Research Report

Leiden Model United Nations 2016
~ fresh ideas, new solutions ~

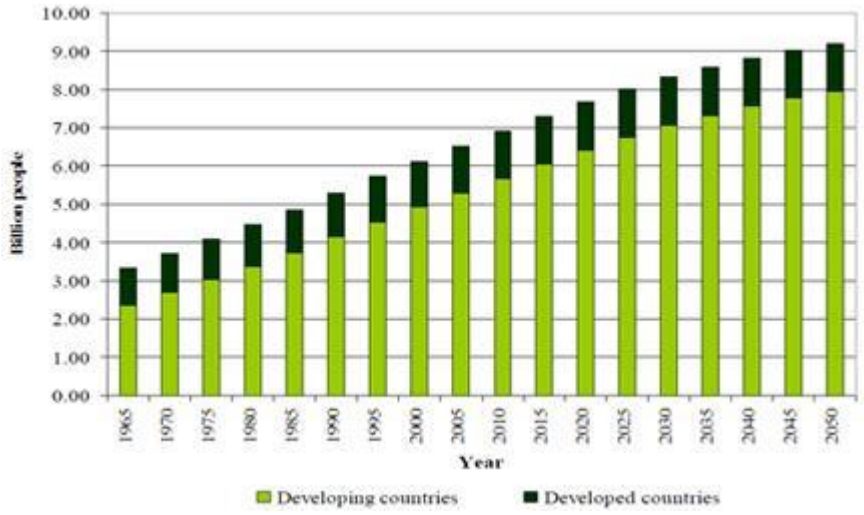
Forum: *Food and Agriculture Organisation*
Issue: *Reducing the use of antibiotics in agriculture*

Position: *President*

Introduction

Over the past century, the global demand for food has increased immensely and it will continue to do so in the upcoming decades.

World Population (1965 – 2050)



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2007) (1).

And with this struggle to supply food for the fast-growing population comes the great challenge of creating sustainable food systems without damaging ecosystems and the health of the consumer.

One of the measures that many intensive livestock farmers deem necessary to keep up with this increasing demand is to use antimicrobials (such as antibiotics and antifungals) during the production of food. These farmers l add antimicrobials to the food of the livestock to stimulate the growth or to treat infections. The people eat the livestock and the substances will be passed on to the consumer. A major problem of using antimicrobials in the production of livestock or plant agriculture is that consumers have a chance that bacteria and microbials will become resistant to the antimicrobials, this will result in an increased ineffectiveness of utilising those antimicrobials as medicines, which makes the bacteria harder to treat.

Definition of Key Terms

Antimicrobial:

Antimicrobials are agents that kill or affect the growth of microorganisms (for example bacteria). Antimicrobials are primarily used in medicines to counter bacteria or fungi. These antimicrobial medicines can be used to prevent infections (*antimicrobial prophylaxis*) or to treat infections (*antimicrobial chemotherapy*). The two most famous kinds of antimicrobials are antibiotics and antifungals.

Antibiotic:

An antibiotic is a kind of antimicrobial that can be used in the form of a medicine to prevent or treat bacterial infections. The first antibacterial substance that was useful to create an antibiotic was penicillin, it was discovered by Alexander Fleming. Antibiotics do not fight infections caused by viruses. The problem with the utilisation of antibiotics is that it causes resistance to those antibiotics.

Resistance:

"Antimicrobial resistance is resistance of a microorganism to an antimicrobial drug that was originally effective for treatment of infections caused by it." - WHO.
So for example, if a person gets a (bacterial) infection and this person uses antibiotics in a irresponsible manner to treat the infection, there is a chance that the bacteria and microbes will be harder to treat in the case of future infections. the microorganisms are now "acclimatised" to the antibiotics. AMR is the abbreviation of antimicrobial resistance and is more than frequently used in this field of expertise and in discussions.

Antibiotic resistance tests: Bacteria are streaked on dishes with white antibiotic impregnated disks. Clear rings, such as those on the left show that bacteria have not grown — indicating that the bacteria are not resistant. Those on the right are fully susceptible to only three of the seven antibiotics tested.

Agriculture:

"The science or practice of farming, including cultivation of the soil for the growing of crops and the rearing of animals to provide food, wool, and other products." this is the definition of the word "agriculture" by the Oxford Dictionary.

Aquaculture:

Aquaculture (or aquafarming) is the farming of organisms or plants in water. Even in Aquaculture farmers use antibiotics to grow their products.

General Overview

Since the discovery of Penicillin by Alexander Fleming the world had a breakthrough on the matter of antimicrobials. New antimicrobials were invented and people started to use them in medicines. Infections caused by microorganisms were suddenly easier to treat thanks to the medicines with antimicrobials.

The only problem with this new medicine was that if you use it, it can make bacteria resistant to the medicine. However, the people who do not know this or people who do not acknowledge the danger of not using antimicrobials with care use antimicrobials superfluously.

Nowadays around 500.000 people die every year of causes related to antimicrobial resistance. The resistance to antimicrobials causes infections to be very difficult (or impossible) to cure. Apart from the major group of people who create AMR (Antimicrobial resistance) for themselves there is a considerable group that causes AMR for "innocent" people. The group that causes this AMR for other people is the group of the farmers. The reason that these farmers add antimicrobials to their products is because the antimicrobials can help their products grow, or treat infections. The problem with that is that the consumers can become resistant to those antimicrobials because the substances of antimicrobials are being transferred by eating the products. These farmers are allowed to add antimicrobials to their products because there aren't enough laws, policies or rules to govern their use. It is important that there will not only be new regulations on the use of antimicrobials in the health care system but also in the agriculture and (international) trade.

Major Parties Involved

WHO

The WHO (World Health Organisation) is one of the most dedicated organisations to fight antimicrobial resistance. Not only have they created multiple researches on the matter but they also created a global multi-year campaign and created possible plans for governments to use to reduce antimicrobial resistance.

FAO

The FAO (Food and Agriculture Organisation of the United Nations) has given itself the task to support government, traders, producers and other stakeholders in creating measurements to reduce the use of antimicrobials and to prevent the development of antimicrobial resistance.

OIE

The OIE (World Organisation For Animal Health) does basically the same as the WHO and the OIE in regard to raising awareness and supporting governments and other stakeholders to create policies, but the OIE is only active on the ground of livestock and other animal agriculture.

Every member state

Every member state has the duty to prevent further development of AMR. This is an issue that is relatable to every state. Every member state needs to create laws or policies to prevent AMR because every state contributes to the development of AMR. Every member state needs to create these laws or policies not only to ensure that antimicrobials can still be used in medicines but also because it is also a matter of national and global health. Because of globalisation and the amount of trade in food between states is it important to tackle this issue, because for example, if a livestock farmer in Argentina uses antimicrobials on his livestock because there are not enough regulations about the use of antimicrobials, and they decide to ship their meat to another state, they may export AMR as well.

Farmers

Without the cooperation of the farmers from all over the world we will not be able to eradicate AMR. The farmers who use antimicrobials, however, use them for a reason, because they also need to sell enough food to earn a profit and to meet the increasing demand for food.

Timeline of Events

1928	Alexander Fleming discovers penicillin.
April 2013	the Infectious Disease Society of America (IDSA) reported that the weak antibiotic pipeline does not match bacteria's increasing ability to develop resistance.

1997	EU (European Union) voted to ban 5 antibiotics to promote Animal growth.
2014	WHO stated the methods to tackle global antibiotic resistance.
November 2015	WHO launched a global campaign called "Antibiotics: Handle with care".

Previous Attempts to solve the issue

- Resolution adopted by the General Assembly on 27 July 2012
- Resolution to the economic and social council-E/2014/NGO/55-2014
- WHO launched a global campaign called "Antibiotics: Handle with care
- Conference of FAO 6-13 June 2015 C 2015/REP

Possible Solutions

Although this is a serious and difficult issue, there are possible solutions to tackle this problem. One of the methods to solve this issue is to improve awareness throughout farmers, governments, NGOs (Non-Governmental Organisation) and populations.

There are simply too many people who do not know the risk of the use of antibiotics and who are not aware that sizable risk of growing resistance to antibiotics.

Another method to possibly solve the issue is to create a legal global framework to control and prevent antimicrobial resistance. Also a global tracking system for antimicrobial resistance would help to indicate in which countries the people are most resistant to antimicrobials, if you have this information then you will be able to decide which countries need more awareness, more education on the matter and so on.

A more obvious, but still very important, measurement to solve this issue is to increase research on new antibiotics and antibiotic resistance. This goal, however, is very difficult to reach and even if we discover 50 more kinds of antimicrobials we would not be able to stop the creation of resistance towards those antimicrobials.

A more grand-scale method to tackle the issue is to enhance the health and living conditions of people all around the world to reduce the chance of infections.

To establish new policies, laws or rules is another way to control antimicrobial resistance.

There is also the problem that if we ban and terminate the use of antimicrobials, the farmers might get in financial struggles - should we compensate them? Additionally, we might need to compensate for the amount of food that is not being produced thanks

to the ban on antimicrobials. World food demand is increasing, and by banning the use of antimicrobials we are also decreasing the world food production. So how are we going to compensate for that?

Last but certainly not least, every member state and the United Nations should start/continue to closely monitor the issue.

Useful documents

- WHO Global strategy for containment of antimicrobial Resistance
- E/2014/NGO/55 Statement submitted by World Society for the Protection of
- Resolution adopted by the General Assembly on 27 July 2012 "The future we want" A/RES/66/288*
- Management Options for Reducing the Release of Antibiotics and Antibiotic
- Fact sheet about AMR by the OIE
- https://amr-review.org/

Appendix/Appendices

- http://www.who.int/mediacentre/factsheets/fs194/en/
- http://www.nature.com/nature/journal/v418/n6898/abs/nature01014.html#a4
- http://www.annualreviews.org/doi/full/10.1146/annurev.phyto.40.120301.093927\
- http://www.fao.org/antimicrobial-resistance/en/
- http://www.agmrc.org/renewable-energy/renewable-energy/can-we-meet-the-worlds-growing-demand-for-food/
- http://emerald.tufts.edu/med/apua/about_issue/antibiotic_agri.shtml
- https://en.wikipedia.org/wiki/Antibiotic_use_in_livestock
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