

**PESTICIDE APPLICATION METHODS AND
ENTRY ROTES OF PESTICIDES INTO SURFACE
WATER IN ETHIOPIA
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1. Introduction

- Pesticides play an important role in agriculture and public health sector
- Pesticides have been used for more than 4 decades in the country

- Seems the best control option

-Desert locusts

-Armyworms'

- Quelea birds

-Malarial transmitting mosquitoes



- The central Rift valley is the major pesticide use area

- Central rift valley Vegetable farmers are caught

by “Pesticide dependency syndrome” and reached

Into the threshold of “ pesticide treadmill”

- Commercial farms (including flower farms) use also huge amount of Pesticides



Small scale farmers

- Mostly use Knapsack sprayers
- Use ULV sprayers (during armyworm control in the past but now it is not used)
- Arial spraying is conducted for the control of quelea birds every year)- on roosting sites
- ❖ Quelea roosting sites are mostly typha grass
- ❖ In the central rift valley Typaha grass is mostly located around water bodies (lake Zeway

Widely used by smallholder vegetable farmers
in the central rift valley



(After Tadesse Amera and Asferachew
Abate, 2008)

Large scale farms

- Use Knapsack sprayers
- Arial and tractor mounted application of pesticides is used in some large scale farms
- Motorized sprayer is used for the control of pests on orchards

A major input in commercial farms



Floriculture

- Use Knapsack sprayer and motorized sprayer

Type of Knpsack sprayer

- Diaphragm pump
- Piston pump

Hight of apparatus above crops

30-50 cms



A major input in flower farms
(photo by Leigh Morris)





Only a respirator!

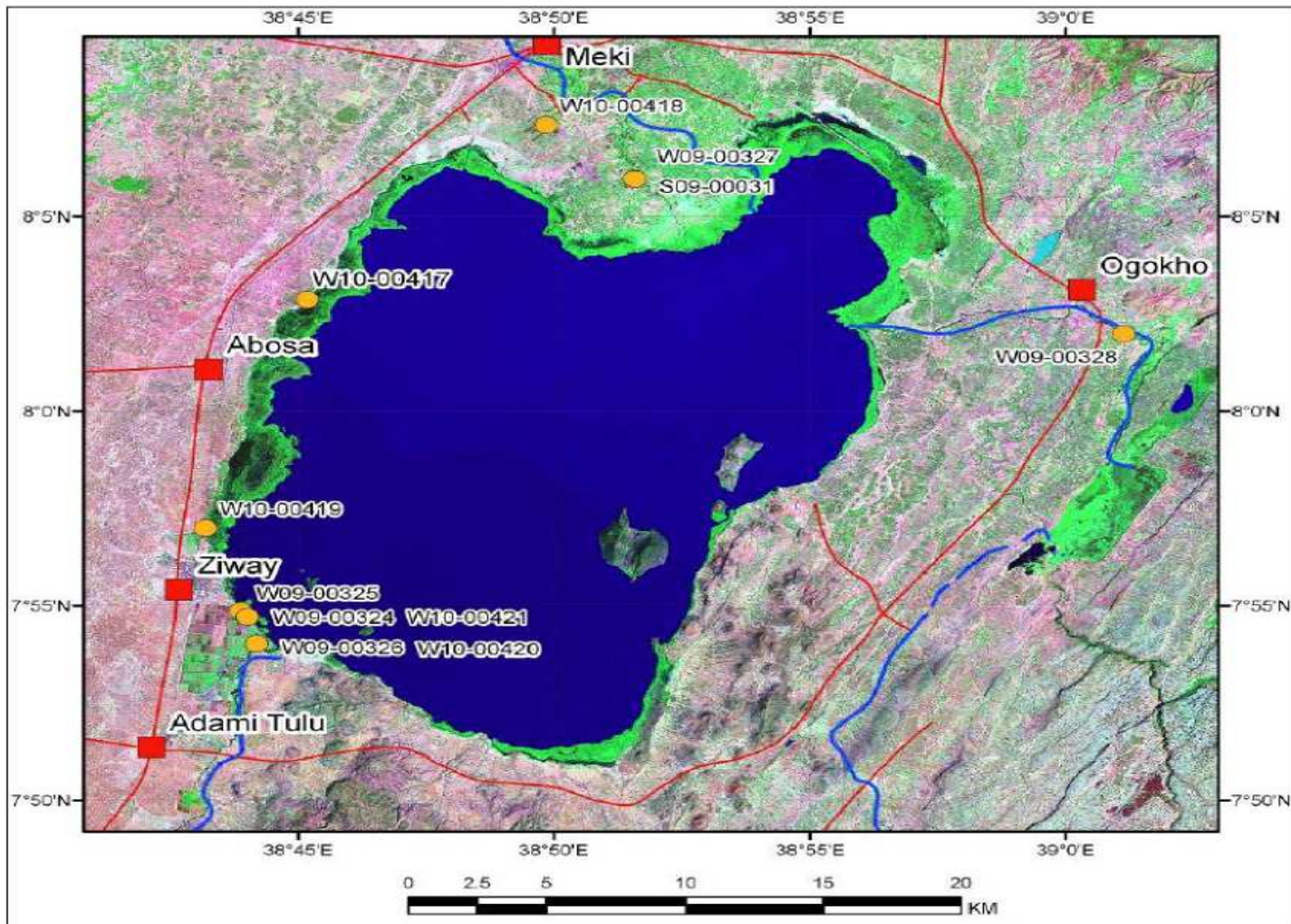
Entry routes of pesticides into surface water

Introduction

- Quality of surface water resources in the Central rift valley are increasingly threatened (Jansen and Harmsen, 2011)
- Study conducted by Alterra in 2009 and 2010 showed most surface water samples in the agriculture areas of north of lake zway and between Meki and zeway town contain residues of pesticides occasionally exceeding 0.1 µg/l

Entry routes of pesticides into surface water (cont..)

- The effluent water from floriculture enterprise contains a range of pesticides with concentrations exceeding $0.1\mu\text{g}/\text{l}$ including some high risk pesticides
- Over 60 types of pesticides have been detected (300 samples)



Lake Ziway and proximity to sampling site by Jansen and Harmsen (2011)

Monitoring results

- Meki and ketar river

Traces of DDT were found from Ketar river

A total of 13 pesticides detected in irrigation canal in the agriculture area east of Meki

Except for sulfur ($7 \mu\text{g}/\text{l}$) $0.1\mu\text{g}/\text{l}$ and metalaxyl ($0.11 \mu\text{g}/\text{l}$) the concentration of other pesticides were less than $0.1\mu\text{g}/\text{l}$

Monitoring results

- **Area between Meki and Zeway**
 - ❖ A total of 17 pesticides detected $0.1\mu\text{g/l}$ and except sulfur ($3\mu\text{g/l}$) all concentrations were less than $0.1\mu\text{g/l}$
 - ❖ Agriculture areas north of Zeway
 - DDT, malathion, metsulfuron-methyl, sulfur, triadimefon. Triadimefon, caffeine and tris (2-chloroethyl) phosphate were detected in more than one water sample

Monitoring results

- Floriculture Enterprise (effluent water)
In the stagnant water concentrations were in the range of 0.01-9 0.1 $\mu\text{g/l}$
In the water discharged to lake Zeway upto 2.2 $\mu\text{g/l}$
Batu Water supply Enterprise
Low concentrations of methomyl (0.02 $\mu\text{g/l}$),metabolite of pyridate and biphenyl detected

Monitoring results

- But in 2010 the water contained high concentration of metsulfuron-mthyl ($0.3 \mu\text{g}/\text{l}$) and sulfur ($10 \mu\text{g}/\text{l}$)

Entry routes of pesticides into surface water

- Spray drift (source of contamination: both from aircraft and Knapsck spraying activityin the crop field)
- Runoff and drainage (source of contamination: from sprayed field)
- Effluents collected in drain and discarched in to lake Zeway (Source of contamination: Floriculture enterprise)

Thank you