - Define **discharge limits** for antibiotics
  - **Transparency** throughout the production chain
  - Changes in the **procurement** of antibiotics
  - Changes in the **generic substitution systems**
  - Changes in **GMP** frameworks





# THANK YOU FOR LISTENING!



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[www.care.gu.se](http://www.care.gu.se)



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# **ANTIMICROBIAL RESISTANCE A THREAT TO SUSTAINABLE AGRICULTURE & FOOD PRODUCTION IN THE GLOBAL FOOD CHAIN**



## **SOLUTIONS IN THE WORKPLACE**

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**Peter Hurst**

**World Water Week 2017  
Stockholm, Sweden**

**Antimicrobial resistance putting  
sustainable development at risk  
Drivers, impacts, solutions**



# WORKERS IN THE AGRI-FOOD SECTOR AT RISK FROM AMR

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- **Agricultural workers:** 1/1.3 billion farmers, farmworkers, fishers (800 million+ of the world's poorest people). Working with farm animals/animal products - meat/poultry, dairy, milk, eggs, honey
- **Aquacultural workers:** handling fish, molluscs, crustaceans: ponds, lakes, rivers, wetlands, coastal/offshore waters
- **Meat/poultry slaughtering workers:** handling carcasses and raw meat, offal
- **Food processing/manufacturing workers:** handling meat, poultry, fish and seafood products
- **Transport/distribution workers:** handling raw/treated products
- **Supermarket/shops workers:** handling packaging when filling shelves; even contact with raw meat (butchery section)
- **Food preparers/handlers:** - restaurants, cafes, hotels, conference centres, catering, canteens in schools & factories





# AMR RISKS IN THE FOOD CHAIN

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## 1. Occupational-related AMR risks:

**1.1** Direct risks to workers - self-employed farmers and hired workers - in agriculture, aquaculture and the food chain of contracting AMR diseases and suffering ill health, or even fatal illness

**1.2** These workers can unknowingly acting as **carriers** of AMR and by accidentally contaminating the food they produce or handle (or the packaging) pose an indirect risk to any consumers who eat this food, or handle the packaging

1.3 Workers as carriers can put at risk the public at large (and in communities), by passing on AMR by physical contact, e.g. shaking hands, or sometimes by respiratory means



## SOLUTIONS TO AMR

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Workers, and the trade unions that represent and organise them, can help provide sustainable solutions to AMR

By helping prevent and/reduce the incident and severity of AMR in the workplace, workers protect not only themselves but also consumers (food safety), public and community health, and the environment

Workers and their trade unions need a voice in national, regional and international policy discussions on AMR prevention and reduction





# Solutions to AMR

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- Farmers/agricultural producer organisations that represent and organise them can help provide sustainable solutions to AMR
- 825 million farms - the vast majority small-scale farms, family run, often producing livestock and fish under contract
- Are often represented and organised in smallholder farmers organisations and networks and not by national farmers' union who often represent the larger farmers or landowners
- Farmers and their organisations need a voice in national, regional and international policy discussions on AMR prevention and reduction

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## Widening Insecurities: Implications of Industrial Pollution in Peri-urban Hyderabad



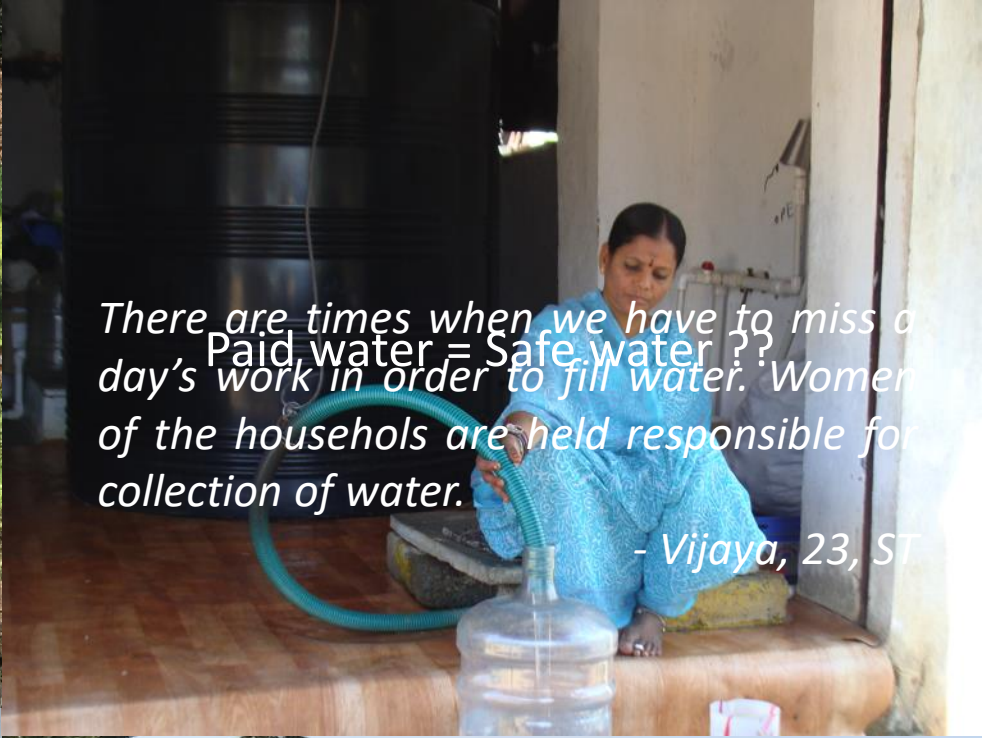




1. Water insecurities for drinking and agricultural uses

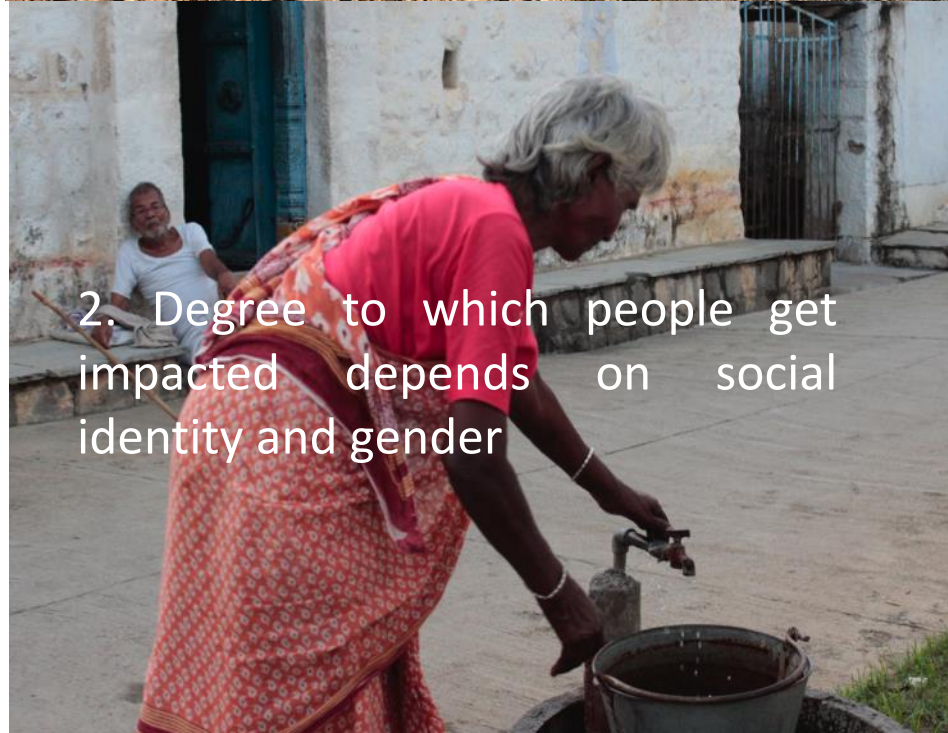
4. Conflicts are to do more with the quality of water rather than the quantity

Conflicts are not always bad

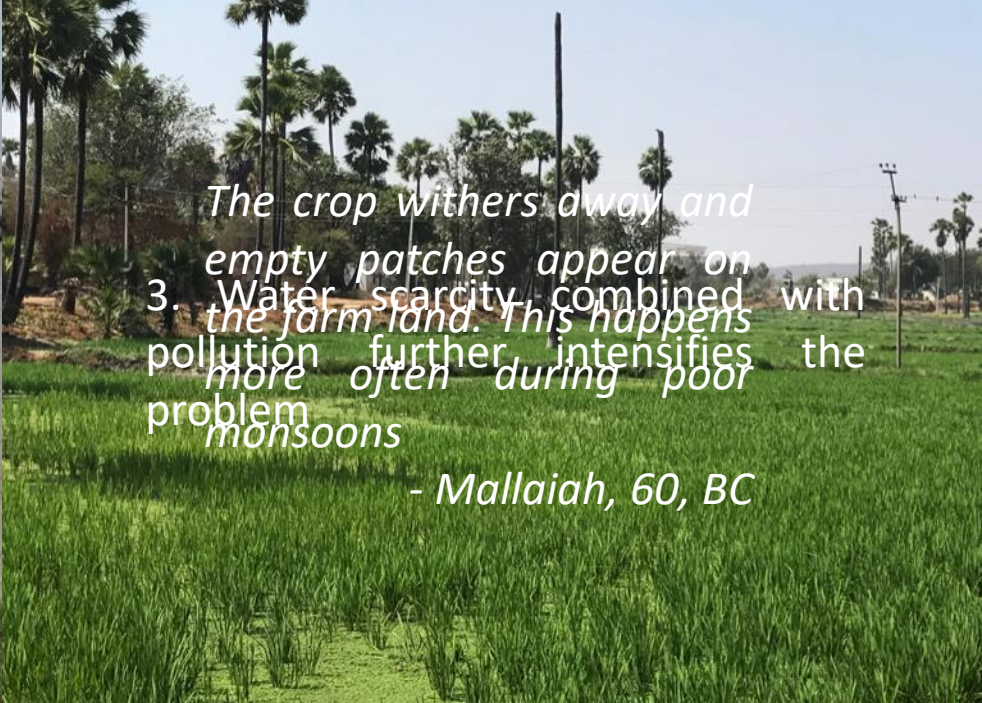


*There are times when we have to miss a day's work in order to fill water. Paid water = Safe water?? Women of the households are held responsible for collection of water.*

*- Vijaya, 23, ST*



2. Degree to which people get impacted depends on social identity and gender



*The crop withers away and empty patches appear on the farm land. This happens more often during poor monsoons*

*- Mallaiah, 60, BC*



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# Pharmaceutical Supply Chain Initiative

An industry body formed by the pharmaceutical sector whose members share a vision for **responsible supply chain management**, to deliver better social, health, safety and environmental outcomes in the communities where they buy.

## What we do

- ❑ Set standards for ethics, labour, health & safety, environment, management systems
- ❑ Share expertise and tools to help suppliers meet our standards
- ❑ Promote sharing of audits to reduce the burden on industry and drive continuous improvement

## 2017 Accomplishments

- ❑ Green Chemistry (GC) & Environmental Awareness Conference  
Visakhapatnam; 20-21 February, 130+ supplier representatives
- ❑ CEO Roundtable Lecture Promoting GC and Environmental Compliance  
Hyderabad; 22-24 February, 54 executives from 40 companies
- ❑ Advanced Auditor Training to understand key issues in Pharma Industry  
Hyderabad; 28 February – 1 March, 49 auditors from 10 companies
- ❑ Supplier Capability Building Conference  
Hyderabad; 8 - 11 May, 150+ supplier representatives



## PSCI member companies









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Svenskt Vatten

# Antimicrobial resistance putting sustainable development at risk: Drivers, impacts, solutions

## World Water Week 2017-

”Water and waste: Reduce and reuse”

### Anders Finnson, Swedish Water & Wastewater Association

- **Policywork to phase out** the use of hazardous substances in the urban water cycle.
- **Research and development for advanced treatment technologies** to be able to reuse the resources in wastewater.

# Antimicrobial resistance – urban solutions



Svenskt Vatten

- **Key message: The parallel approach**

- **control at source** to minimise the use of antibacterial substances, not at least in households (silver and triclosan)

- **and** to develop **energy efficient treatment technologies** to minimise the risk for spreading of antimicrobial resistance to water and soil from wastewater treatment plants

UN WATER Report

The United Nations World Water Development Report 2017

**EXECUTIVE  
SUMMARY**



**Wastewater**  
The Untapped Resource





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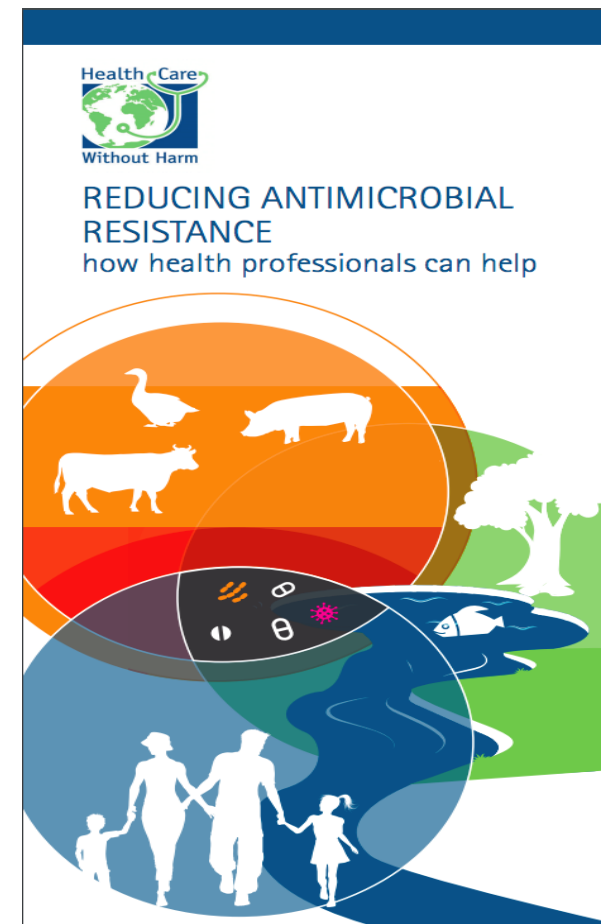


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# How health professionals can help reduce antimicrobial resistance

Adela Maghear

Pharmaceuticals Policy Officer  
Health Care Without Harm Europe  
[www.noharm-europe.org](http://www.noharm-europe.org)





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# Sustainable Procurement in the Health Sector (SPHS)

International Water Week. Stockholm Sweden  
28<sup>th</sup> August, 2017

Dr. Rosemary Kumwenda  
SPHS Coordinator and Team Leader for Regional  
HIV, Health and Development, UNDP Europe and  
CIS







## Who We Are

Established in 2012, SPHS brings together seven United Nations agencies and three global health financing institutions, committed to introducing sustainable procurement in the global health sector and beyond.

Our annual cumulative purchasing power is around US\$ 5 billion, which represents a sizable portion of the global pharmaceutical and other health products markets.

[www.savinglivesustainably.org](http://www.savinglivesustainably.org)



## What We Do

### MULTI-LEVEL PERSPECTIVE

We promote sustainable health systems and inclusive green economies

### CROSS-CUTTING INNOVATION

We address sustainability from different perspectives - public health, the environment, procurement.

### DRIVER FOR CHANGE INCLUSIVE APPROACH

Our UN procurers, suppliers and manufactures work at global, regional and national levels

Our engagement with suppliers and manufacturers is based on systematic consultation, ongoing dialogue and collaboration

### MARKET INTELLIGENCE

We can draw on the expertise and knowledge from our far-reaching network

### ONLINE ENGAGEMENT

We maintain a repository of good practice examples on sustainable procurement and sustainable manufacturing

### PLATFORM TO BUSINESS

We bring together a global network of technical experts who can support suppliers and manufacturers



## Achievements

Green Procurement Index Health roadmap

Guide on Health Procurement and the Compliance with International Environmental Conventions on Chemicals

Carbon foot printing of UNDP Global Fund grants

Health care waste assessments and waste management toolkits

Engagement Strategy with suppliers and manufacturers and a Signed High-Level engagement statement

Sustainable Health Procurement Guidelines and Procurers training

Environmental Questionnaire for suppliers and manufacturers

Partnerships with Health Care without Harm, SIWI, Skoll Foundation, UNF



- Thank you.



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# Medical Products Agency

A leading force in collaboration for better health

Kia Salin  
Environmental Strategist

20170828





- **MPA ♥ Agenda 2030** Good health and well-being
- **Increased environmental considerations in the pharmaceutical legislation in EU and internationally**
- **”Good Manufacturing Practice” to protect health - harmful emissions and discharges must be minimized as a logical consequence!**
- **Negotiations Regulation of Vet. Medicinal products**
- **When the perfect is the enemy of the good**
- **The carrot and the stick!**
- **National reimbursement system and procurement**

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# Antibiotic Resistance: key messages

- **All** antibiotic use – humans, animals, crops – worsens the problem
- Antibiotic resistance threatens several Sustainable Development Goals, including SDG6 on clean water and sanitation
- **One newborn child dies every 5 minutes** from resistant blood infections (South Asia)
- Antibiotic resistance **cannot be solved**, only managed!
- 500 000 000 cases of diarrhea treated with antibiotics each year – **60 % reduction** possible by improving water and sanitation
- No action cost is enormous. The world need to respond stronger. We need political will, collective action and sustainable funding!



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# Addressing Antimicrobial Resistance to attain the SDGs: What role should aid play?

**Maria Teresa Bejarano. MD.PhD.**  
Senior Research Advisor  
Unit for Research Cooperation, Sida  
Professor Infection Biology,  
Karolinska Institutet

# Why is AMR an aid and development issue?

- Addressing AMR **underpins** SDG achievements and **sustains** MDG gains
- Inaction would cost 10 m Lives/y and \$100 trillion of global GDP
- AMR disproportionately affects the poor and AMR thrives in poor settings
- LMICs response to AMR is what will make a significant difference for us all going forward
- LICs have insufficient resources (financial, technical, human)
- Multilateral aid has capacity for sustainable & effective action from multiple perspectives (health, environment, agriculture etc: One health)
- Aid has purchasing and convening power to leverage for improving regulatory frameworks based on internationally agreed principles/standards and also conditionality for support
- AMR is a global and urgent crisis to be managed collectively



<http://www.sida.se/research>



# Antimicrobial resistance putting sustainable development at risk

- drivers, impacts, solutions -

Find resources at [www.programme.worldwaterweek.org/event/6883](http://www.programme.worldwaterweek.org/event/6883)

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