Evaluation of agricultural
gross production value, gross production value per capita and population

Conflict-affected & non-conflict-affected Sub-Saharan African countries

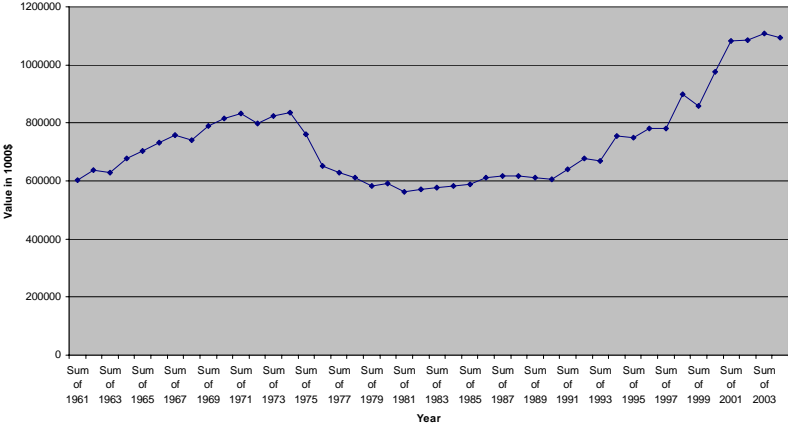**(DRAFT)**

Elina Lauriala
TCAS

Contents

1.

Findings Annex

1. Conflict countries - Angola

GRS Production evoluation in Angola, 1961-2004

Agricultural grs production per capita in Angola, 1961-2003
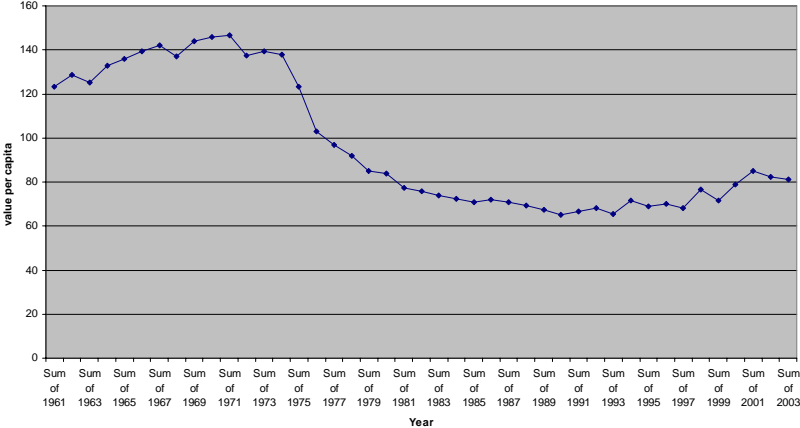
Population in Angola 1961-2003
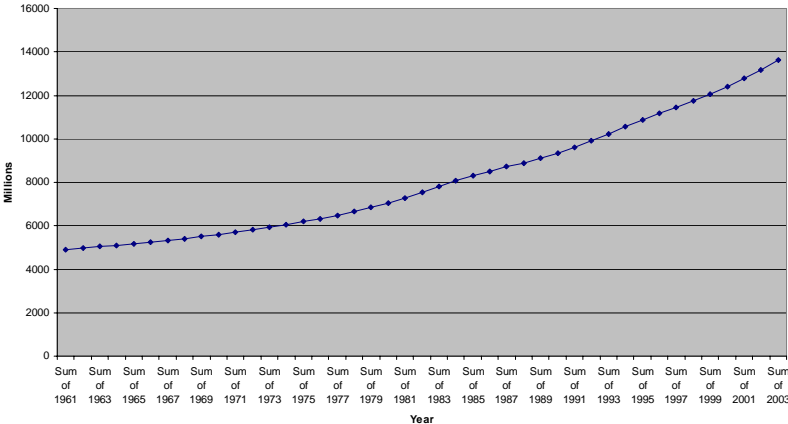
Findings

*production declined after independence 1975 (conflict), stagnated for several years and started to grow again in 1991 (peace treaty)

*before 1975 the production per capita was in a higher level, but dropped fast after that

*population growth has been very rapid, so even the production has increased, the population growth has been "eaten" the effect

* Average annual growth of:

population (1961-2004) 2,57 change 178 percent

value of total production (1961-2004) 0.64

value of total production (1999-2004) 4.66

* Average production per capita (1961-2004) 97 $

4

Conflict countries - Burundi

Agricultural GRS Production evaluation in Burundi, 1961-2004
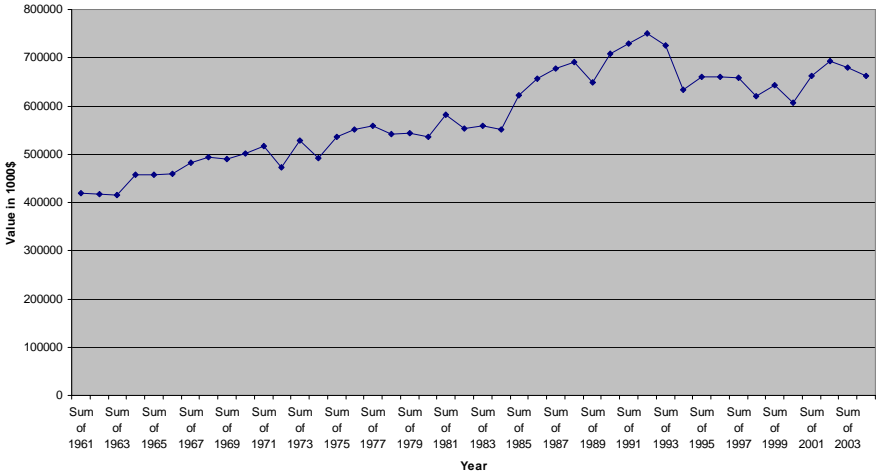
Agricultural grs production per capita in Burundi, 1961-2003
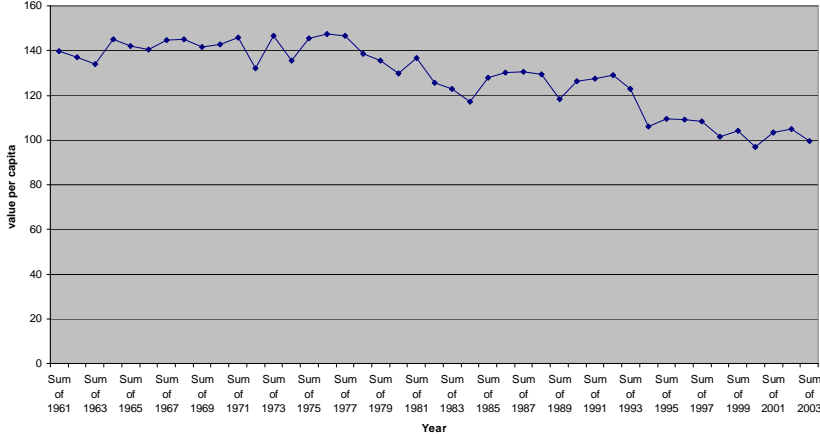
Population growth in Burundi 1961-2003
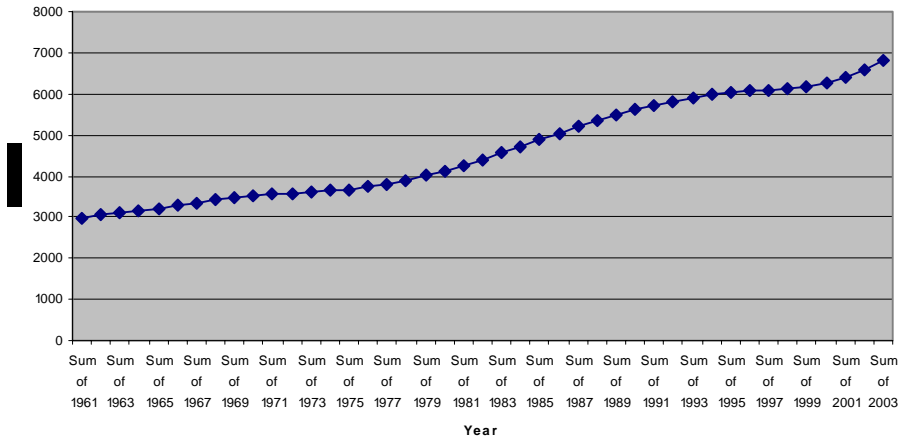
Conflict countries – Central African Republic

Findings
*Before 1993 (conflict) the trendline of gross production was rising.
Growht was especially fast 1984-1992.
*After the drop in 1993 (continued conflict) the production has been
stagnating.
* the trend in grs production per capita has been decreasing. There is a
drop in 1994 and stagnation after that
* population growth has been rapid and production haven't been able to
keep up with it
* Average annual growth of:
population (1961-2004) 2,09 change 128 percent
value of total production (1961-2004) 1.17
value of total production (1999-2004) 1.51
* Average production per capita (1961-2004) 128 $

Agricultural GRS Production evaluation in Central African Republic, 1961-2004

Agricultural grs production per capita in Central African Republic, 1961-2003

Population growth in Central African Republic 1961-2003

Findings:
*production has been growing steadily for whole period.
* Production per capita has been stagnating.
*Population growth has been eaten the production growth.
*conflict has been continuing since the independence 1960, so it is not possible to see clear declines
* Average annual growth of:
population (1961-2004) 2,30 change 148 percent
value of total production (1961-2004) 2.54
value of total production (1999-2004) 2.47
* Average production per capita (1961-2004) 148 $

7

Conflict countries – DR Congo

Agricultural GRS Production evaluation in DR Congo, 1961-2004
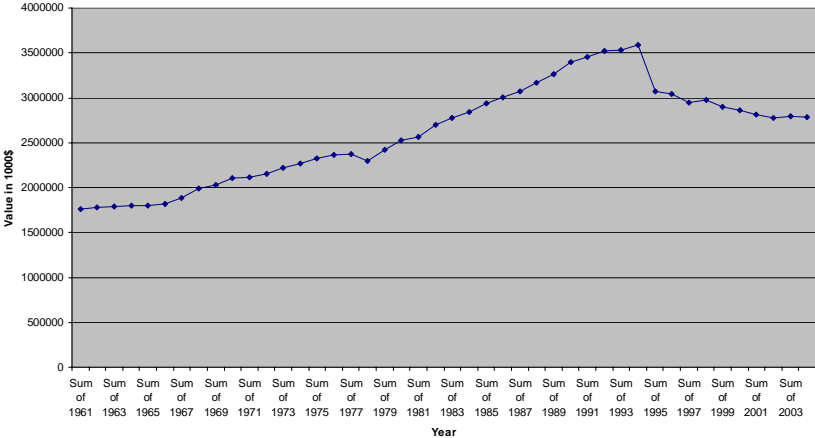
Agricultural grs production per capita in DR Congo, 1961-2003
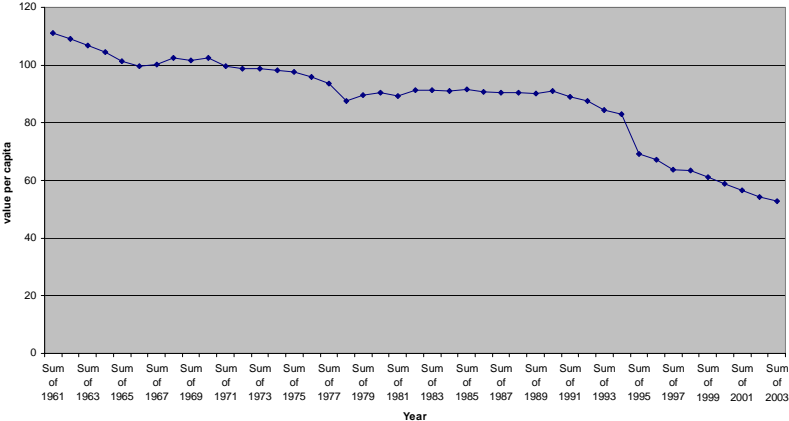
Population growth in DR Congo 1961-2003
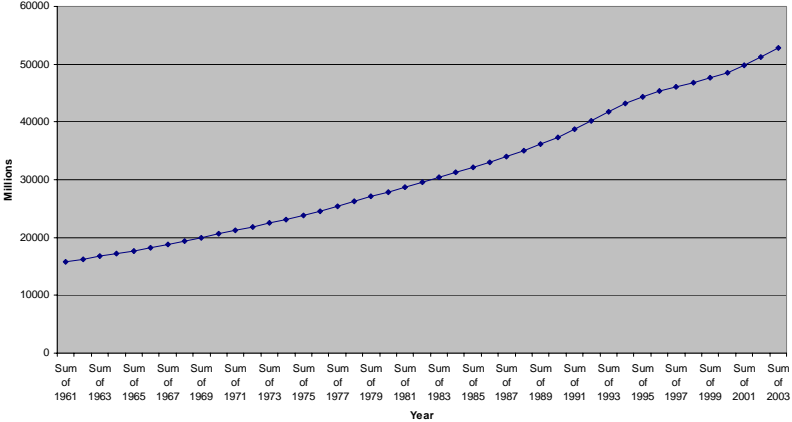
Findings:
*production line was increasing until the drop in 1994 (Rwanda crisis??).
* in one year the production dropped the amount which took eight years to develop
* after the drop production has been stagnating and haven't been able to reach the same level
* trend in grs production per capita has been slightly decreasing until the big drop in 1994. After that the decline has been accelerating.
* Average annual growth of:
population (1961-2004) 2,98 change 233 percent
value of total production (1961-2004) 1.46
value of total production (1999-2004) -0.82
* Average production per capita (1961-2004) 88 $

Conflict countries – Congo

**Agricultural GRS Production evaluation in Republic of Congo, 1961-2004**
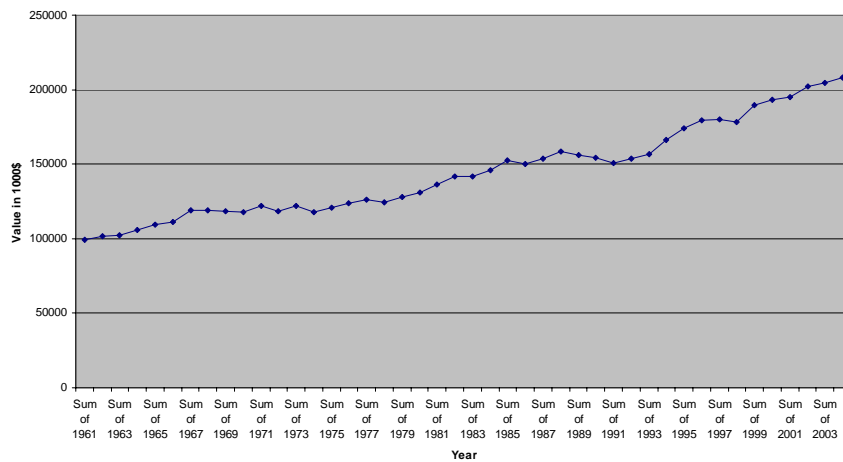
Agricultural grs production per capita in Republic of Congo, 1961-2003
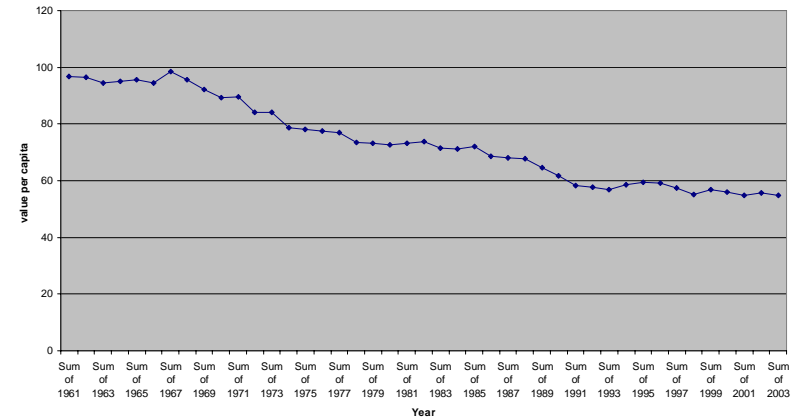
Population growth in Republic of Congo 1961-2003

Findings:
* Production has been increasing the whole period. Not even the start of a civil war has had a major effect.
* grs production per capita has been steadily decreasing.
* the change in amount of population has been one of the highest in SSA
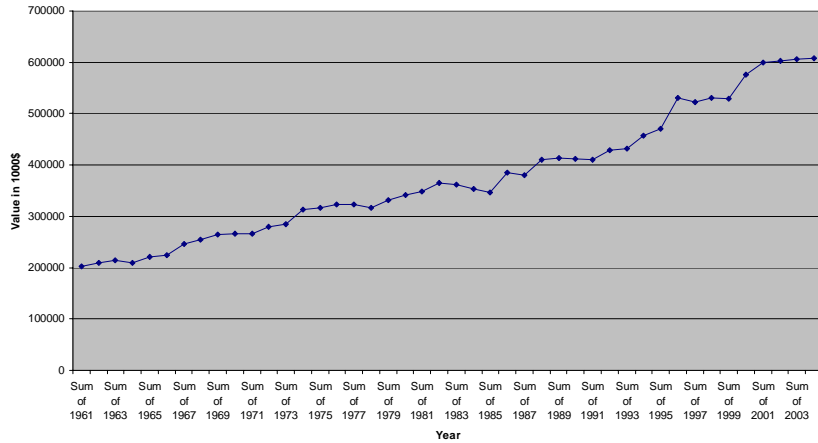* Average annual growth of:
population (1961-2004) 3.19 change 262 percent
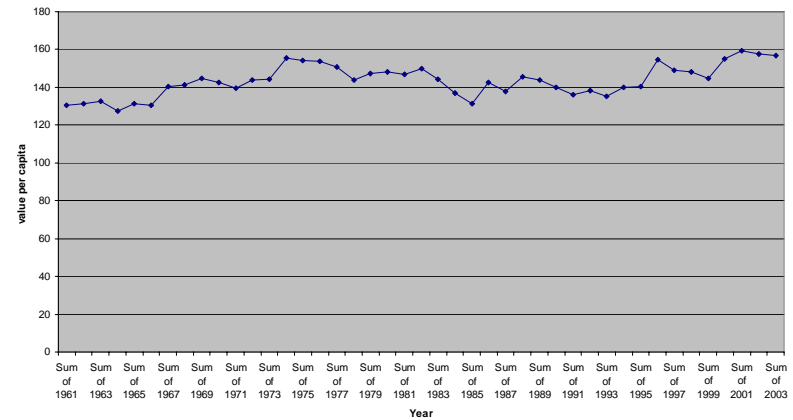value of total production (1961-2004) 1.61
value of total production (1999-2004) -1.94
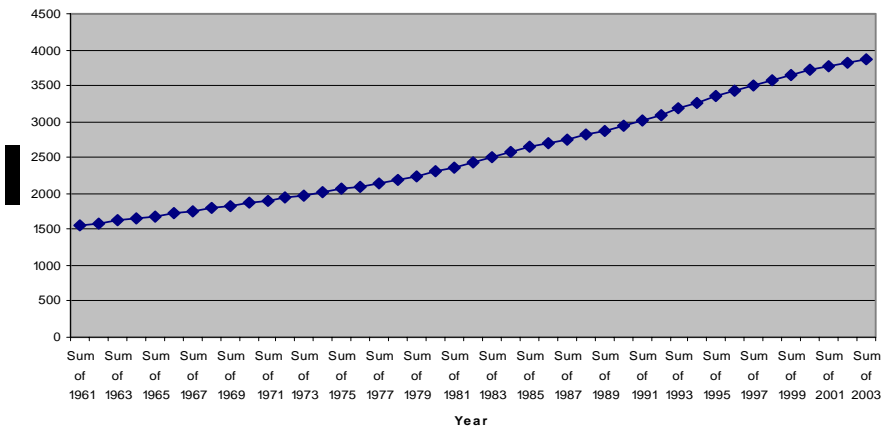* Average production per capita (1961-2004) 74 $

9

Conflict countries – Cote d'Ivoire

Agricultural GRS Production evaluation in Cote d'Ivoire, 1961-2004
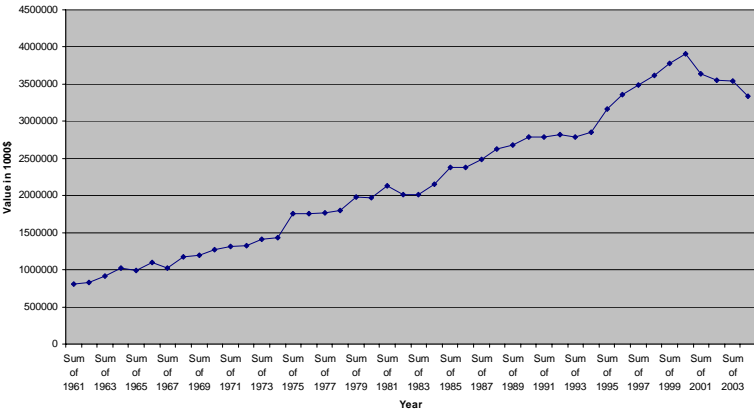
Agricultural grs production per capita in Cote d'Ivoire, 1961-2003
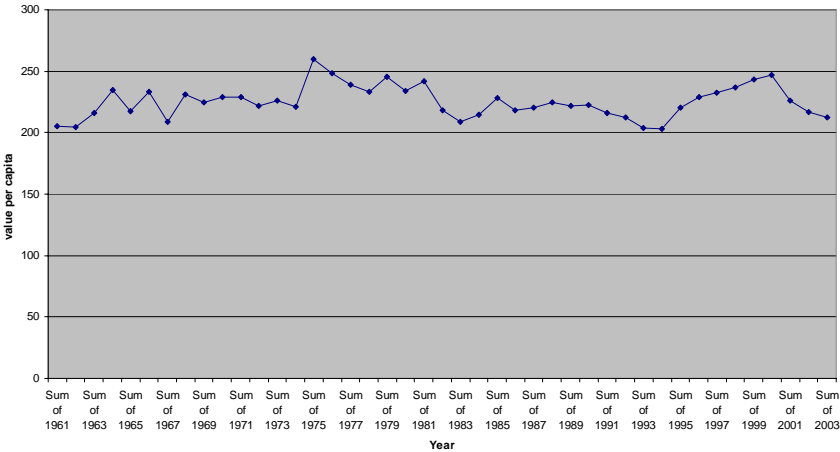
Population growth in Cote d'Ivoire 1961-2003

Findings:
* production grew very well until the start of a conflict in 1999.
* Growth has been very good between 1961-2004 (3.67) and even better between 1961-1998 (3.96) before the conflict.
* grs production per capita reach its peak 1975 and started to fall after that. After the bottom of 1994, gdp increased until the the following year of conflict in 2000.
* population growth started to accelerate after the mid 70's and that was also the time when grs production per capita started to decline
* Average annual growth of:
population (1961-2004) 3.75 change 323 percent
value of total production (1961-2004) 3.67
value of total production (1999-2004) -2.66
* Average production per capita (1961-2004) 225 $

Conflict countries - Eritrea

Agricultural GRS Production evaluation in Ethiopia PDR and Eritrea, 1961-2004
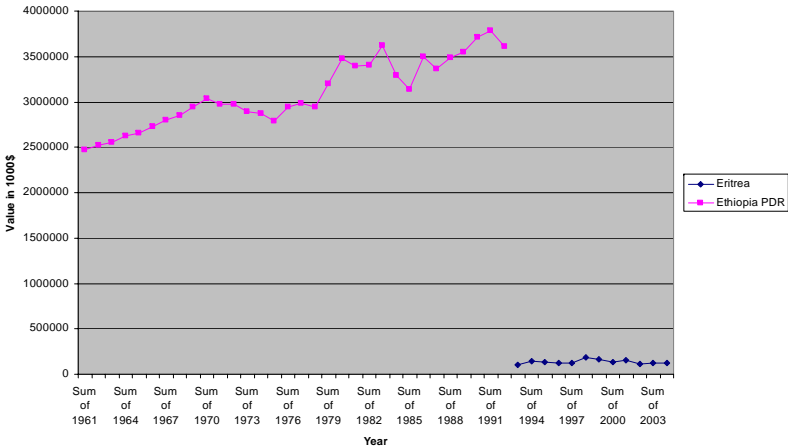
Agricultural GRS Production evaluation in Eritrea, 1993-2004
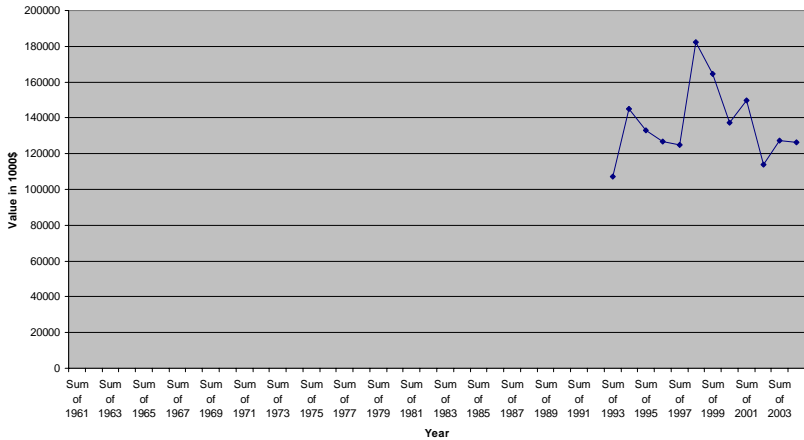
Agricultural grs production per capita in Eritrea, 1961-2003
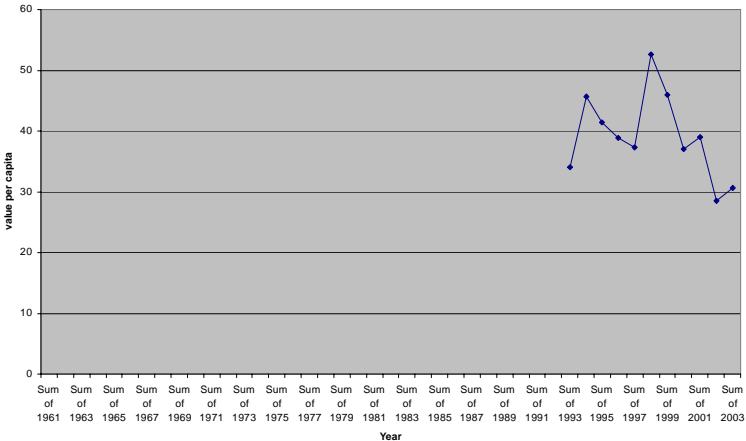
Population growth in Eritrea 1961-2003

11
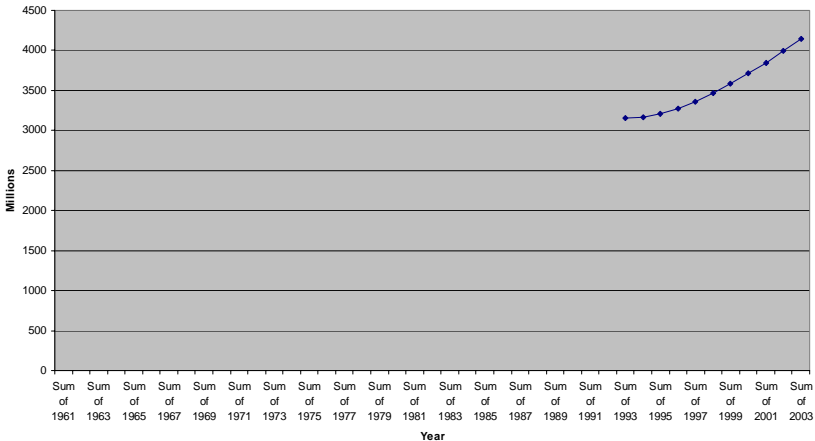
Findings:
* The value of the production almost doubeled in five years (93 to 98)
* After the start of a conflict production dropped almost as much in four years (98 to 2002)
* grs production per capita - line looks almost the same as production line except the drop is steeper
* average population growth 1993-2003 has been 2.90 and average annual growth 0.18 with very big fluctuations
* population has grown 31% in ten years
* Average annual growth of:
population (1993-2003) 2.90 change 31 percent
value of total production (1993-2004) 0.18
value of total production (1999-2004) -5.09
* Average production per capita (1961-2004) 39 $

Conflict countries - Ethiopia

Agricultural GRS Production evaluation in Ethiopia PDR and Ethiopia, 1961-2004
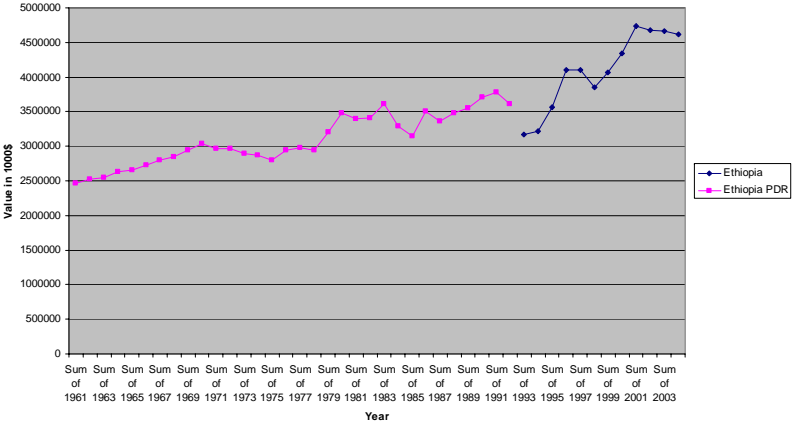
Agricultural grs production per capita in Ethiopia, 1993-2003
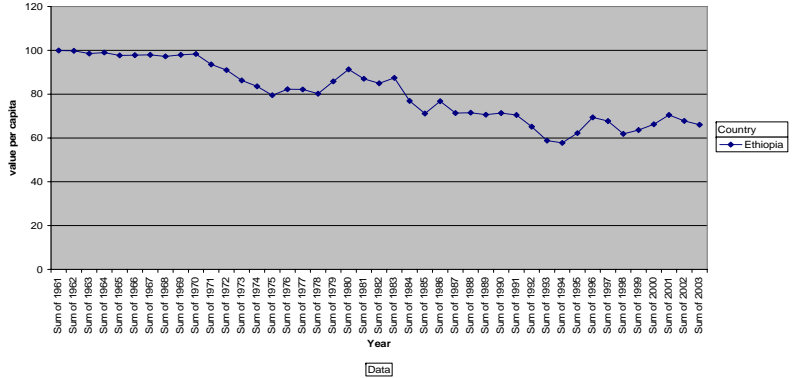
Population growth in Ethiopia 1961-2003
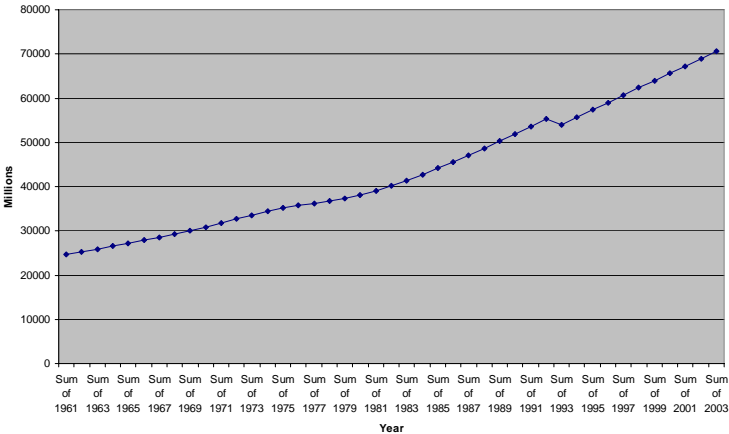
Findings:
* the trend in production has been increasing. The biggest drops have been between 1983-85 (drought) and 1991-93 (??).
* grs production per capita has been declining most in the period of 1980-1994, after that it started to rise again.
* after the separation (1993-2004) the average annual production growth has been 3.68
* Average annual growth of:
population (1993-2003) 2.55 change 186 percent
value of total production (1993-2004) 1.30
value of total production (1999-2004) 2.40
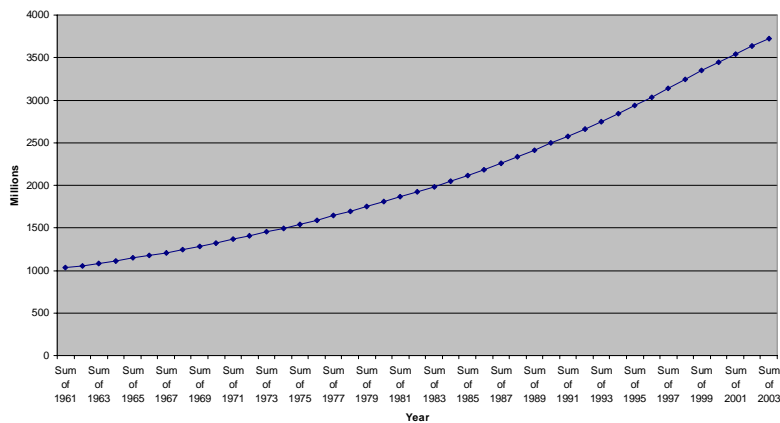* Average production per capita (1961-2004) 65 $

Conflict countries – Guinea

Agricultural GRS Production evaluation in Guinea, 1961-2004
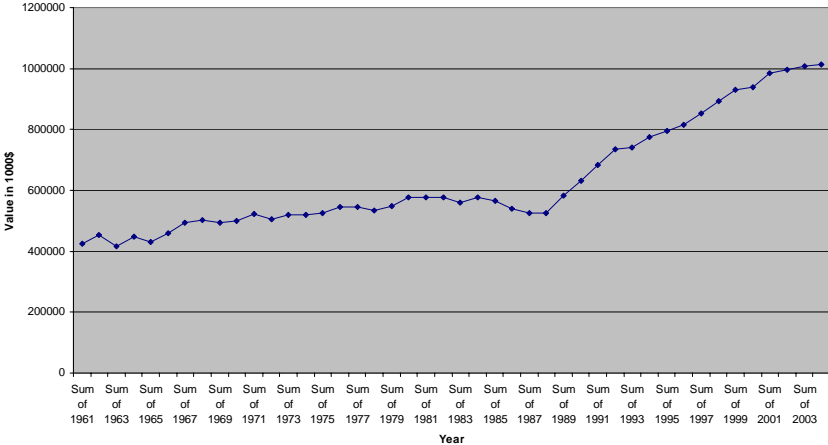
Agricultural grs production per capita in Guinea, 1961-2003
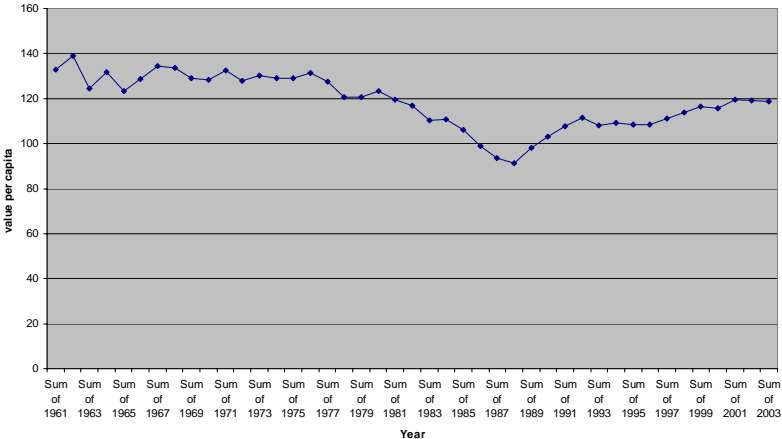
Population growth in Guinea 1961-2003

Findings:
* After the stagnation of 1961-1987 production started to increase rapidly 1988
* Conflict (starting 1999) haven't dropped the production
* grs production dropped between 1976 and 1988 when it started to grow again.
* Average annual growth of:
population (1993-2003) 2.47 change 165 percent
value of total production (1993-2004) 1.95
value of total production (1999-2004) 1.86
* Average production per capita (1961-2004) 118 $

14

Post-conflict countries – Guinea-Bissau

Agricultural GRS Production evaluation in Guinea-Bissau, 1961-2004

Agricultural grs production per capita in Guinea-Bissau, 1961-2003
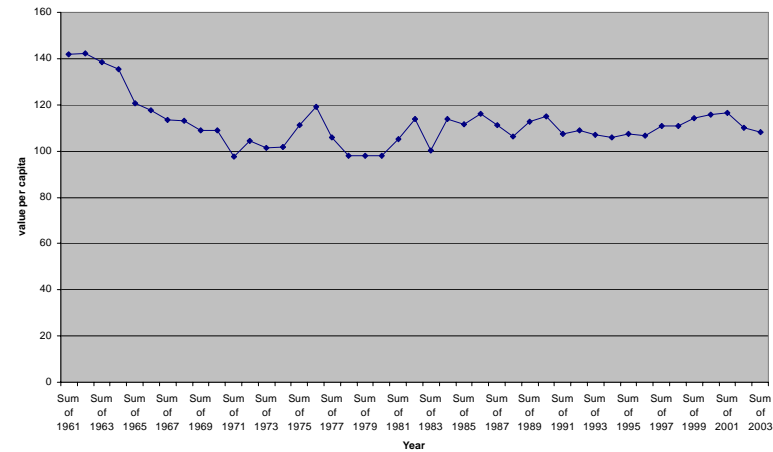
Population growth in Guinea-Bissau 1961-2003

Findings:
* Production started to increase in the beginning of the
70's and it has almost tripeled in 30 years.
* Since 1965 the production per capita has stagnated in
between 100-120 dollars.
* Average annual growth of:
population (1961-2004) 2.63, change 169 percent
value of total production (1961-2004) 2.38
value of total production (1999-2004) 0.98
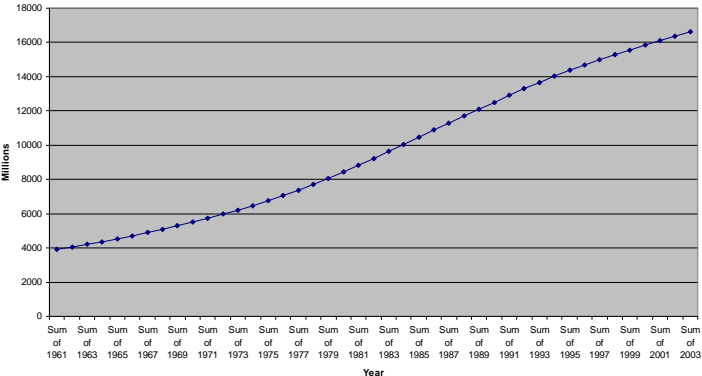* Average production per capita (1961-2004) 112 $

15

Conflict countries – Liberia

Agricultural GRS Production evaluation in Liberia, 1961-2004
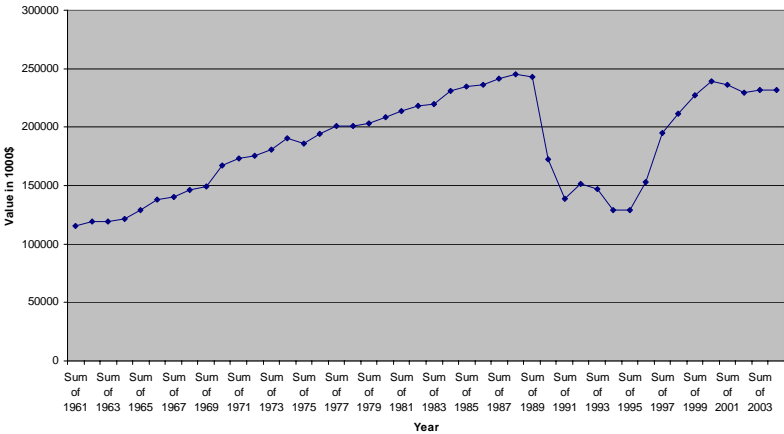
Agricultural grs production per capita in Liberia, 1961-2003
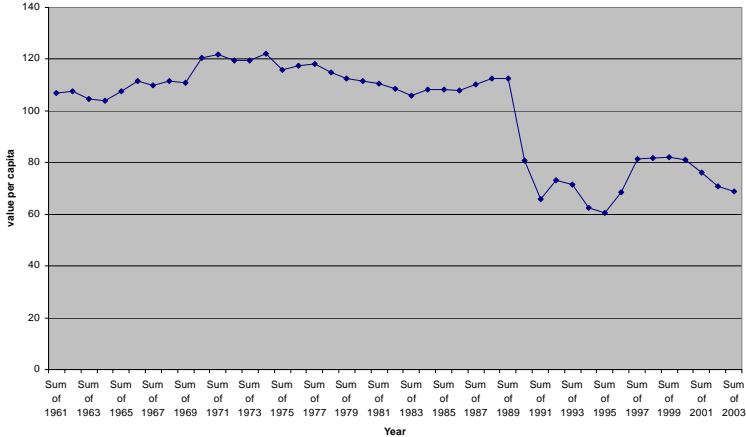
Population growth in Liberia 1961-2003
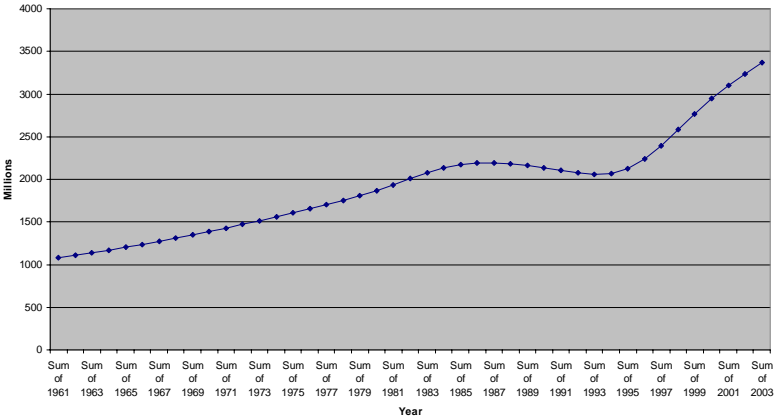
Findings:
* When the conflict started 1989 the production decreased drastically 43% in two years
* After the peace treaty 1995 Liberia was able to reach the same level of production in five years
* After 1995 the production has been stagnating (continuing conflict)
* Grs production per capita rise slightly in the 60's and started to go down in the 70's. The biggest drop happened in 1989 (conflict). Between 1989-1995 the grs production declined 46 percent, between 1995-1997 Liberia was able to increase the grs per capita by 27 percent. After that it has been stagnated and started to go down.
* The effect of a conflict can be seen in the population curve. It is not going straight up like usually in SSA countries.
* Average annual growth of:
population (1993-2003) 2.36 change 211 percent
value of total production (1993-2004) 1.05
value of total production (1999-2004) -0.05
* Average production per capita (1961-2004) 99 $

16

Post-conflict countries – Mozambiq

Agricultural GRS Production evaluation in Mozambiq, 1961-2004

Agricultural grs production per capita in Mozambique , 1961-2003

Population growth in Mozambique 1961-2003
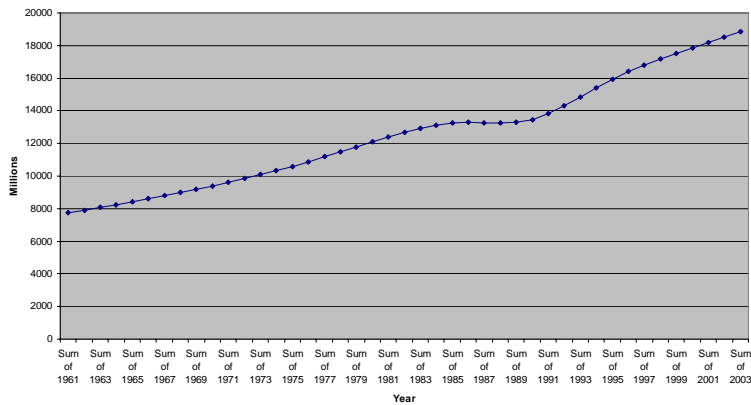
Findings:
* Production grew until 1973 and sunk with some exceptions until 1992 (peace treaty)
After that the growth has been rapid except the year of 2000 (floods).
* Grs production per capita grew until 1973 (??), when it started to sunk and reach its bottom 1992 (peace treaty).
Growth continued until the major floods in 2000, but it haven't been able to reach the level of the 60's.
* Population has grown steadily except the stagnation between 1985-1990
* Average annual growth of:
population (1993-2003) 2.11 change 143 percent
value of total production (1993-2004) 0.66
value of total production (1999-2004) -1.12
* Average production per capita (1961-2004) 75 $

17

Post-conflict countries – Namibia

Agricultural GRS Production evaluation in Namibia, 1961-2004
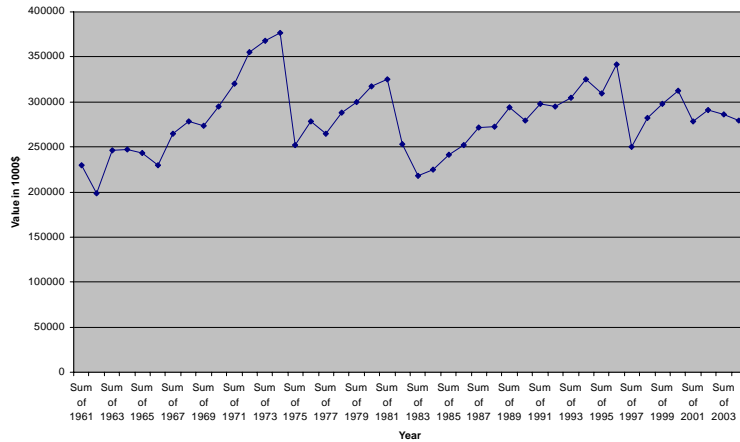
Agricultural grs production per capita in Namibia , 1961-2003
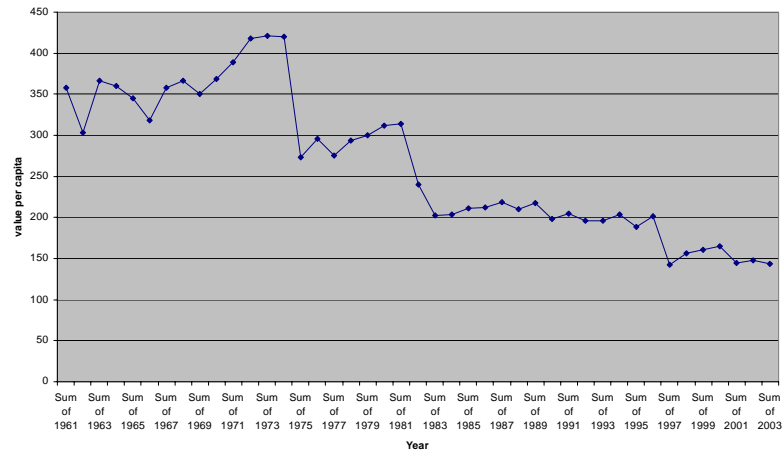

Population growth in Namibia 1961-2003
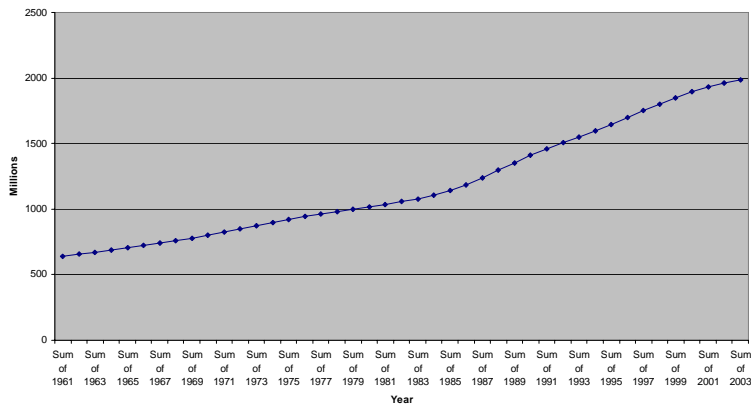
Findings
* There has been three big drops in production 1975, 1983 and 1997.
Between and after these drops production has grown, but never
reached the level of the peak in 1972-1974.
Because of the major drops, the average annual production growth
rate is only 0.32
* The trend in grs production per capita is decreasing. It is possible to
see three big drops 1975, 1983 and 1997.
The difference with the production line is that after the drop the line
doesn't arise, but stagnates.
Today's level is less than half of the level in the 60's and mid-70's
* Average annual growth of:
population (1993-2003) 2.84 change 210 percent
value of total production (1993-2004) 0.32
value of total production (1999-2004) -1.55
* Average production per capita (1961-2004) 264 $

18
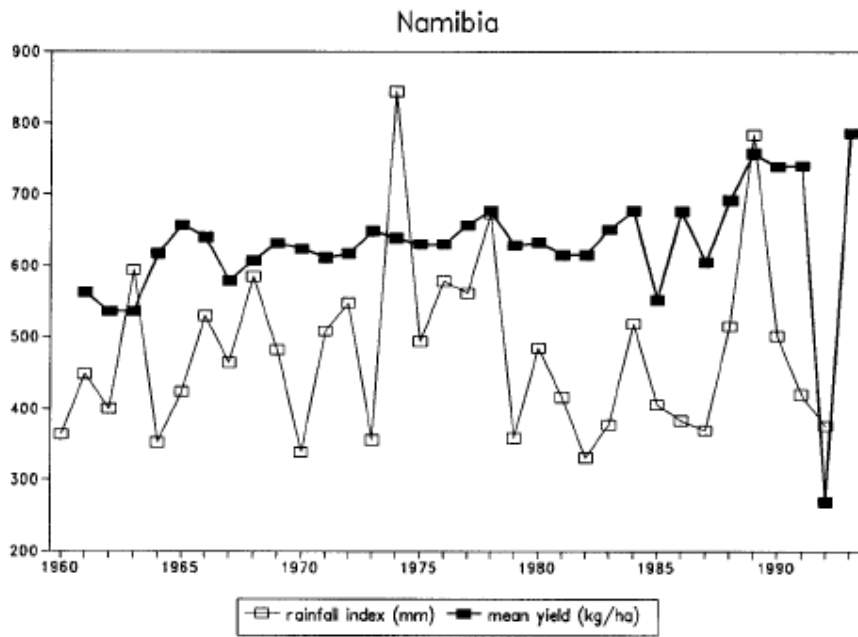
Source: FAO Agrometeorology series. Number 9. Gommes, R & Petrassi, F, 1994

Conflict countries – Rwanda

Agricultural GRS Production evaluation in Rwanda, 1961-2004
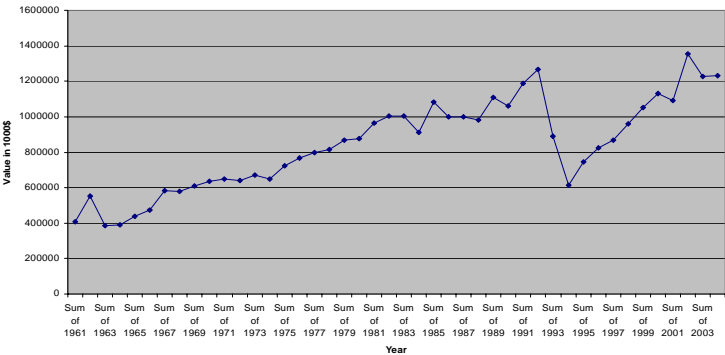
Agricultural grs production per capita in Rwanda , 1961-2003
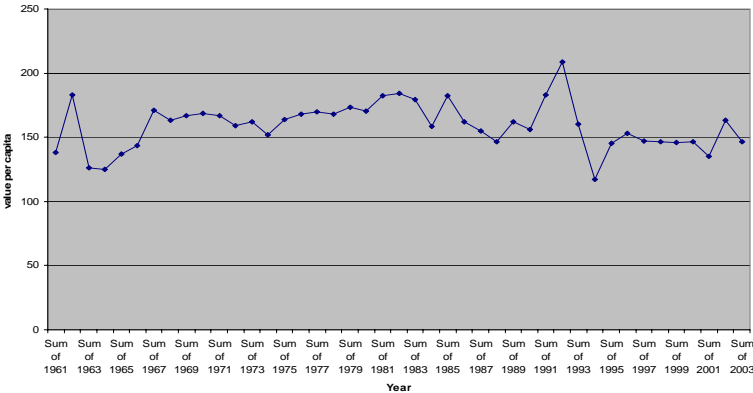
Population growth in Rwanda 1961-2003
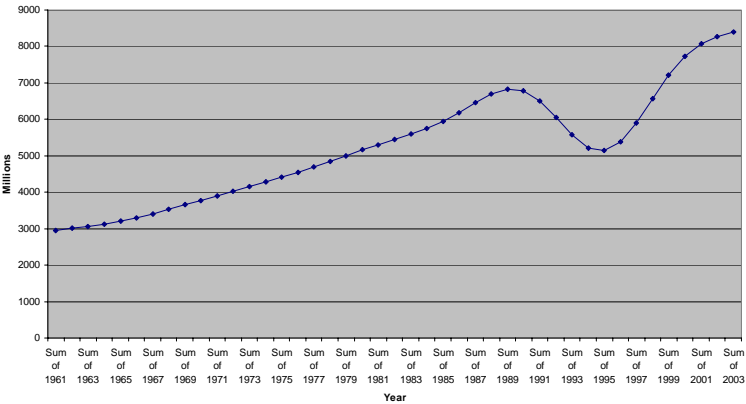
Findings:
* Production grew until 1992 (civil war 1990, genocide 1994) when it dropped sharply for two years
Growth was steady in the 60's and 70's, but in the 80's the value of production fluctuated
Rwanda has been able to reach the level of the 90's in eight years
* Except the drops in the 60's, the grs production per capita did not change dramaticlly in 70's and 80's
The major drop happened after the start of a civil war 1992-1994. Grs production per capita have not reached the same level as before the conflict.
* The effect of a civil war and genocide is clearly seen in population curve
* Average annual growth of:
population (1993-2003) 2.27 change 184 percent
value of total production (1993-2004) 2.21
value of total production (1999-2004) -3.63
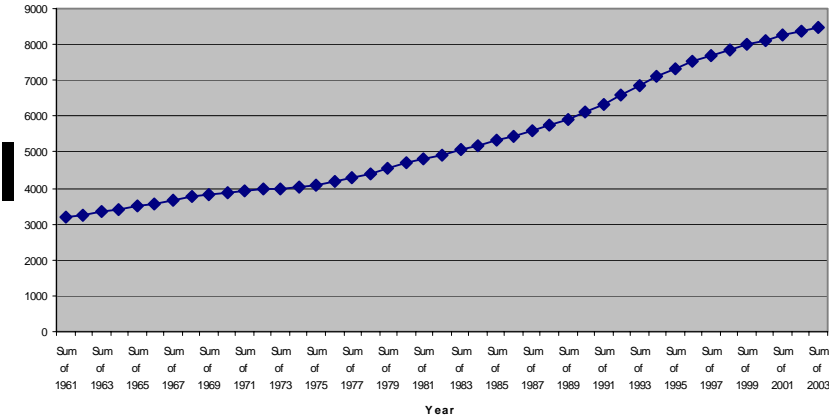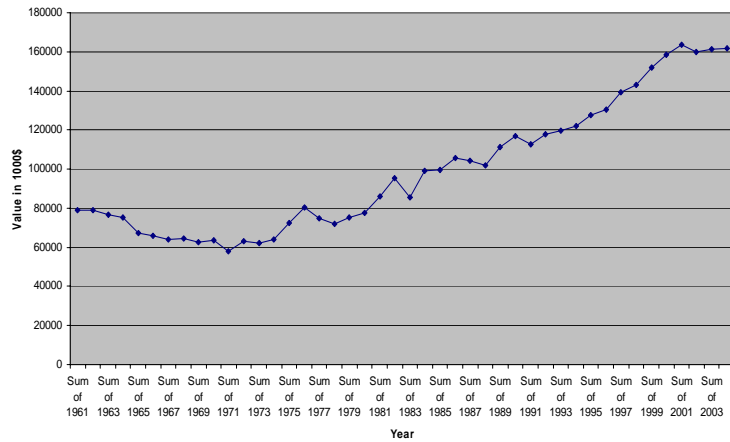* Average production per capita (1961-2004) 159 $

Conflict countries – Sierra Leone

Agricultural GRS Production evaluation in Sierra Leone, 1961-2004

Agricultural grs production per capita in Sierra Leone, 1961-2003

Population growth in Sierra Leone 1961-2003
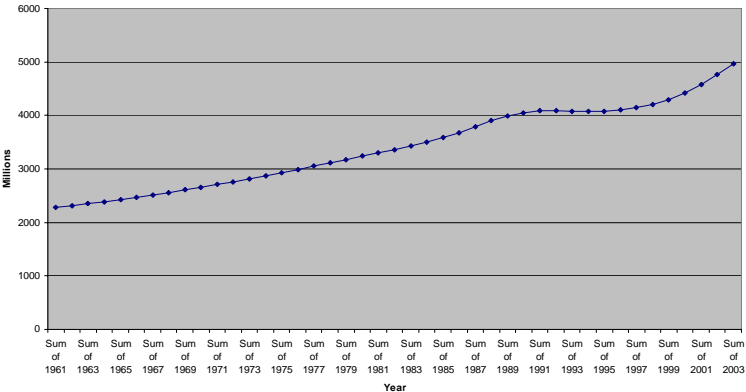
Findings:
* Production grew steadily without major fluctuations until 1991 (civil war)
The biggest drop happened between 1997 and 2000. Production haven't been able to reach the level before the war.
* Grs production per capita have been slightly decreased until the big drop in 1997.
The level after the drop is the lowist ever in 43 years.
* Average annual growth of:
population (1993-2003) 1.80 change 118 percent
value of total production (1993-2004) 0.90
value of total production (1999-2004) 2.47
* Average production per capita (1961-2004) 83 $
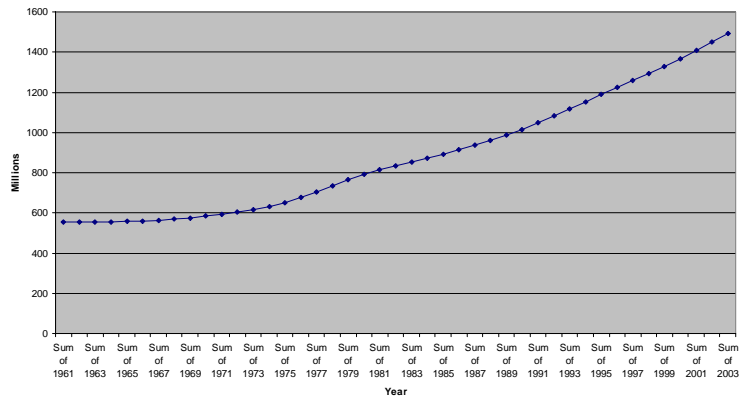
21

Conflict countries – Uganda

Agricultural GRS Production evaluation in Uganda, 1961-2004

Agricultural grs production per capita in Uganda, 1961-2003

Population growth in Uganda 1961-2003
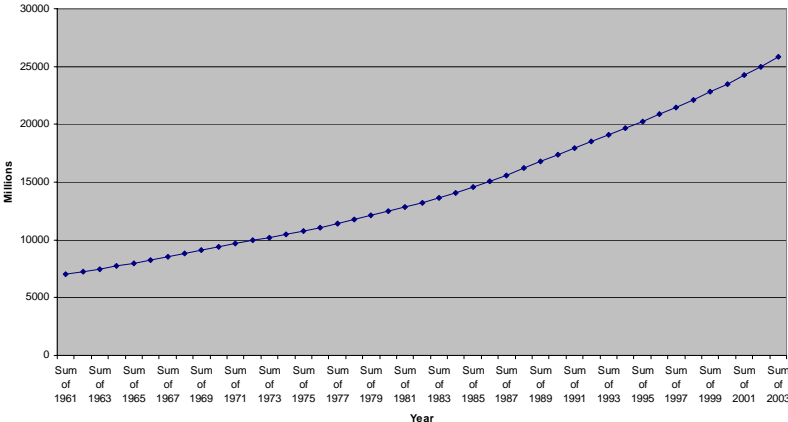
Findings:
* Production grew rapidly between 1965-1970, in the 70's (Idi Amin years 1971-79) the production kept the high level until the drop in 1978 (conflict).
There is not any clear sign of recent conflict in north Uganda in the production curve (1990->)
After the conflict the production has been growing steadily
* Grs production per capita did very well until the drop in 1978, stagnation since
* Average annual growth of:
population 3.14 (1961-2004) change 268
value of total production 1.93 (1961-2004)
value of total production 10.72 (1999-2004)
* Average production per capita (1961-2004) 236 $

22

# Conflict countries – Zimbabwe

Agricultural GRS Production evaluation in Zimbabwe, 1961-2004

Agricultural grs production per capita in Zimbabwe, 1961-2003
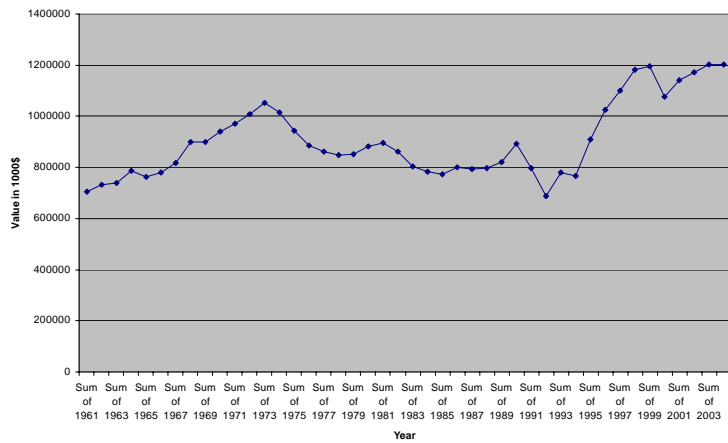

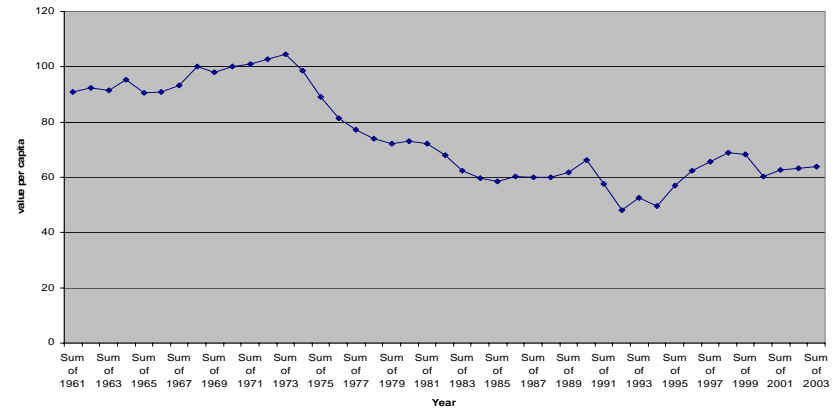Population growth in Zimbabwe 1961-2003
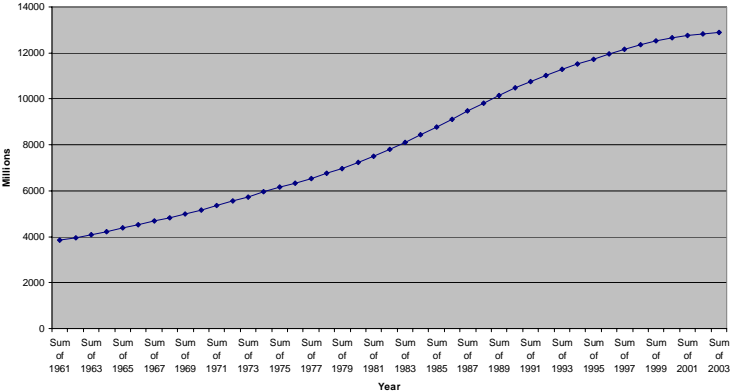
Findings:
* The trend in production is increasing with high flucutations.
The fluctuations has increased after the beginning of the 80's (independence & unstability 1980->)
The start of a landreform 2000 is clearly seen in the curve.
* The grs production trend is decreasing with high fluctuations.
The grs production curve has big drops and some, but not all of them, are right after the conflict situation.
For example the last big drop is after the start of a violent landreform.
*Average annual growth:
population is 3.18 (1961-2004) change 236 percent
value of total production 2.03 (1961-2004)
value of total production -14.79 (1961-2004)

General findings concerning conflict-affected countries:

● the effects of a conflict can be seen in production & production / capita curves
● population growth exceeds the production growth, so the production per capita decreases
● most of the countries have their production / capita level lower than in the 60's -> only three out of 17 countries has the pr. / capita in a same or higher level than in the 60's
● in some cases agricultural production recovers suprisingly fast after the conflict situation and in other cases production stagnates and don't reach the previous level

Non-conflict countries – Benin

GRS Production evaluation in Benin, 1961-2004
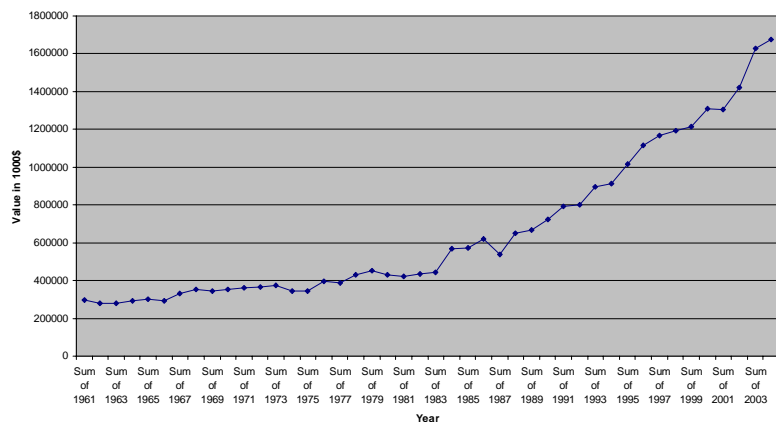
Agricultural grs production per capita in Benin, 1961-2003
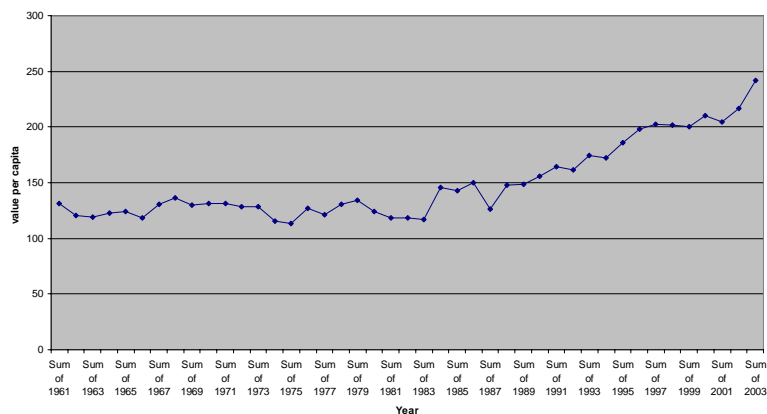
Population growth in Benin 1961-2003
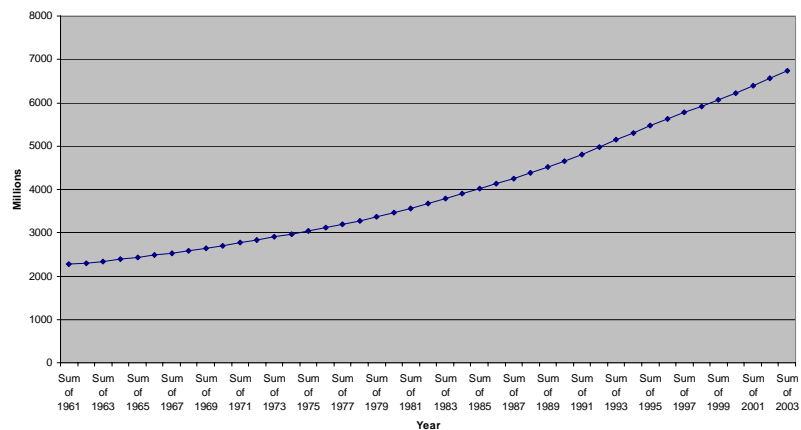
Findings:
* Production started to increase rapidly in the beginning of the 80's
* Production / capita started to increase also in the beginning of the 80's, but not as sharply as production
* Average annual growth of:
population 2.74 (1961-2004)
value of total production 4.29 (1961-2004)
value of total production 6.92 (1999-2004)

Non-conflict countries –Botswana


GRS Production evoluation in Botswana, 1961-2004

Agricultural grs production per capita in Botswana, 1961-2003

Population growth in Botswana 1961-2003
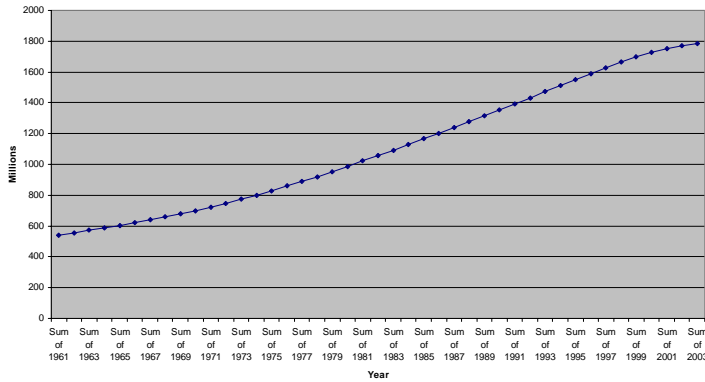
Findings:
* Production increased slowly with fluctuations until 1995. After that it has declined and stagnated.
* Production per capita has decreased to the half of the level it had in the 60's
* Average annual growth of:
population 3.09 (1961-2004)
value of total production 0.82 (1961-2004) growth of value of total production 1.98 (1999-2004) reasonst: exports? Hiv-epidemic?

Non-conflict countries –Burkina Faso

GRS Production evoluation in Burkina Faso, 1961-2004
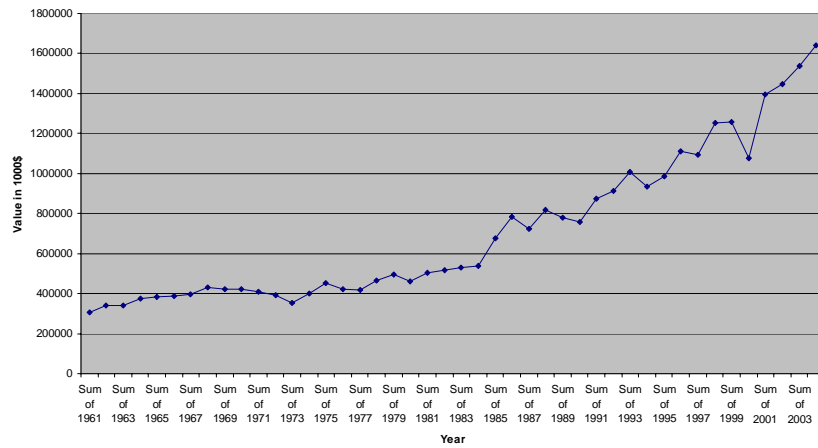
Agricultural grs production per capita in Burkina Faso, 1961-2003
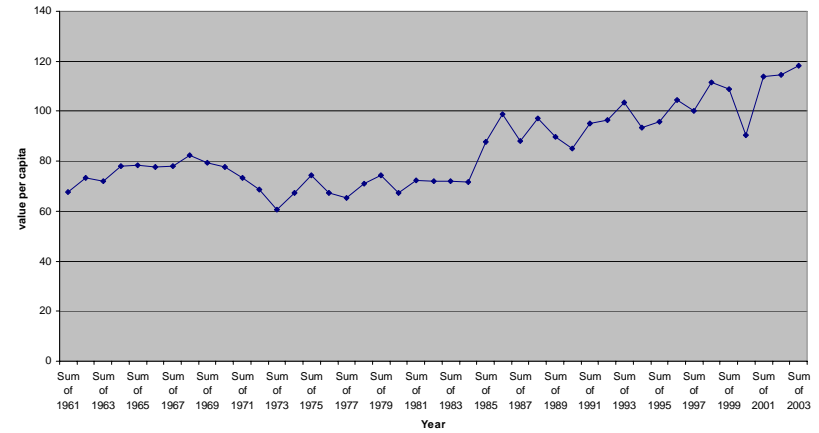
Population growth in Burkina Faso 1961-2003
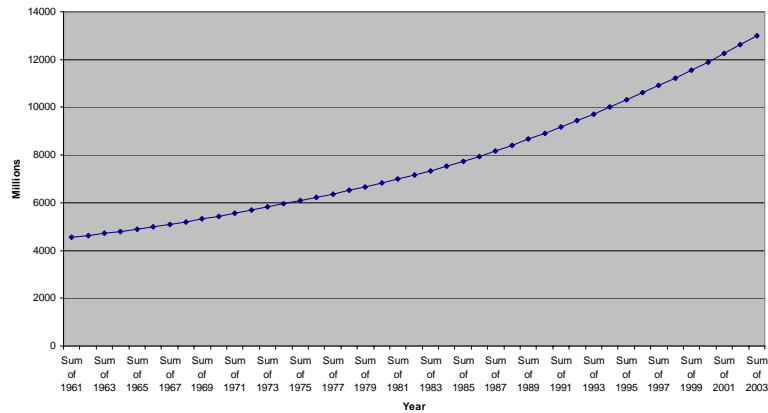
Findings:
* Production started to increase rapidly in 1984 after long period of stagnation.
There was a drop in 2000, but country recovered immediately.
* Production per capita increased fast in the middle of the 80's. It has kept increasing but slower and with more fluctuations.
* Population growth has accelerated since the middle of the 80's.
* Average annual growth of:
population 2.56 (1961-2004) change 186 percent.
value of total production 3.78 (1961-2004)
value of total production 7.14 (1999-2004)

Non-conflict countries –Cape Verde

Agricultural GRS Production evaluation in Cape Verde, 1961-2004

Agricultural grs production per capita in Cape Verde, 1961-2003
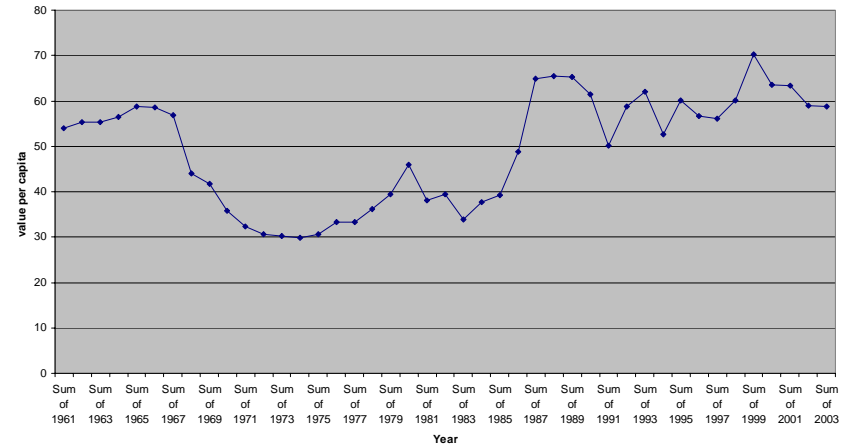
Population growth in Cape Verde 1961-2003

Findings:
* Production started to increase in the beginning of the 80's.
Trend is still increasing with high fluctuations.
* Production per capita follows similar pattern as total
production, except there has been less growth in the 90's
* Average annual growth of:
population (1961-2004) 1.79
value of total production (1961-2004) 2.74
value of total production (1999-2004) -1.38

28

# Non-conflict countries – Chad

Agricultural GRS Production evaluation in Chad, 1961-2004
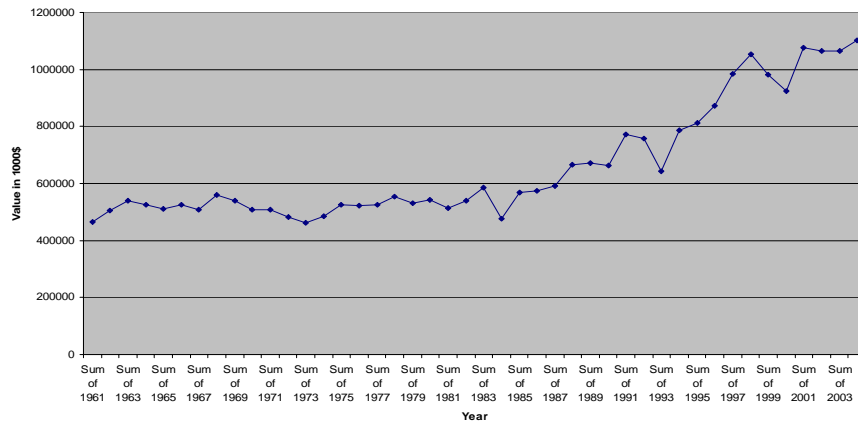
Agricultural grs production per capita in Chad, 1961-2003
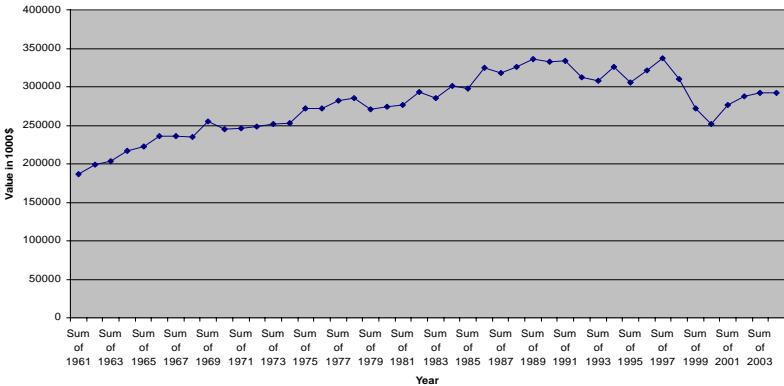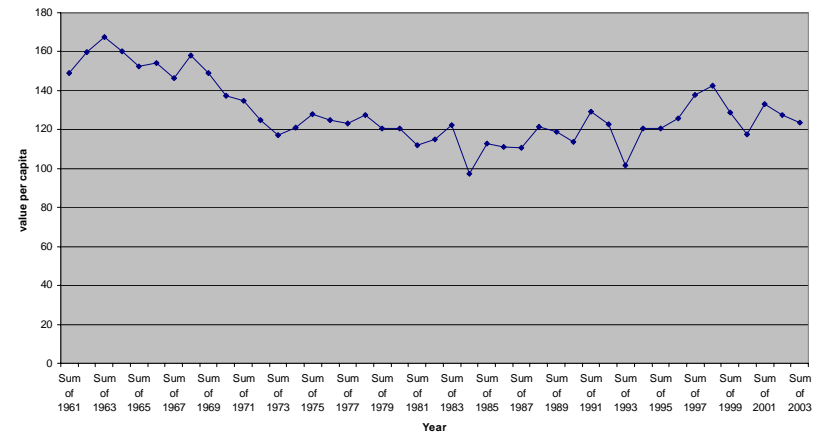

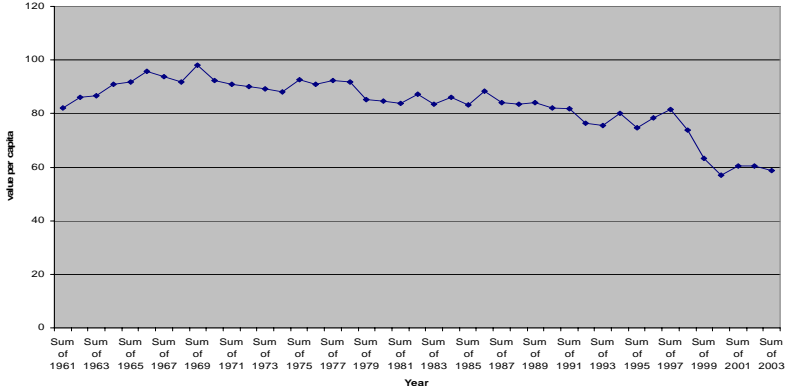**Population growth in Chad 1961-2003**

Findings:
* Production started to increase 1984. The biggest drops have been 1993 (?) and 2000 (drought).
* Production per capita trend was decreasing until the middle of the 80's. After that it has been slightly increasing.
Biggest drops have been 1993 and 2000 (drought).
* Population growth has accelerated since the middle of the 80's.
* Average annual growth of:
population (1961-2004) 2.43
value of total production (1961-2004) 1.92
value of total production (1999-2004) 2.84

Non-conflict countries – Comoros

Agricultural GRS Production evaluation in Comoros, 1961-2004

Agricultural grs production per capita in Comoros, 1961-2003
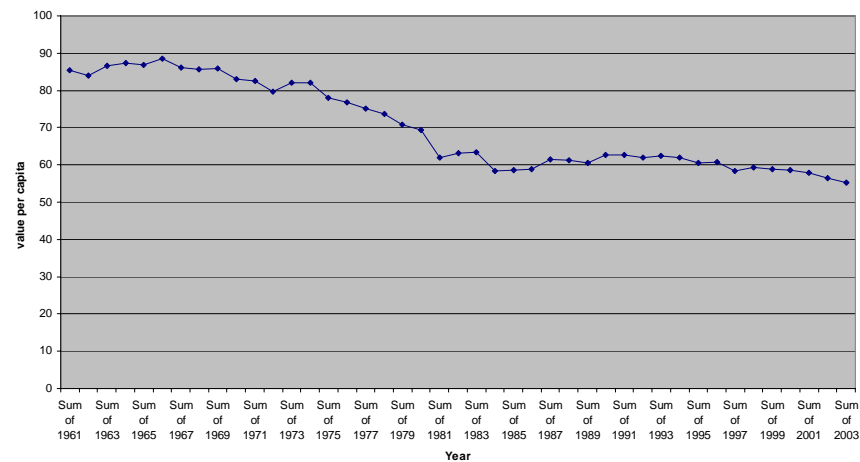
Population growth in Comoros 1961-2003
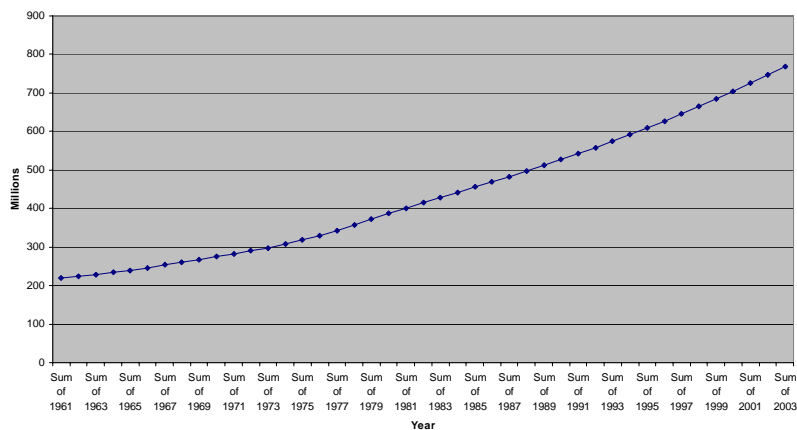
Findings:
* Comoros has had steady growth since the 60's. There has been only two drops: 1981 and 1984.
* Production per capita has steadily decreased.
* Even though the value of production has been doubeled, it haven't been enough to keep the pr/capita in the same level.
* Average annual growth of:
population (1961-2004) 3.16
value of total production (1961-2004) 1.92
value of total production (1999-2004) 1.05

Non-conflict countries – Gabon


Agricultural GRS Production evaluation in Gabon, 1961-2004
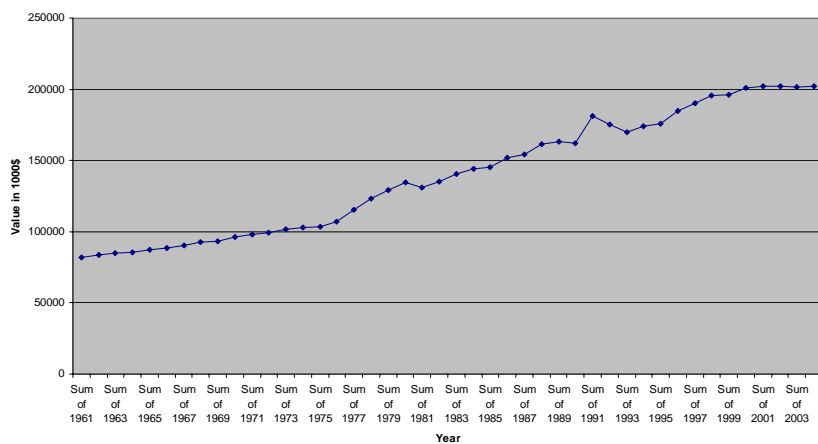
Agricultural grs production per capita in Gabon, 1961-2003
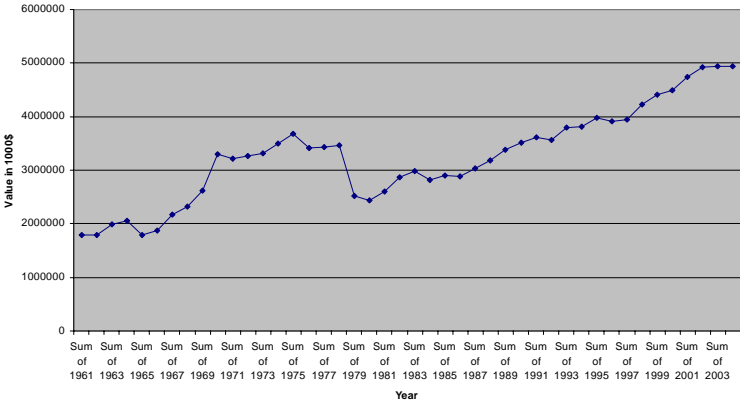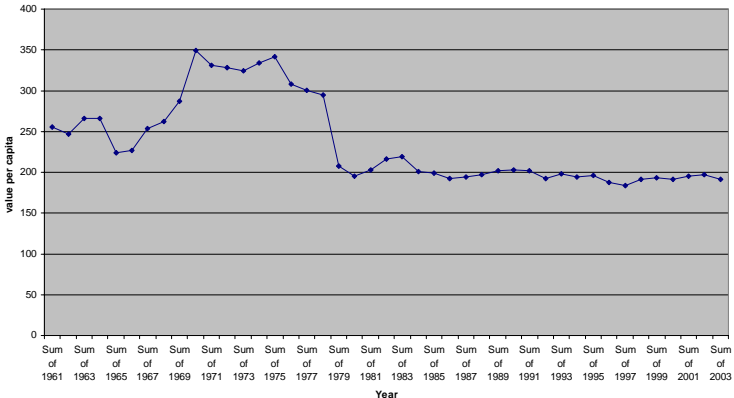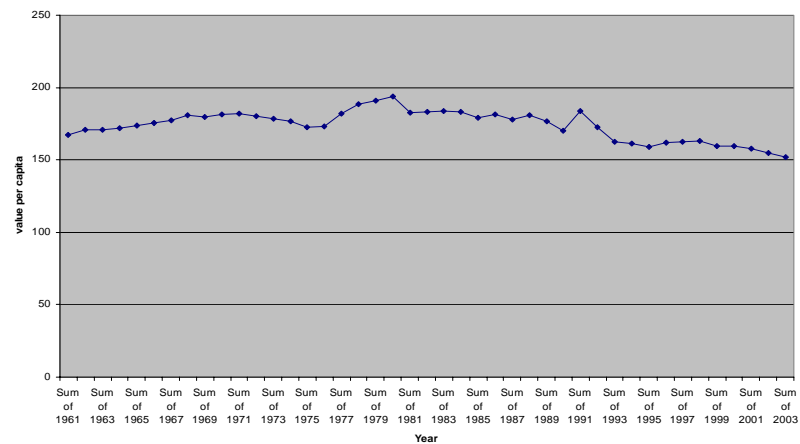

Population growth in Gabon 1961-2003

Findings:
* Steady production growth since the 60's.
* There are not big changes in production per capita over the
period; most of the time it has been between 150-180.
Last ten years the production value per capita has been
lower than before.
* Average annual growth of:
population (1961-2004) 2.71
value of total production (1961-2004) 2.41
value of total production (1999-2004) 0.48

Non-conflict countries – Gambia

Agricultural GRS Production evaluation in Gambia, 1961-2004

Agricultural grs production per capita in Gambia, 1961-2003

Population growth in Gambia 1961-2003
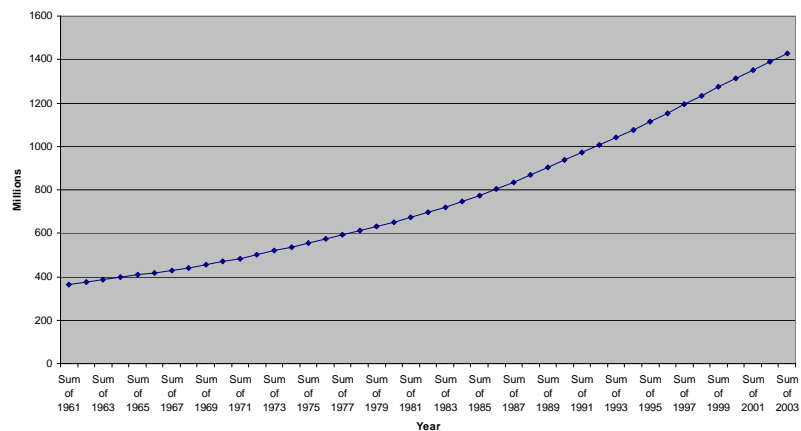
Findings:
* Value of production has had very big fluctuations over the time (heavy dependence on peanut exports)
Even with the high fluctuations the production has more or less stagnated.
* Production per capita has been decreasing to one fourth from the level of the 60's.
* Average annual growth of:
population (1961-2004) 3.41
value of total production (1961-2004) -0.09
value of total production (1999-2004) -7.20

Non-conflict countries –Ghana

Agricultural GRS Production evaluation in Ghana, 1961-2004
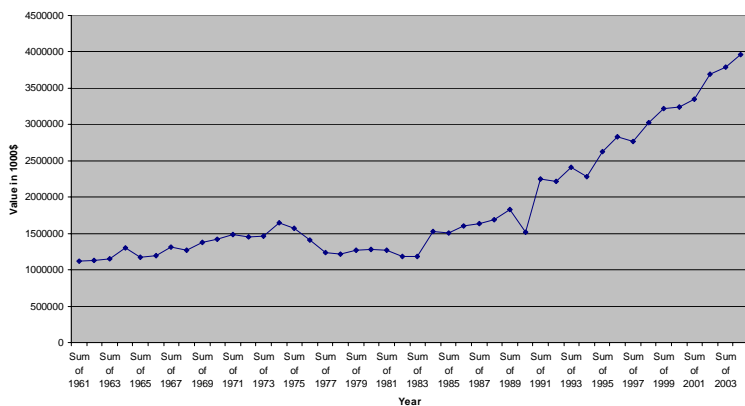
Agricultural grs production per capita in Ghana, 1961-2003
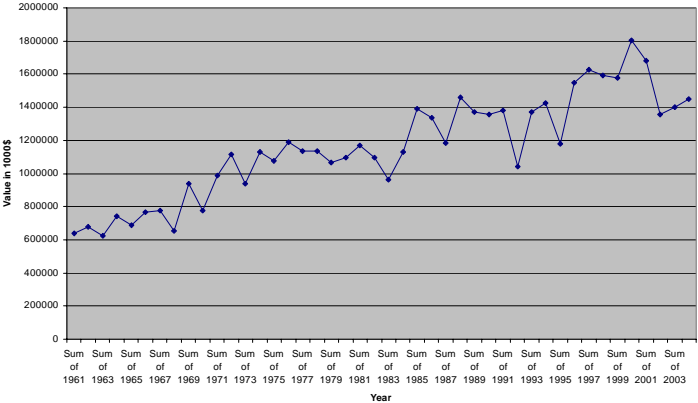

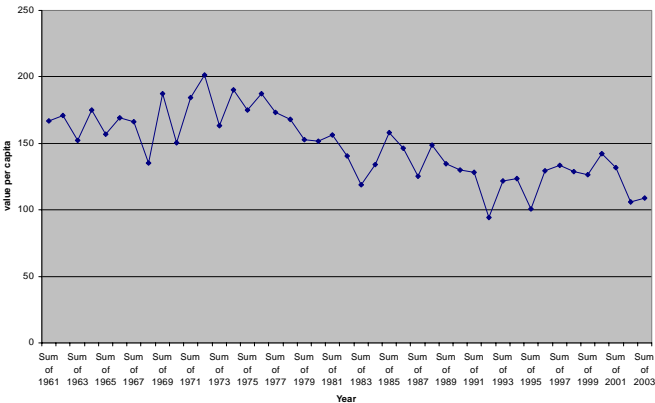**Population growth in Ghana 1961-2003**

Findings:
* Production has been increasing since the beginning of the 80's
* Production per capita dropped around 25 percent between 1975 and 1990. It reached the level of 1975 in 1991.
* Average annual growth of:
population (1961-2004) 2.74
value of total production (1961-2004) 2.73
value of total production (1999-2004) 4.73

33

Non-conflict countries – Kenya

Agricultural GRS Production evaluation in Kenya, 1961-2004
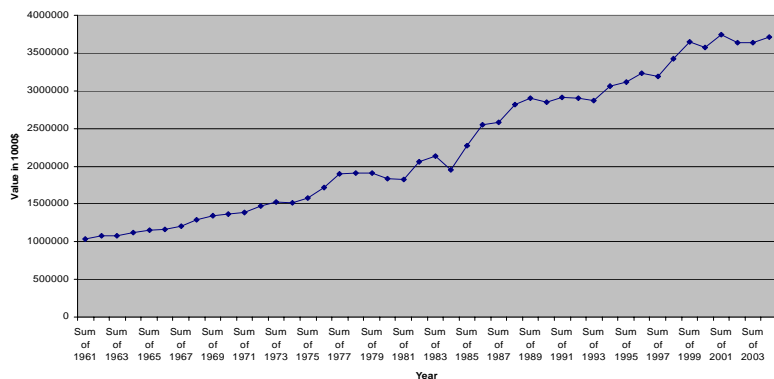
Agricultural grs production per capita in Kenya, 1961-2003
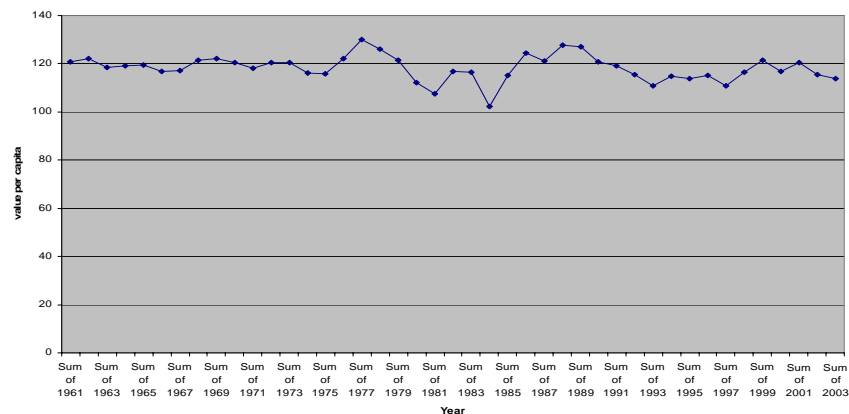
Population growth in Kenya 1961-2003
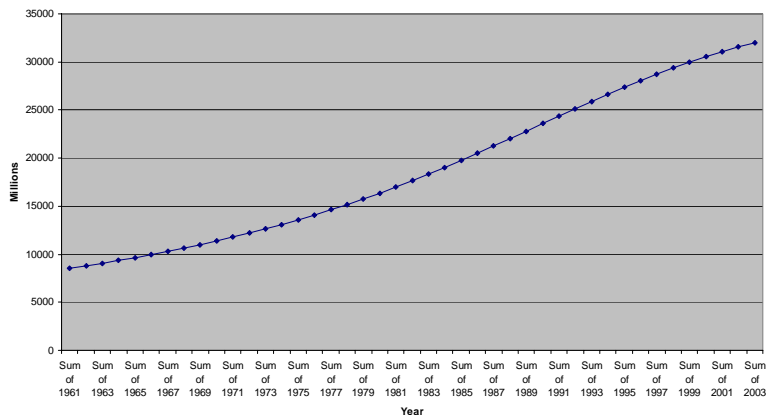
Findings:
* Production has increased steadily since the 60's. The biggest drop has happened in 1984.
* Production per capita has stayed around 120$. In the period of 1975-1990 there was more fluctuation.
* Average annual growth of:
population (1961-2004) 3.42, change 275 percent
value of total production (1961-2004) 3.29
value of total production (1999-2004) 0.36

34

# Non-conflict countries - Lesotho

Agricultural GRS Production evaluation in Lesotho, 1961-2004
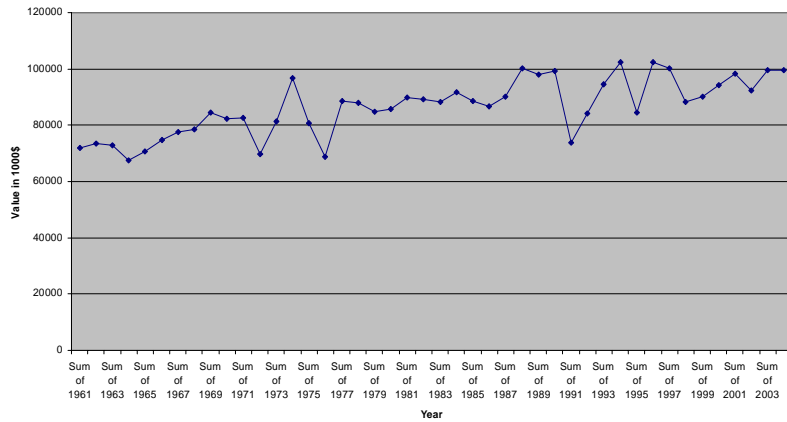
Agricultural grs production per capita in Lesotho, 1961-2003
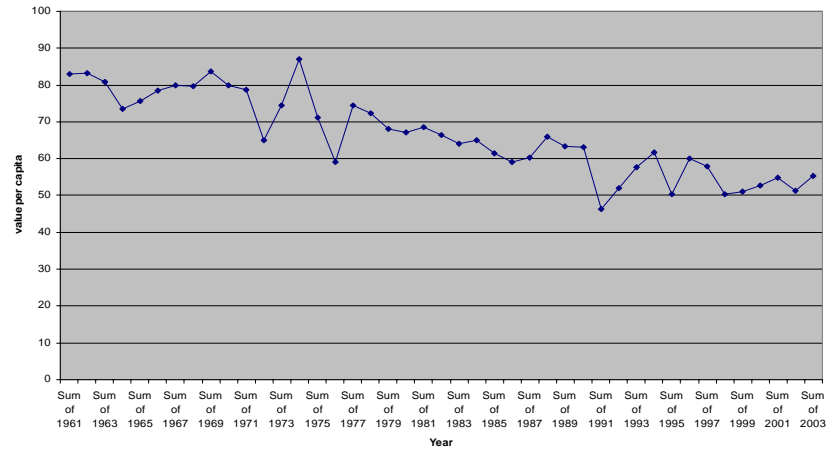
Population growth in Lesotho 1961-2003
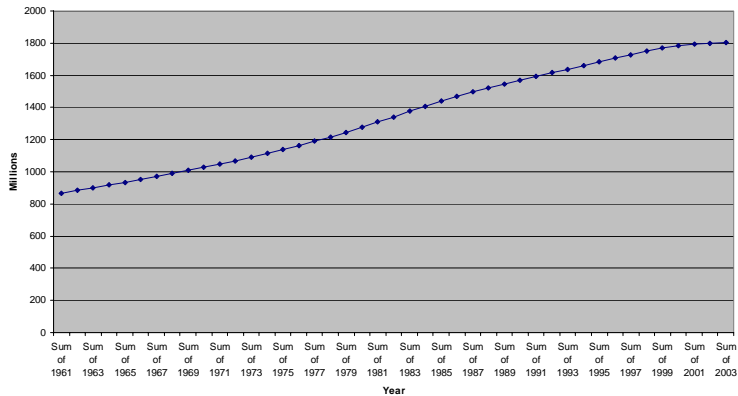
Findings:
* The production trend is increasing even though there are very high yearly fluctuations.
* The production per capita trend is decreasing with fluctuations.
* Average annual growth of:
population (1961-2004) 1.91, change 108 percent
value of total production (1961-2004) 0.7
value of total production (1999-2004) 1.73

35

Non-conflict countries - Madagascar

Agricultural GRS Production evaluation in Madagascar, 1961-2004
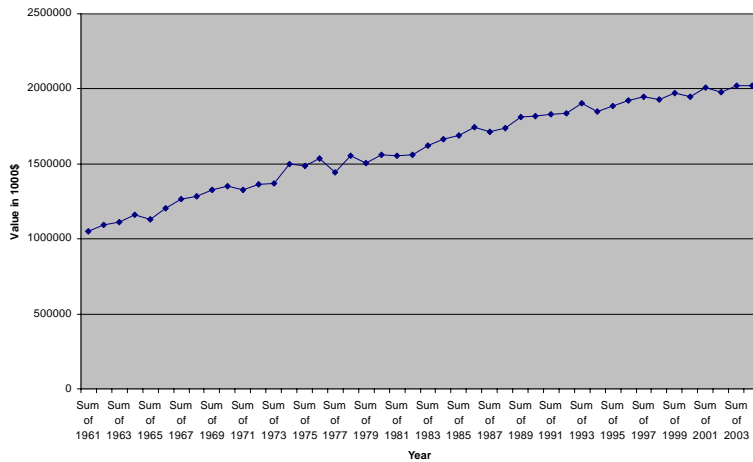
Agricultural grs production per capita in Madagascar, 1961-2003
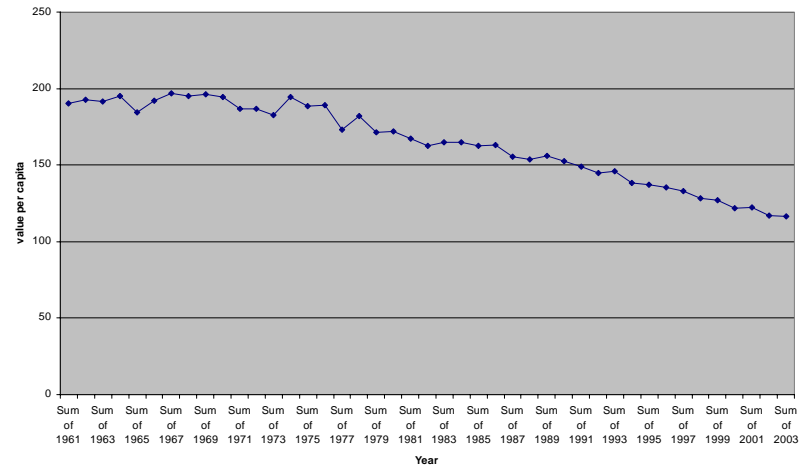
Population growth in Madagascar 1961-2003
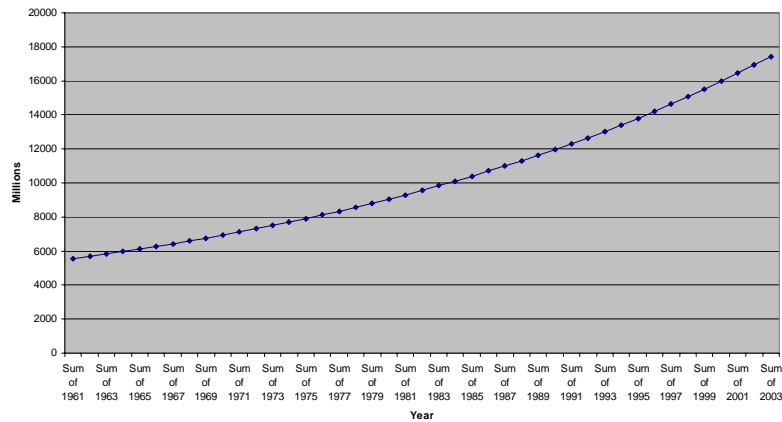
Findings:
* Production has grown slowly and steadily from the 60's.
* After stagnation until the mid 70's the pr./capita has slowly and steadily decreased.
* Average annual growth of:
population (1961-2004) 2,78 change 215 percent
value of total production (1961-2004) 1.48
value of total production (1999-2004) 0.61

36

Non-conflict countries - Malawi

Agricultural GRS Production evaluation in Malawi, 1961-2004
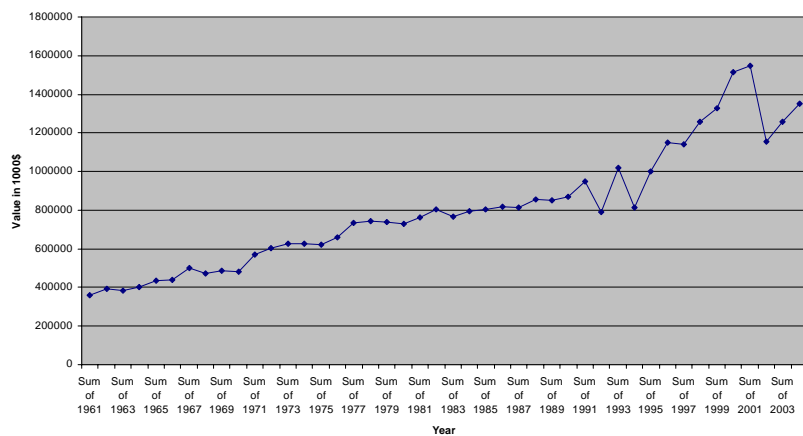
Agricultural grs production per capita in Malawi, 1961-2003
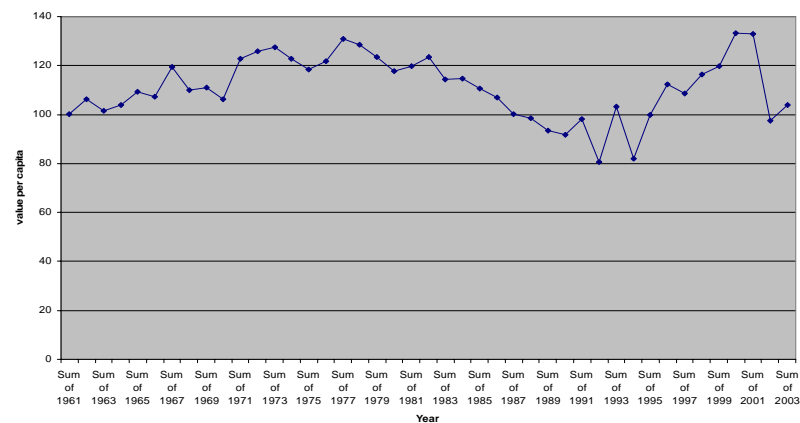
Population growth in Malawi 1961-2003
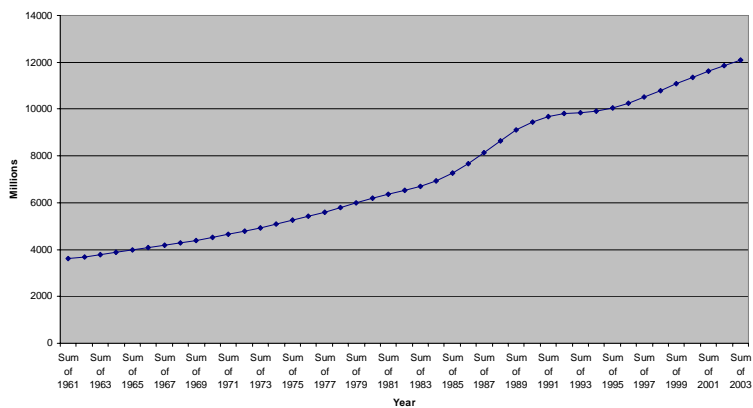
Findings:
* Production grew slowly until drops in 1992 and 1994. After that the production grew rapidly until the severe drought in 2002.
* Production per capita has been in the highest level in the 70's and in the beginning of the 2000 (over 120$).
The biggest drops have been in the beginning of the 90's.
* Average annual growth of:
population (1961-2004) 3.15 change 235 percent
value of total production (1961-2004) 2.98
value of total production (1999-2004) -2.15

Non-conflict countries - Mali

Agricultural GRS Production evaluation in Mali, 1961-2004
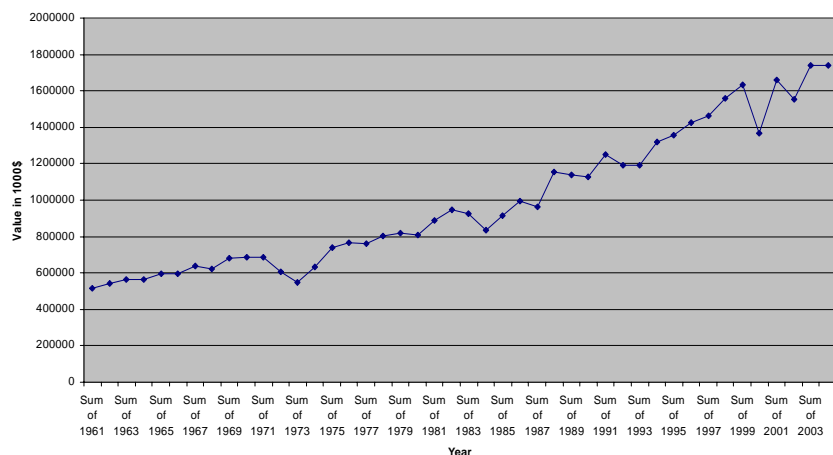
Agricultural grs production per capita in Mali, 1961-2003
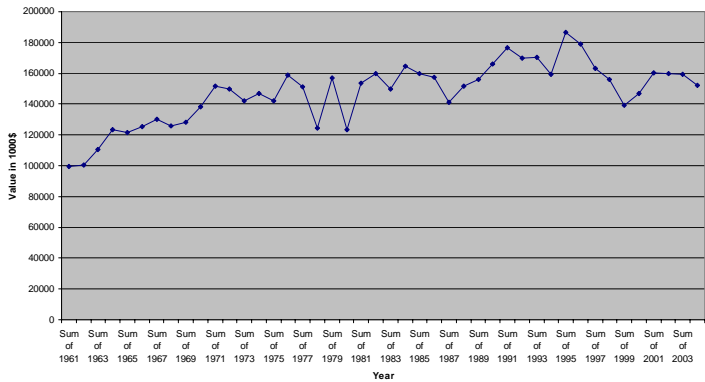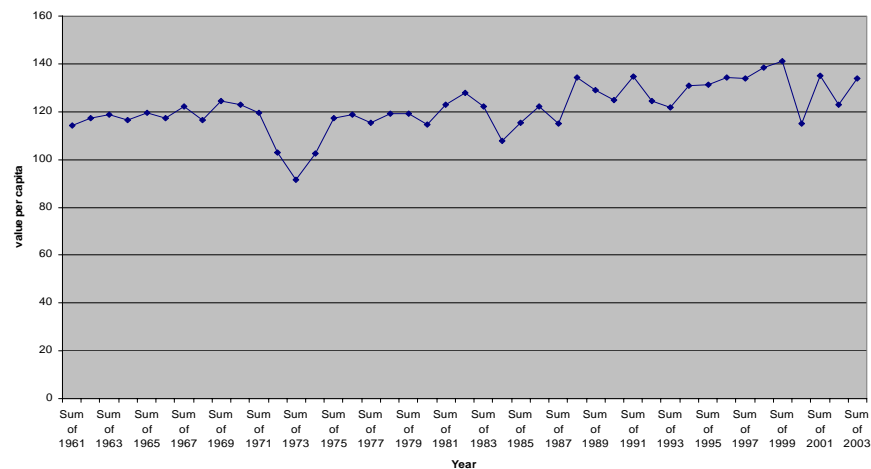

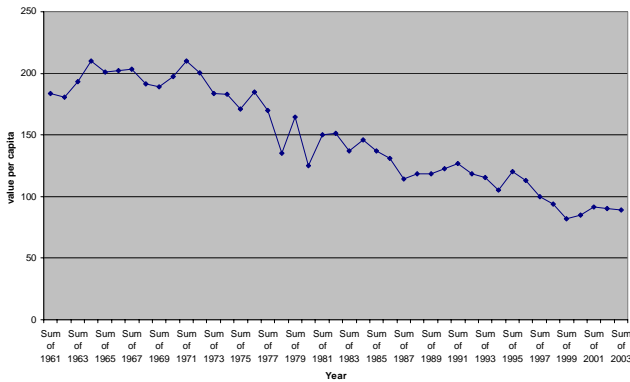**Population growth in Mali 1961-2003**
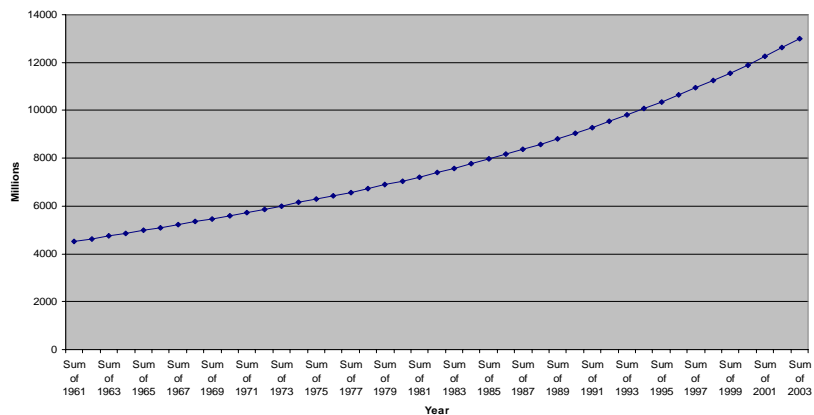
Findings:
* Production has grown since 1973. Even in 2000 when the production didn't grow food aid wasn't needed. (GIEWS)
* Most of the time production per capita has stagnated above and under 120$.
* Average annual growth of:
population (1961-2004) 2.51 change 187 percent
value of total production (1961-2004) 2.90
value of total production (1999-2004) 2.83

Non-conflict countries - Mauritania

Agricultural GRS Production evaluation in Mauritania, 1961-2004
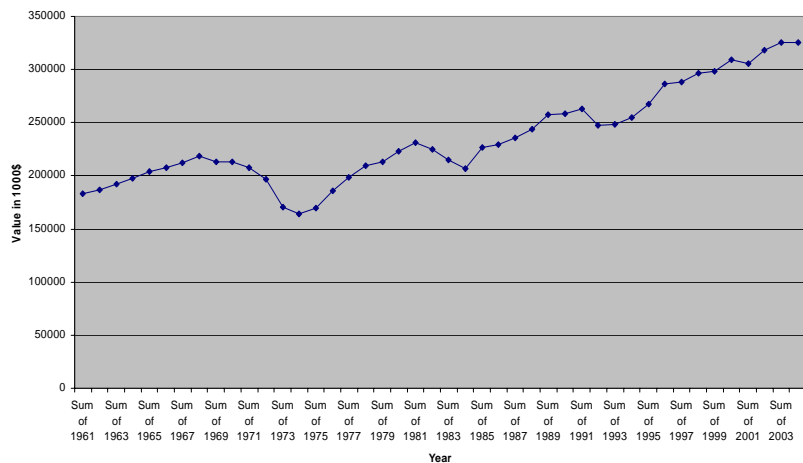
Agricultural grs production per capita in Mauritania, 1961-2003
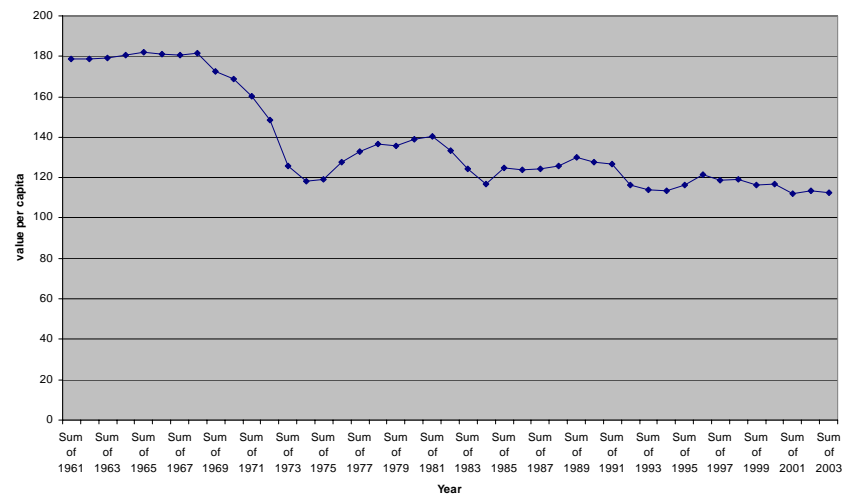
Population growth in Mauritania 1961-2003
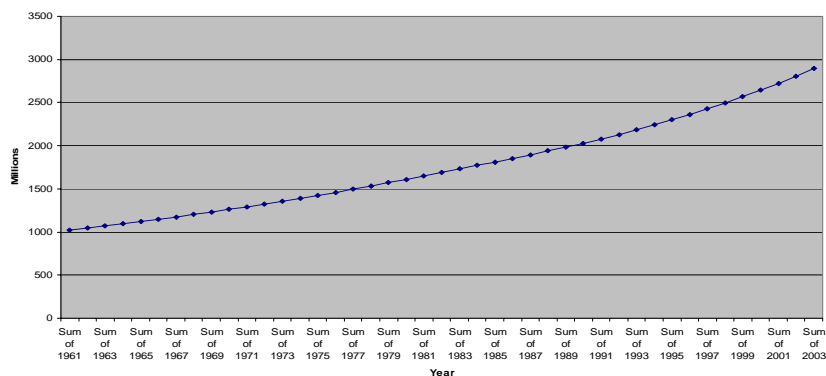
Findings:
* After the drop in the middle of the 70's the production
has been growing quite stablely.
* Production per capita has been stagnating and slightly
decreasing since the middle of the 70's.
* Average annual growth of:
population (1961-2004) 2.46 change 183 percent
value of total production (1961-2004) 1.28
value of total production (1999-2004) 1.81

39

Non-conflict countries - Mauritius

Agricultural GRS Production evaluation in Mauritius, 1961-2004
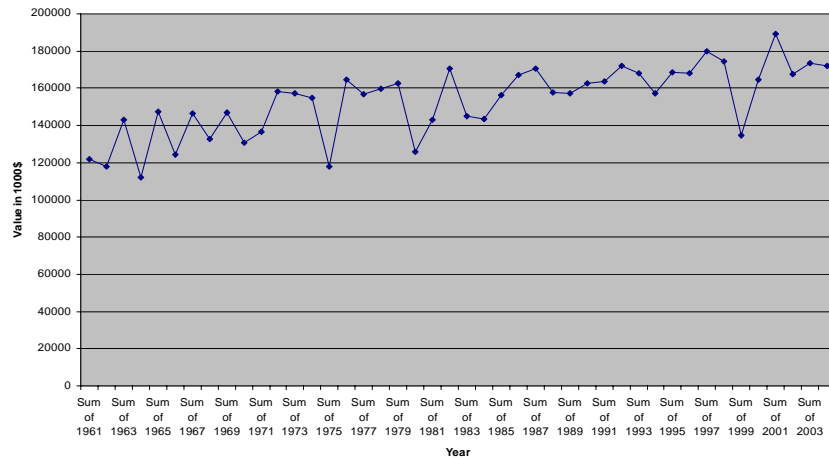
Agricultural grs production per capita in Mauritius, 1961-2003
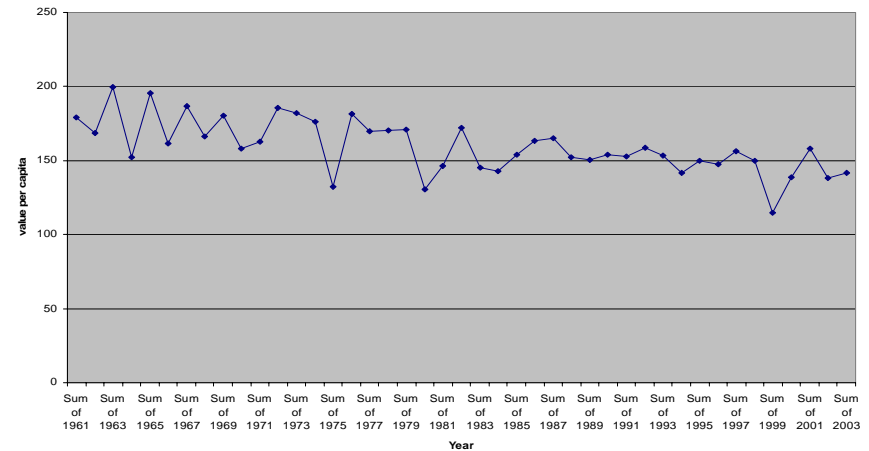
Population growth in Mauritius 1961-2003
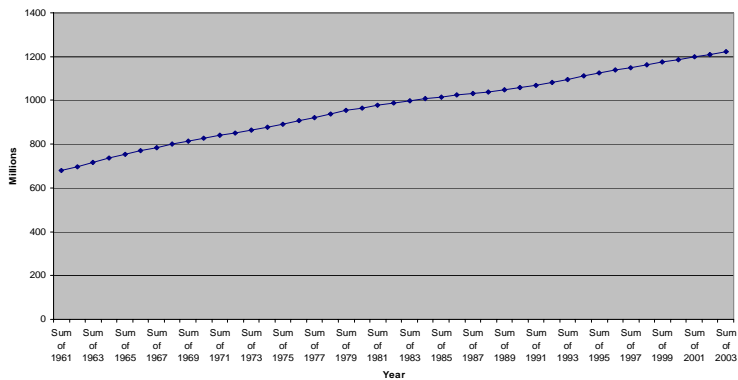
Findings:
* The trend in production has been slightly increasing, but yearly changes have been significant.
* Before the beginning of the 80's production per capita fluctuated heavily.
After that it has been stagnated except the drop in 1999 (no any abnormal weather conditions).
* Average annual growth of:
population (1961-2004) 1.31 change 80 percent
value of total production (1961-2004) 0.71
value of total production (1999-2004) 3.64

40

Non-conflict countries – Niger

Agricultural GRS Production evaluation in Niger, 1961-2004
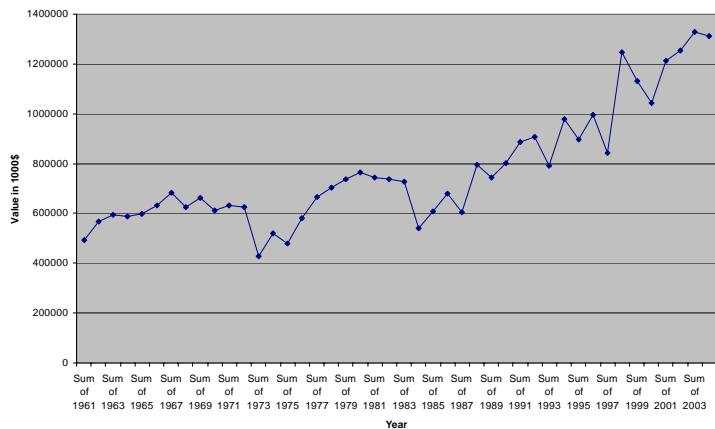
Agricultural grs production per capita in Niger , 1961-2003
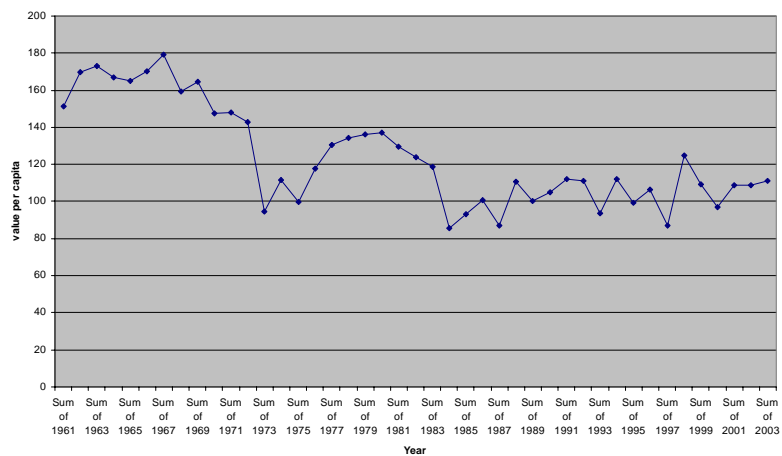
Population growth in Niger 1961-2003
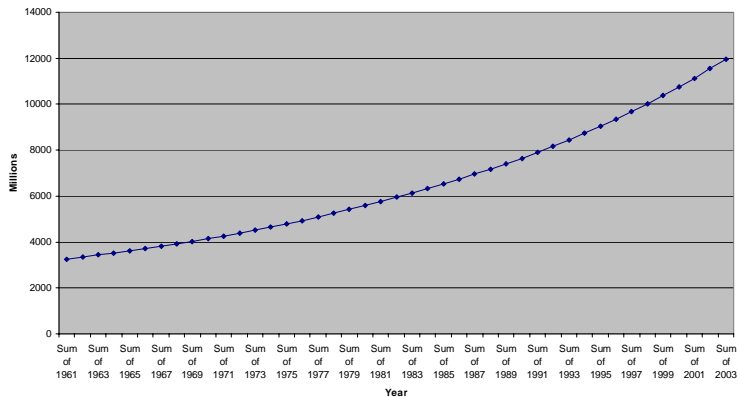
Findings:
* There was stagnation in the 60's (drought 68-73) , but after that the trend has been increasing. Yearly fluctuations have been very big.
* Production per capita decreased from the 60's level of 170$ to the level of 100$ in the 80's. The curve have stagnated there since then.
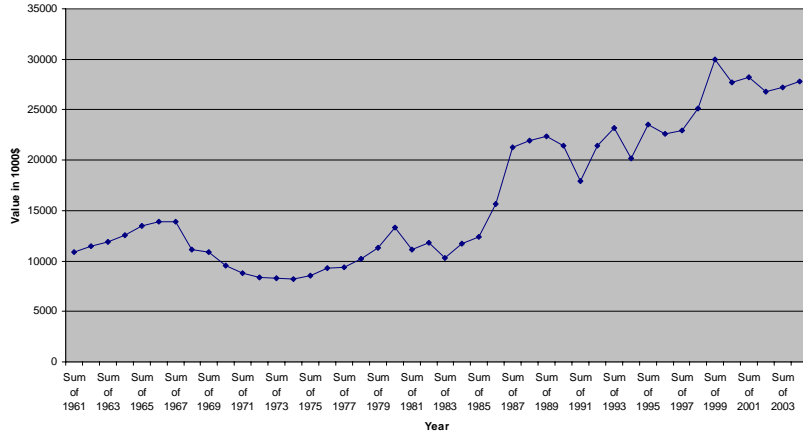* Average annual growth of:
population (1961-2004) 3.15 change 267 percent
value of total production (1961-2004) 3.15
value of total production (1999-2004) 4.37
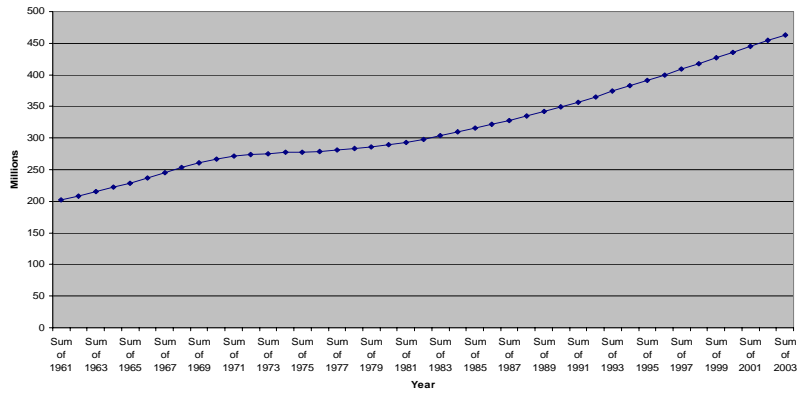
Non-conflict countries – Nigeria

Agricultural GRS Production evaluation in Nigeria, 1961-2004
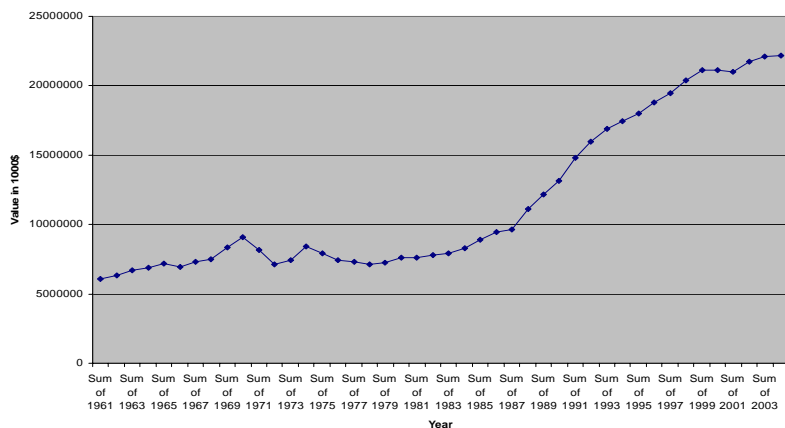
Agricultural grs production per capita in Nigeria , 1961-2003
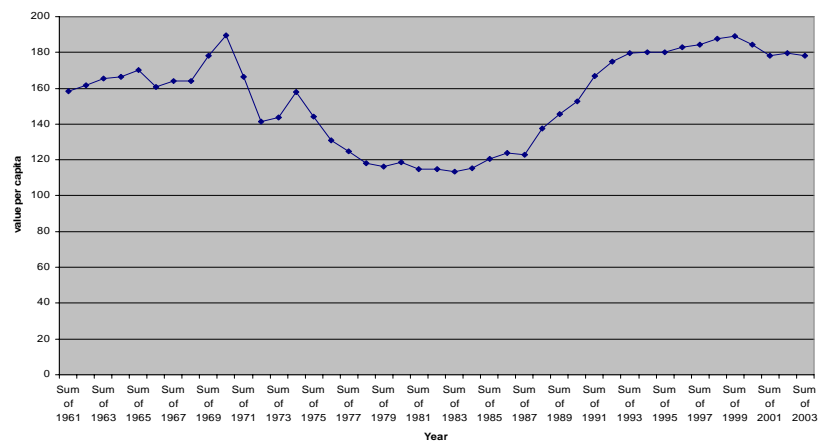
Population growth in Nigeria 1961-2003
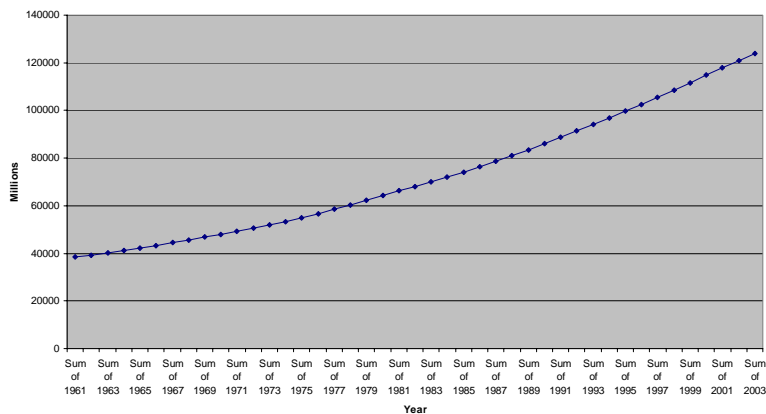
Findings:

* After stagnation the production started to increase in the beginning of the 80's.

Since then the production has been steadily increasing.

* Production per capita decreased for almost twenty years between 1973 and 1990.

Exceptionally compared to the other SSA-countries, Nigeria has been able to reach higher level than in the 60's.

* Average annual growth of:

population (1961-2004) 2.19 change 223 percent

value of total production (1961-2004) 3.23

value of total production (1999-2004) 1.18

Non-conflict countries – Sao Tome and Principe

Agricultural GRS Production evaluation in Sao Tome and Principe, 1961-2004
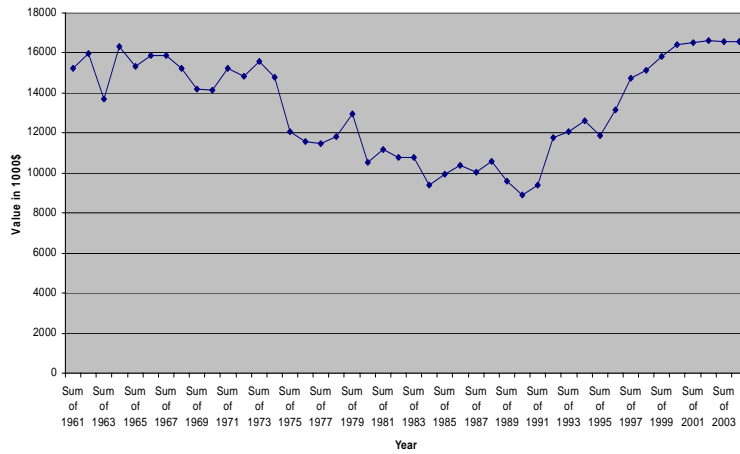
Agricultural grs production per capita in Sao Tome and Principe , 1961-2003
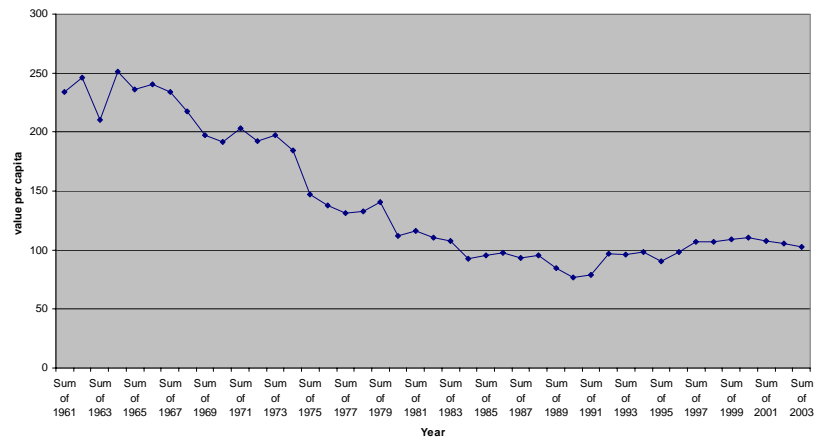
Population growth in Sao Tome and Principe 1961-2003
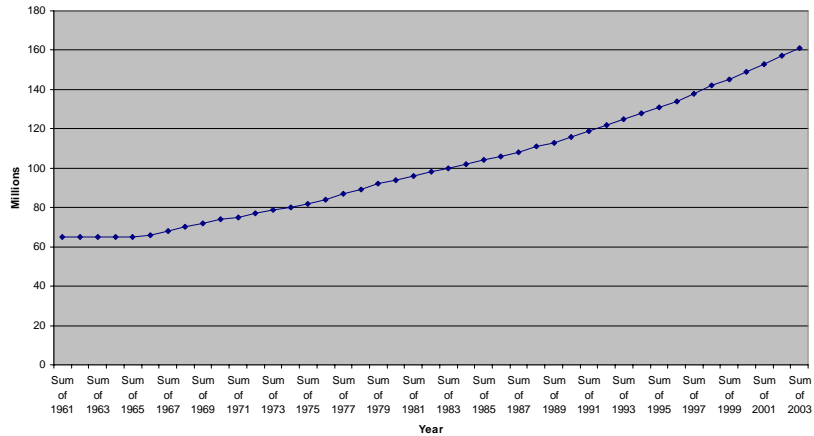
Findings:
* After stagnation the value of production went down for several years.
The production started to grow again from the beginning of the 90's.
* Production per capita has been declining until the beginning of the 90's.
Since then it has been slightly increasing and stagnating.
* Average annual growth of:
population (1961-2004) 2.31 change 148 percent
value of total production (1961-2004) -0.19
value of total production (1999-2004) 0.76

43

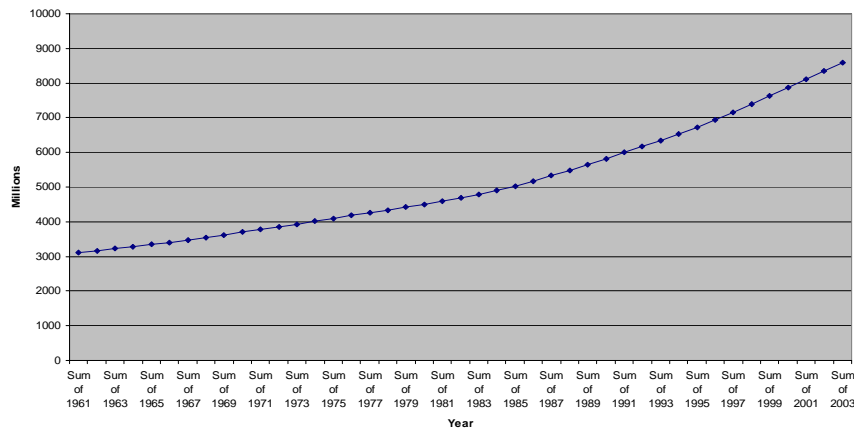# Non-conflict countries – Senegal

Agricultural GRS Production evaluation in Senegal, 1961-2004
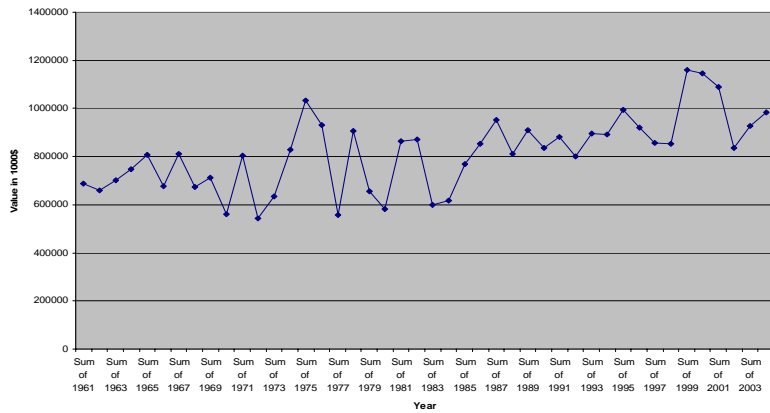
Agricultural grs production per capita in Senegal, 1961-2003
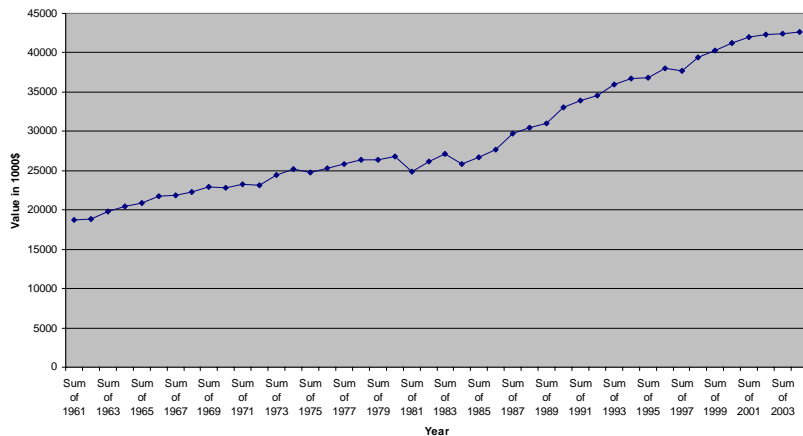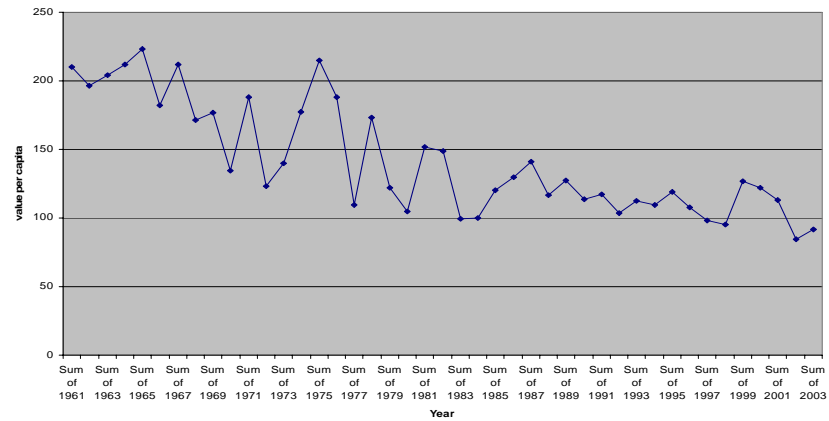

Population growth in Senegal 1961-2003
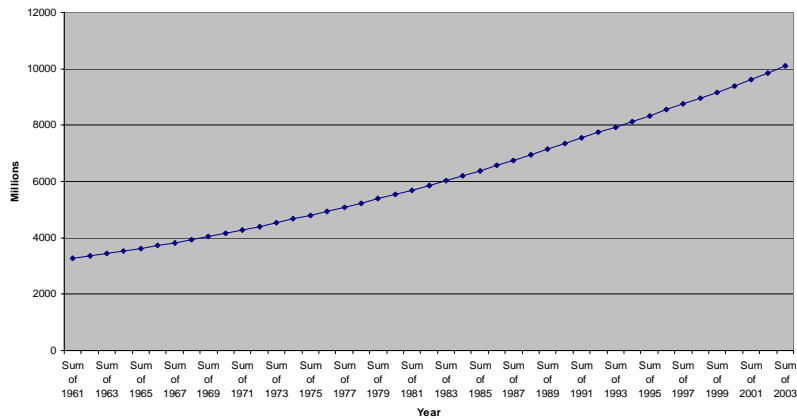
Findings:
* Production has been fluctuated very much, especially before the 80's.
The trend is increasing. The reason for a drop in 2002 was a drought->
the production of main cash crop, groundnut, went down over 40 percent.
* Production per capita has been declining. Fluctuations has been lessen in the 80's and 90's.
* Average annual growth of:
population (1961-2004) 2.78 change 209 percent
value of total production (1961-2004) 0.93
value of total production (1999-2004) -4.81

44

Non-conflict countries – South Africa

Agricultural GRS Production evaluation in South Africa, 1961-2004
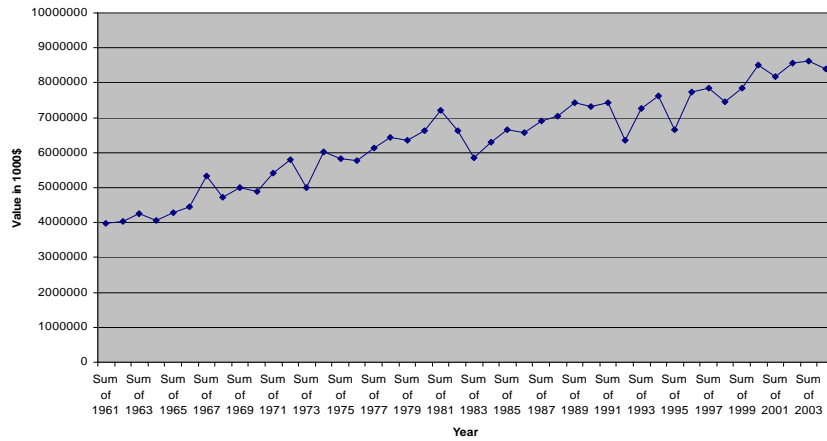
Agricultural grs production per capita in South Africa, 1961-2003
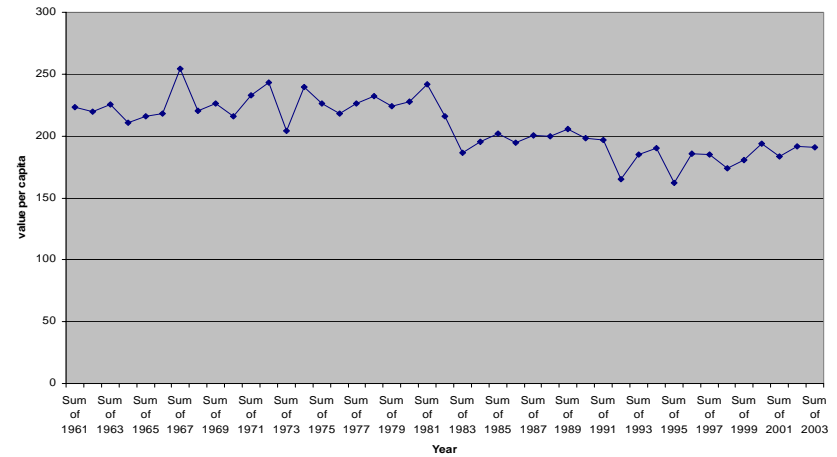
Population growth in South Africa 1961-2003
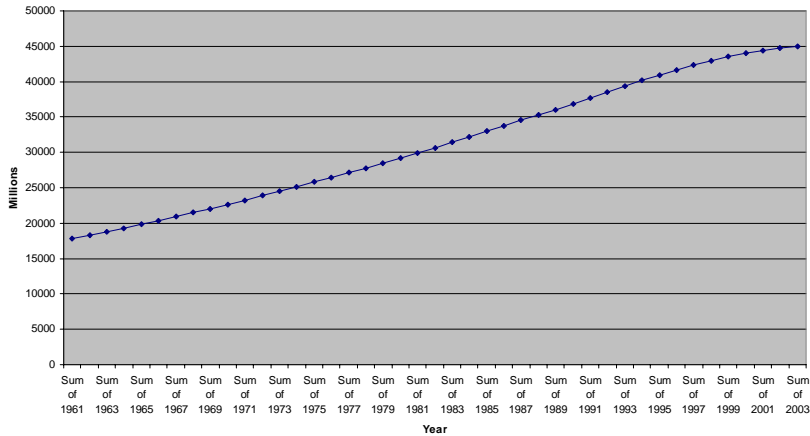
Findings:
* Production has been increasing and it has been doubled since the beginning of the period.
* In the period the production per capita has been stagnated and decreased slightly.
* Average annual growth of:
population (1961-2004) 2.33 change 152 percent
value of total production (1961-2004) 1.65
value of total production (1999-2004) 1.17

45

Non-conflict countries – Swaziland

Agricultural GRS Production evaluation in Swasiland, 1961-2004
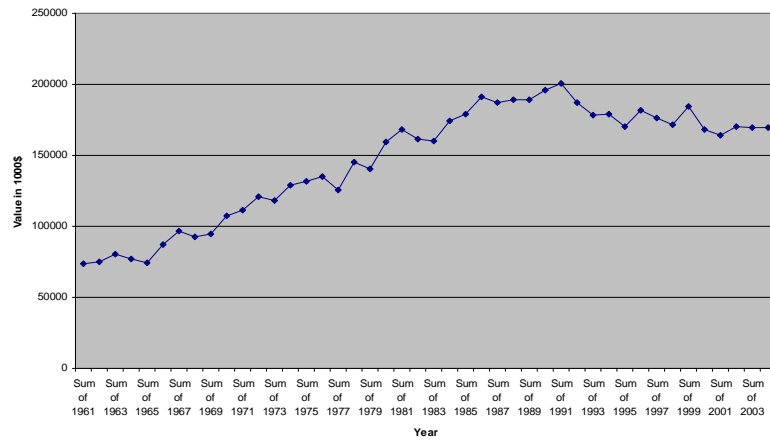
Agricultural grs production per capita in Swaziland, 1961-2003
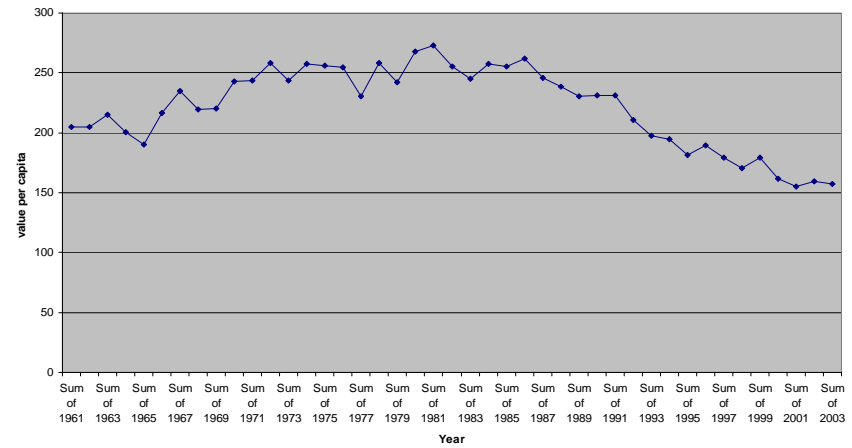
Population growth in Swaziland 1961-2003
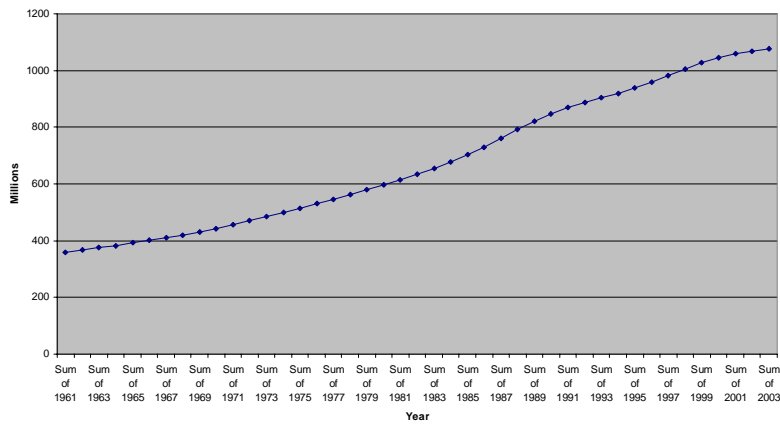
Findings:
* Production grew until 1991. After that it decreased some
and from 1995 it has been more or less stagnating.
* Production per capita slightly increased until the beginning
of the 80's. Since then it has been decreasing.
* Average annual growth of:
population (1961-2004) 2.90 change 200 percent
value of total production (1961-2004) 2.15
value of total production (1999-2004) -0.99

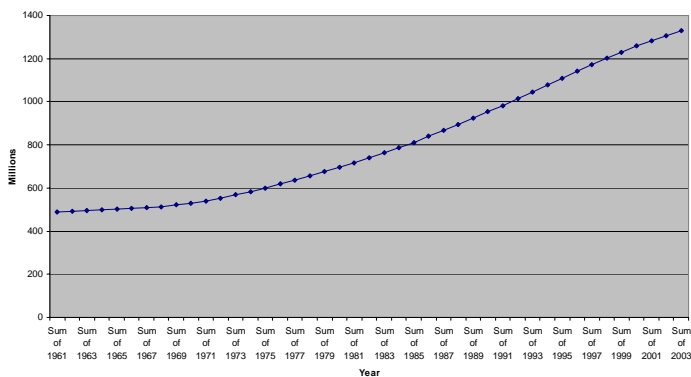# Non-conflict countries – Tanzania

Agricultural GRS Production evaluation in Tanzania, 1961-2004
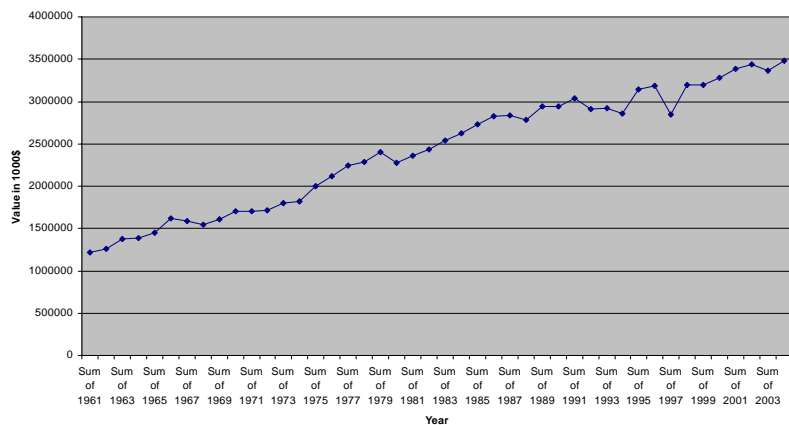
Agricultural grs production per capita in Tanzania, 1961-2003
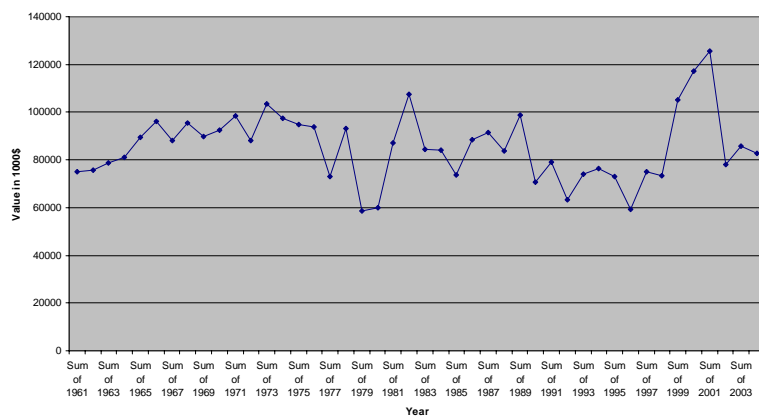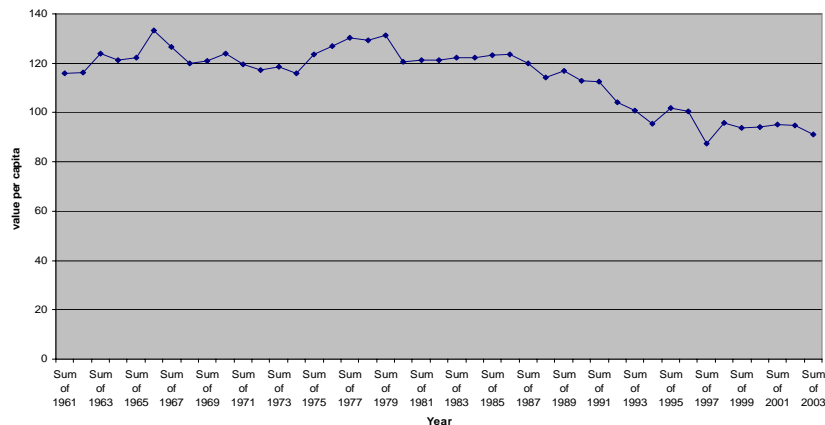

Population growth in Tanzania 1961-2003
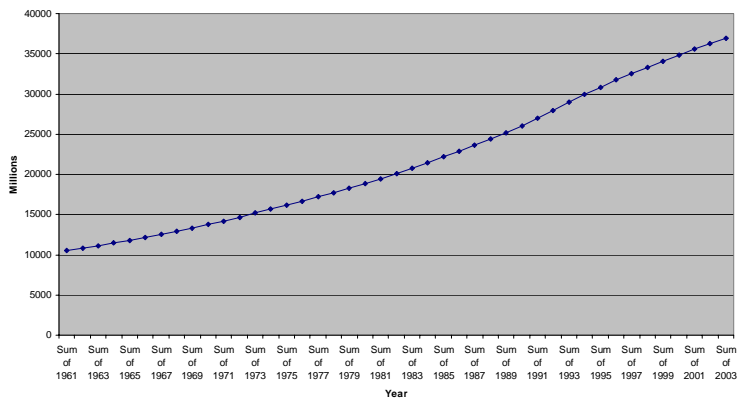
Findings:
* The value of the production has been growing steadily in the period, except in 1997 ("Vuli" rains & dry spells at critical stages of the growing season).
* Production per capita has been stagnating since the 90's when it started to decline.
* Average annual growth of:
population (1961-2004) 3.17 change 252 percent
value of total production (1961-2004) 2.40
value of total production (1999-2004) 1.48

Non-conflict countries – Togo

Agricultural GRS Production evaluation in Togo, 1961-2004
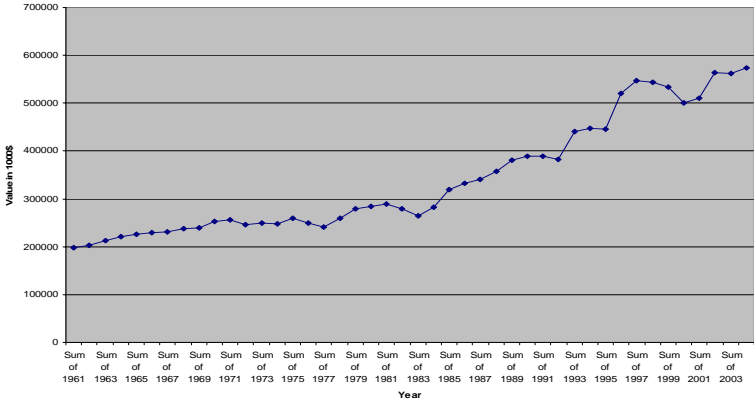
Agricultural grs production per capita in Togo, 1961-2003
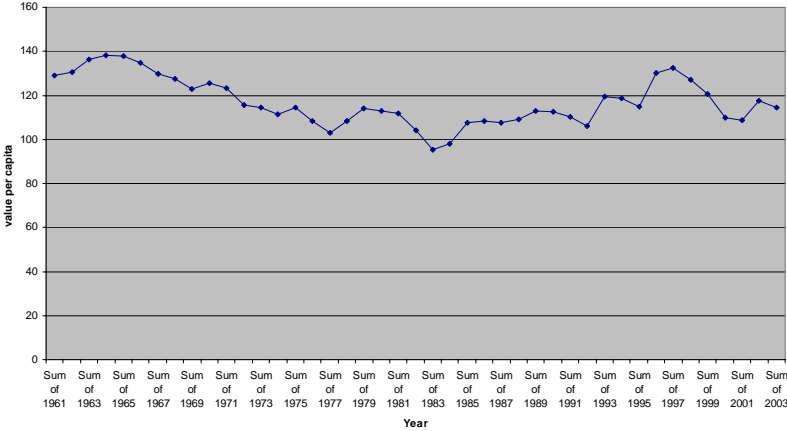
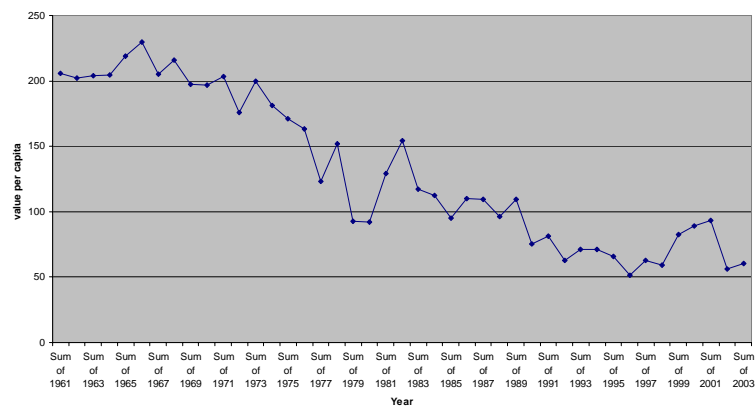**Population growth in Togo 1961-2003**
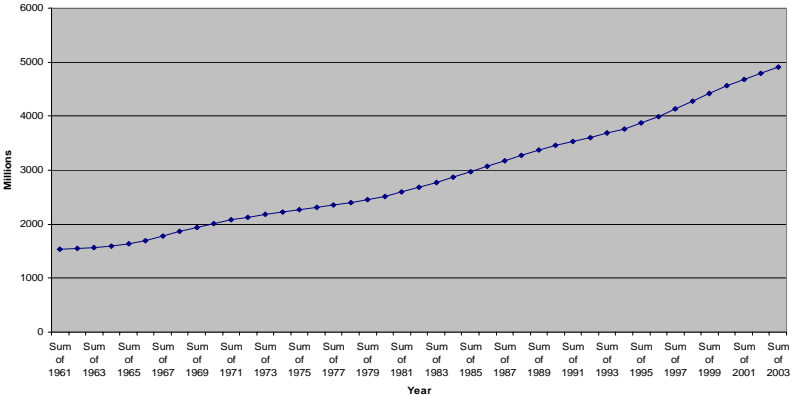
Findings:
* After slow increase in the 60's and 70's the production growth started to accelerate in the 80's.
* Production per capita was slowly decreasing until the beginning of the 80's, when the trend changed.
* Average annual growth of:
population (1961-2004) 2.85 change 219 percent
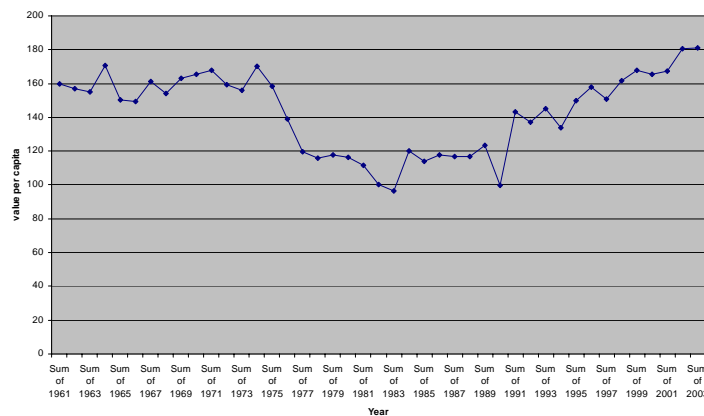value of total production (1961-2004) 2.56
value of total production (1999-2004) 2.32
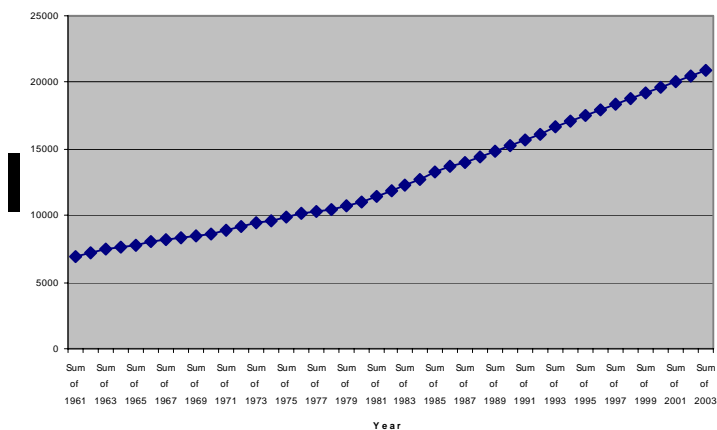
Non-conflict countries – Zambia

Agricultural GRS Production evaluation in Zambia, 1961-2004
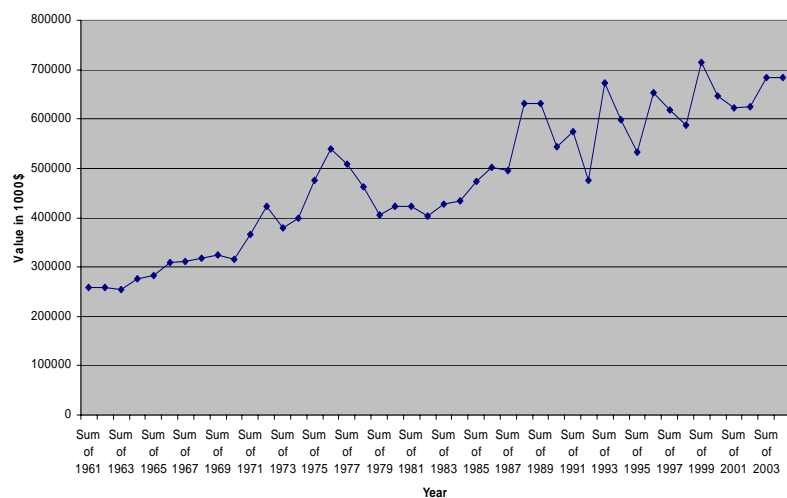
Agricultural grs production per capita in Zambia, 1961-2003
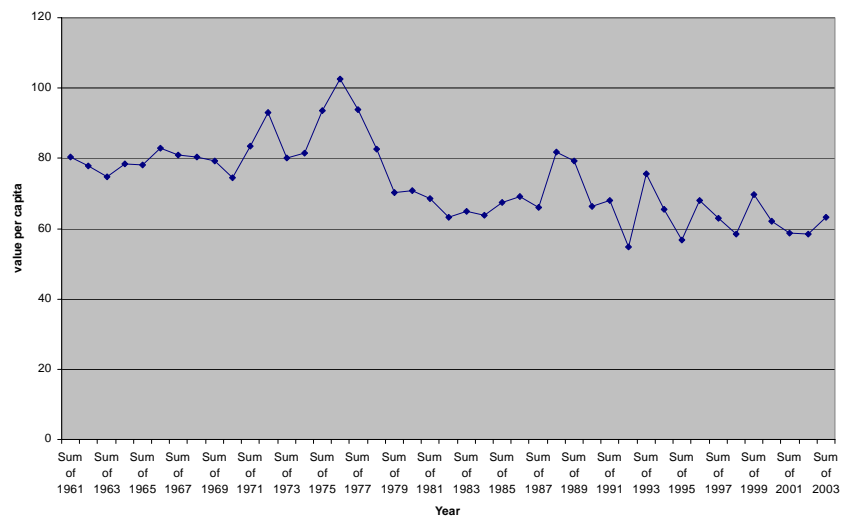
Population growth in Zambia 1961-2003
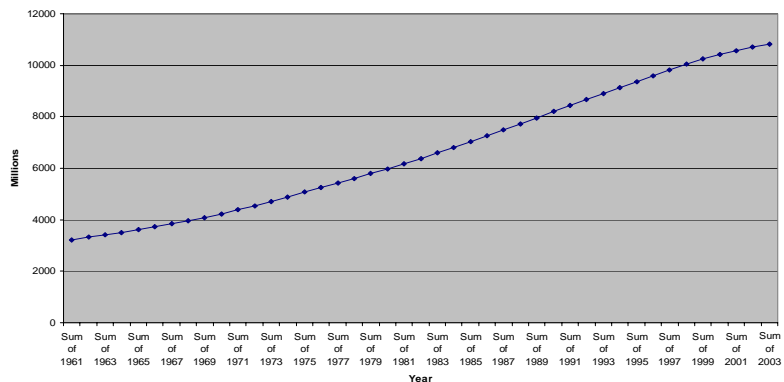
Findings:
* The value of production has been increasing, but the yearly changes have been bery big.
Between 1979 and 1986 the growth was stable and slow.
* The production per capita has had big fluctuations in the 70's and in the 80's.
The trend is decreasing.
* Average annual growth of:
population (1961-2004) 3.11change 235 percent
value of total production (1961-2004) 2.25
value of total production (1999-2004) -0.11

General findings concerning non- conflict-affected countries:

● The value of total production has grown in most of the countries. In few countries there has been stagnation and very much fluctuations.

In many countries the growth has started to accelerate in the beginning of the 80's.

Only Gambia and Sao Tome & Principe are approximately in the same level as they were in the 60's. Both are very small countries heavily dependent on exports of one product – Gambia on peanut and Sao Tome and Principe on cocoa crops. They are hostages to fluctuations in the production and world prices of the crop.

●The production per capita has declined in most of the countries.

There are only four countries out of 26 non-conflict countries which have been able to keep the value of production per capita in the same level as in the 60's. (Cape Verde, Kenya, Malawi, Mali)
Four countries have higher production per capita level than in the 60's (Benin, Burkina Faso, Ghana and Nigeria). Only Benin and Burkina Faso have grown clearly. Ghana's and Nigeria's production per capita has grown only in the 90's but most of the time in the period the level has been lower than in the 60's.
The main reason for Benin's and Burkina Faso's good performance is propably the increasing price of the cotton. Common factor for Ghana and Nigeria is that their both have much of natural resources.

● Population growth exceeds the production growth, so the production per capita decreases

 Only six countrie's (out of 26) total production growth was higher than population growth (Benin, Burkina Faso, Cape Verde, Ghana, Mali, Nigeria)

General findings concerning both groups

● There has been negative trend in rainfall from 1950 onwards culminating, in especially in West Africa 1984. Since then starting in 1988, the Sahel has recorded a series of good years (Gommes, R. 1996)
This trend can be seen in graphs.

● Most of the time the worst droughts 1973, 1984 and 1992 can be seen in the curves. Not allways though.

● The growth from the beginning of the eighties can be due to succesfull structural adjustement programmes and the good weather conditions.

● the biggest drops can be seen in the countries where occurs combination of low rainfall and conflict

-Population growth can be seen in both groups
-in conflict countries the effect of conflict overdraws the effect of population growth

-GRS / capita : in the better or same level compared to 60's:
-Conflict countries: Central African Republic, Cote d' Ivoire, Rwanda
-Non-conflict: Benin, Burkina Faso, Cameroon, Cape Verde, Cabon, Ghana, Kenya, Malawi, Mali, Nigeria

Findings Annex

Contents

1. Long-term effects of conflict :
Comparison of conflict and non-conflict countries

1.1 Average gross production per capita 1961-2004

Non-conflict countries		Conflict countries	
Benin	149	Angola	97
Botswana	147	Burundi	128
Burkina Faso	85	Central African Republic	143

Cameroon	162	Chad		129
Cape Verde	49	Congo, Dem Republic of		88
Comoros	70	Congo, Republic of		74
Gabon	174	Côte d'Ivoire		225
Gambia	131	Eritrea		39
Ghana	143	Ethiopia		65
Kenya	118	Guinea		118
Lesotho	66	Guinea-Bissau		112
Madagascar	164	Liberia		99
Malawi	111	Mozambique		75
Mali	122	Namibia		264
Mauritania	138	Rwanda		159
Mauritius	159	Sierra Leone		83
Niger	124	Uganda		236
Nigeria	155	Zimbabwe		148
Sao Tome and Principe	142			
Senegal	142			
South Africa	208			
Swaziland	222			
Tanzania, United Rep of	114			
Togo	117			
Zambia	73			
Average per capita	131			127

Average non-conflict without South Africa and Swaziland is 124.
Average conflict without Cote d' Ivoire, Namibia and Uganda is 104.

There is not a significant difference between total averages in conflict and non-conflict countries. In this case though the average is hiding some information. In conflict and post-conflict countries there are three very good performances which increases the average. Almost half of the group (7/15) the average is less than 100 $. Most of the non-conflict countries have the average over 100 $. Only six out of 28 non-countries have the per capita average less than 100 $.
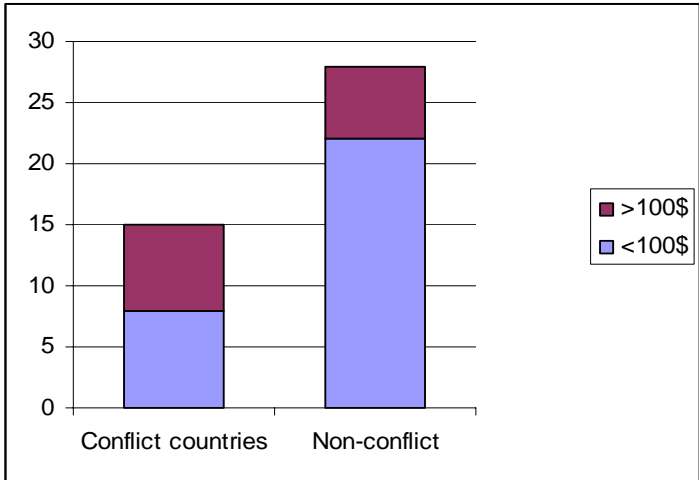
Approximately half of the countries's gdp is between 100 and 150. The outliers for the conflict countries are seen in the graph. The countries are Namibia, Cote d' Ivoire and Namibia. When excluding them, the difference in averages is much more significant. Average for non-conflict countries is 131 and conflict countries 98.
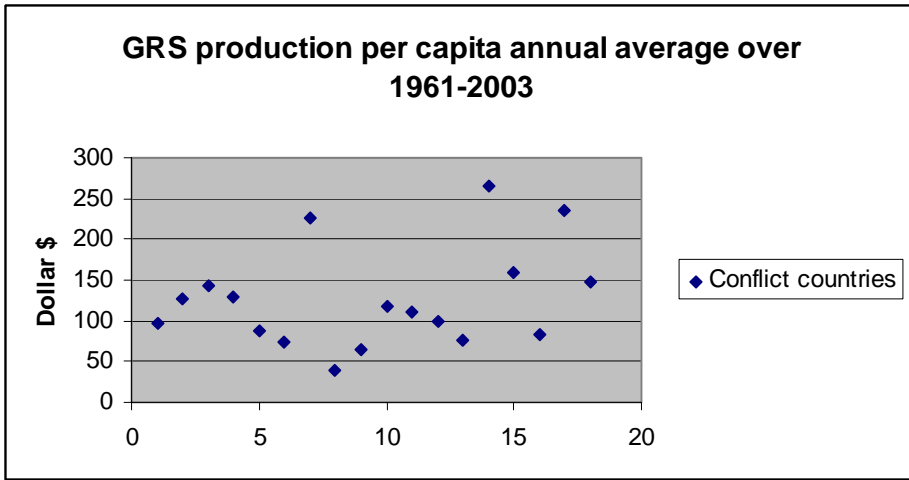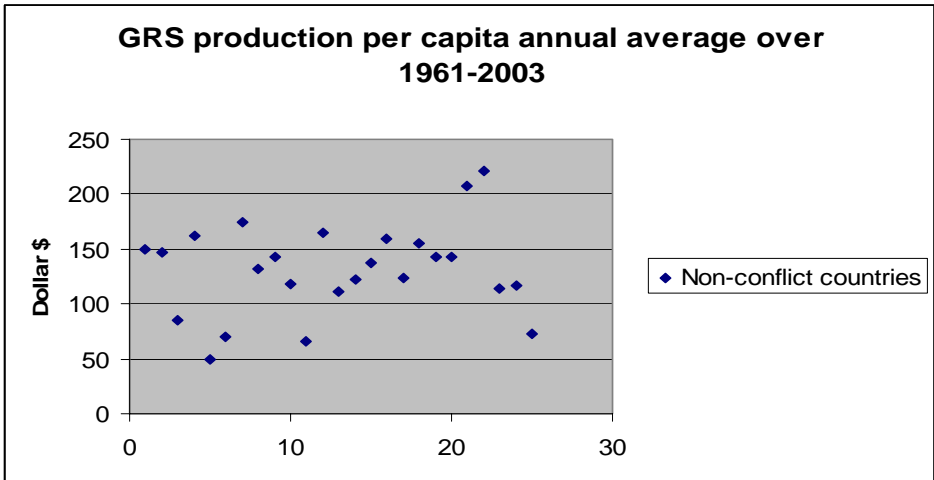
1.1.2 T-test for average gross production per capita 1961-2004

Conflict and non-conflict countries

t-Test: Two-Sample Assuming Equal Variances

	Non-conflict 1	Conflict 2
Mean	131.49	126.84
Variance	1732.24	3804.24
Observations	25.00	18
Pooled Variance	2591.36	
Hypothesized Mean Difference	0.00	
df	41.00	
t Stat	**0.30**	
P(T<=t) one-tail	0.38	
t Critical one-tail	1.68	
P(T<=t) two-tail	0.77	
t Critical two-tail	2.02	

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	Variable 2
Mean	131.49	126.84
Variance	1732.24	3804.24
Observations	25.00	18.00
Hypothesized Mean Difference	0.00	
df	28.00	
t Stat	**0.28**	
P(T<=t) one-tail	0.39	
t Critical one-tail	1.70	
P(T<=t) two-tail	0.78	
t Critical two-tail	2.05	

The probability of having a difference in means by chance is 0.00. So means are statistically not different.

Null hypothesis: no mean difference

t-value: 0.28

Critical t-value: 1.70 one tail
                      2.05 two tails

Our t-value does fall within the -2.05 to 2.05 interval. Therefore, we do not reject the null hypothesis, so **the means are not different**.

1.1.3 T-test for average gross production per capita 1961-2004 w/o outliers

Conflict and non-conflict countries
Outliers:
non-conflict: South Africa & Swaziland
conflict: Ivory coast, Namibia, Uganda

t-Test: Two-Sample Assuming Equal Variances

	Non-conflict 1	Conflict 2
Mean	124.26	103.83
Variance	1202.72	1158.93
Observations	23.00	15.00
Pooled Variance	1185.69	
Hypothesized Mean Difference	0.00	
df	36.00	
t Stat	**1.79**	
P(T<=t) one-tail	0.04	
t Critical one-tail	1.69	
P(T<=t) two-tail	0.08	
t Critical two-tail	2.03	

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	Variable 2
Mean	124.26	103.83
Variance	1202.72	1158.93
Observations	23.00	15.00
Hypothesized Mean Difference	0.00	
df	30.00	
t Stat	**1.79**	
P(T<=t) one-tail	0.04	
t Critical one-tail	1.70	
P(T<=t) two-tail	0.08	
t Critical two-tail	2.04	

The probability of having a difference in means by chance is 0.00.
So, we can say that the means are statistically significantly different at 92 % level of confidence

Null hypothesis: no mean difference

t-value: 1.79

Critical t-value: 1.70 one tail
                2.04 two tails

Our t-value does not fall within the -1.70 to 1.70 interval. Therefore, we do reject the null hypothesis, so **the means are different**.

1.2 Average annual growth rate of total production 1961-2004

Agricultural grs production (FAO Stat 2005)

There is a difference between conflict affected and non-conflict affected countries in growth rates. In the long term (1961-2004) the non-conflict countries has better average annual growth rate. In non-conflict countries more than a half had growth rate over two, but conflict countries only one fourth.

Non-conflict		Conflict	
Benin	4.29	Angola	0.64
Botswana	0.82	Burundi	1.17
Burkina Faso	3.78	Central African Republic	2.54
Cameroon	2.81	Chad	1.92
Cape Verde	2.74	Congo, Dem Republic of	1.46
Comoros	1.92	Congo, Republic of	1.61
Djibouti	5.48	Côte d'Ivoire	3.67
Gabon	2.41	Eritrea	0.18
Gambia	-0.09	Ethiopia	1.30
Ghana	2.73	Guinea	1.95
Kenya	3.29	Guinea-Bissau	2.38
Lesotho	0.70	Liberia	1.05
Madagascar	1.48	Mozambique	0.66
Malawi	2.98	Namibia	0.32
Mali	2.90	Rwanda	2.21
Mauritania	1.28	Sierra Leone	0.90
Mauritius	0.71	Sudan	2.50
Niger	1.90	Uganda	1.93
Nigeria	3.23		
Sao Tome and Principe	-0.19		
Senegal	0.93		
Seychelles	-0.33		
South Africa	1.65		
Swaziland	2.15		
Togo	2.56		
Zambia	2.25		
Zimbabwe	2.03		
Simple average	**2.09**		**1.58**
Average annual growth (known_y's,known_x's,new_x's,const)	**2.62**		**1.41**

1.2.1 T-tests for average annual growth rate 1961-2004

Conflict and non-conflict countries

t-Test: Two-Sample Assuming Equal Variances

	Non-conflict 1	Conflict 2
Mean	2.09	1.58
Variance	1.88	0.81
Observations	27.00	18.00
Pooled Variance	1.46	
Hypothesized Mean Difference	0.00	
df	43.00	
t Stat	**1.39**	
P(T<=t) one-tail	0.09	
t Critical one-tail	1.68	
P(T<=t) two-tail	0.17	
t Critical two-tail	2.02	

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	Variable 2
Mean	2.09	1.58
Variance	1.88	0.81
Observations	27.00	18.00
Hypothesized Mean Difference	0.00	
df	43.00	
t Stat	**1.51**	
P(T<=t) one-tail	0.07	
t Critical one-tail	1.68	
P(T<=t) two-tail	0.14	
t Critical two-tail	2.02	

The probability of having a difference in means by chance is 0.00.

Null hypothesis: no mean difference

t-value: 1.51

Critical t-value: 1.68 one tail
2.02 two tails

Our t-value does fall within the -1.68 to 1.68 interval. Therefore, we do not reject the null hypothesis, so **the means are not different**.

1.2.2 T-tests for average annual growth rate 1961-2004 w/o outliers

Conflict and non-conflict countries
Outliers:
non-conflict: Djibouti, Gambia, Benin, Sao Tome and Principe, Seychelles
conflict: Cote d' Ivoire, Eritrea, Namibia

Non-conflict		Conflict	
Benin		Angola	0.64
Botswana	0.82	Burundi	1.17
Burkina Faso	3.78	Central African Republic	2.54
Cameroon	2.81	Chad	1.92
Cape Verde	2.74	Congo, Dem Republic of	1.46
Comoros	1.92	Congo, Republic of	1.61
Djibouti		Côte d'Ivoire	
Gabon	2.41	Eritrea	
Gambia		Ethiopia	1.30
Ghana	2.73	Guinea	1.95
Kenya	3.29	Guinea-Bissau	2.38
Lesotho	0.70	Liberia	1.05
Madagascar	1.48	Mozambique	0.66
Malawi	2.98	Namibia	
Mali	2.90	Rwanda	2.21
Mauritania	1.28	Sierra Leone	0.90
Mauritius	0.71	Sudan	2.50
Niger	1.90	Uganda	1.93
Nigeria	3.23		
Sao Tome and Principe			
Senegal	0.93		
Seychelles			
South Africa	1.65		
Swaziland	2.15		
Togo	2.56		
Zambia	2.25		
Zimbabwe	2.03		
Simple average	**2.15**		**1.62**

t-Test: Two-Sample Assuming Equal Variances

	Non-conflict 1	Conflict 2
Mean	2.15	1.62
Variance	0.80	0.42
Observations	22.00	15.00
Pooled Variance	0.65	
Hypothesized Mean Difference	0.00	
df	35.00	
t Stat	**1.98**	
P(T<=t) one-tail	0.03	
t Critical one-tail	1.69	
P(T<=t) two-tail	0.06	
t Critical two-tail	2.03	

t-Test: Two-Sample Assuming Unequal
Variances

	Variable 1	Variable 2
Mean	2.15	1.62
Variance	0.80	0.42
Observations	22.00	15.00
Hypothesized Mean Difference	0.00	
df	35.00	
t Stat	**2.10**	
P(T<=t) one-tail	0.02	
t Critical one-tail	1.69	
P(T<=t) two-tail	0.04	
t Critical two-tail	2.03	

The probability of having a difference in means by chance is 0.00.
So, we can say that the means are statistically significantly different at 96 % level of confidence

Null hypothesis: no mean difference

t-value: 2.10

Critical t-value: 1.69 one tail
                      2.03 two tails

Our t-value does not fall within the -1.69 to 1.69 or -2.03 to 2.03 interval. Therefore, we do reject the null hypothesis, so **the means are different**.

Average annual growth rate of total pr. 1961-2004

Average annual growth rate of total production 1961-2004
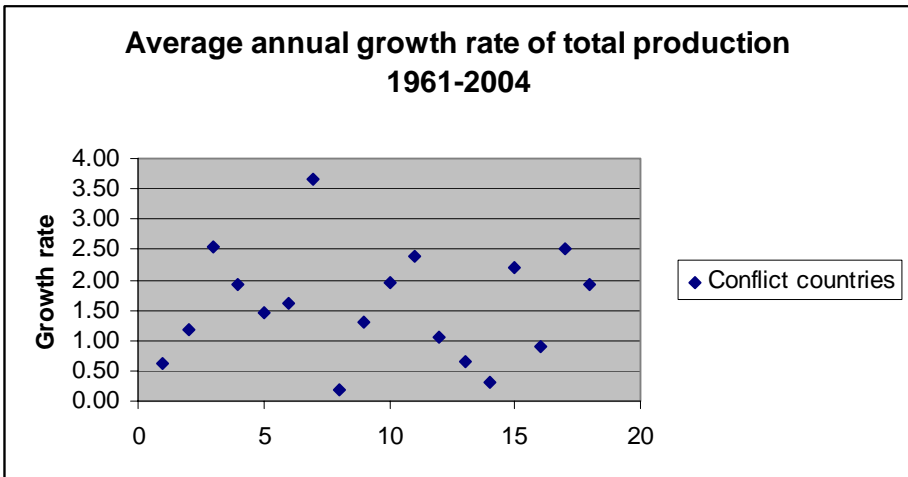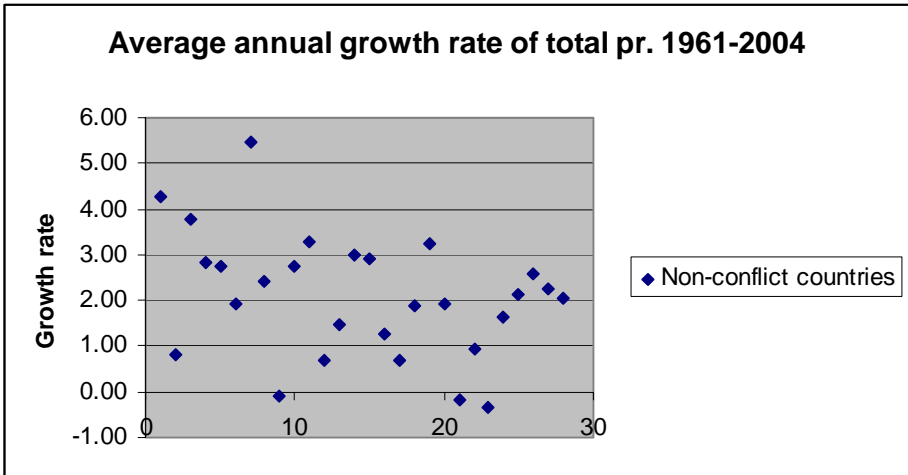
1.3 Average annual growth rate of total production per capita 1961-2004

Agricultural grs production per capita (FAO Stat 2005)

Non-conflict countries		Conflict countries	
Benin	1.45	Angola	-1.97
Botswana	-2.16	Burundi	-0.87
Burkina Faso	1.14	Central African Republic	0.24
Cameroon	0.06	Chad	-0.54
Cape Verde	0.93	Congo, Dem Republic of	-1.40
Comoros	-1.20	Congo, Republic of	-1.54
Gabon	-0.26	Côte d'Ivoire	0.01
Gambia	-3.39	Eritrea 1993-2003	-2.23
Ghana	-0.09	Ethiopia 1993-2003	1.32
Kenya	-0.09	Guinea	-0.54
Lesotho	-1.18	Rwanda	-0.04
Liberia	-1.28	Sierra Leone	-0.85
Madagascar	-1.24	Uganda	-1.18
Malawi	-0.16		
Mali	0.38	Post-conflict countries	
Mauritania	-1.17	Guinea-Bissau	-0.25
Mauritius	-0.58	Mozambique	-1.47
Niger	-1.27	Namibia	-2.43
Nigeria	0.30		
Sao Tome and Principe	-2.53		
Senegal	-1.80		
South Africa	-0.64		
Swaziland	-0.65		
Tanzania, United Rep of	-0.71		
Togo	-0.29		
Zambia	-0.81		
Zimbabwe	-1.06		
Simple average	**-0.68**		**-0.86**
Average annual growth	**-0.66**		**-0.93**
(known_y's,known_x's,new_x's,const)			

1.3.1 T-test for average annual growth rate per capita 1961-2004

Conflict and non-conflict countries

t-Test: Two-Sample Assuming Equal Variances

	Variable 1	Variable 2
Mean	-0.68	-0.86
Variance	1.17	0.99
Observations	27.00	16.00
Pooled Variance	1.11	
Hypothesized Mean Difference	0.00	
df	41.00	
t Stat	**0.54**	
P(T<=t) one-tail	0.29	
t Critical one-tail	1.68	
P(T<=t) two-tail	0.59	
t Critical two-tail	2.02	

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	Variable 2
Mean	-0.68	-0.86
Variance	1.17	0.99
Observations	27.00	16.00
Hypothesized Mean Difference	0.00	
df	34.00	
t Stat	**0.56**	
P(T<=t) one-tail	0.29	
t Critical one-tail	1.69	
P(T<=t) two-tail	0.58	
t Critical two-tail	2.03	

The probability of having a difference in means by chance is 0.00 (i.e., the P(T<=t) two tail)

Null hypothesis: no mean difference

t-value: 0.56

Critical t-value: 1.69 one tail
                        2.03 two tails

Our t-value does fall within the -2.03 to 2.03 interval. Therefore, we do not reject the null hypothesis, so **the means are not different**.

1.3.2 T-test for average annual growth rate per capita 1961-2004 w/o outliers

Conflict and non-conflict countries
Outliers:
non-conflict: Benin, Botswana, Burkina Faso, Sao Tome and Principe, Gambia
conflict: Ethiopia, Eritrea, Namibia

Non-conflict countries		Conflict countries	
Benin		Angola	-1.97
Botswana		Burundi	-0.87
Burkina Faso		Central African Republic	0.24
Cameroon	0.06	Chad	-0.54
Cape Verde	0.93	Congo, Dem Republic of	-1.40
Comoros	-1.20	Congo, Republic of	-1.54
Gabon	-0.26	Côte d'Ivoire	0.01
Gambia		Eritrea	
Ghana	-0.09	Ethiopia	
Kenya	-0.09	Guinea	-0.54
Lesotho	-1.18	Guinea-Bissau	-0.25
Liberia	-1.28	Mozambique	-1.47
Madagascar	-1.24	Namibia	
Malawi	-0.16	Rwanda	-0.04
Mali	0.38	Sierra Leone	-0.85
Mauritania	-1.17	Uganda	-1.18
Mauritius	-0.58		
Niger	-1.27		
Nigeria	0.30		
Sao Tome and Principe			
Senegal	-1.80		
South Africa	-0.64		
Swaziland	-0.65		
Tanzania, United Rep of	-0.71		
Togo	-0.29		
Zambia	-0.81		
Zimbabwe	-1.06		
Simple average	**-0.58**		**-0.80**

t-Test: Two-Sample Assuming Equal Variances

	Variable 1	Variable 2
Mean	-0.58	-0.80
Variance	0.45	0.47
Observations	22.00	13.00
Pooled Variance	0.46	
Hypothesized Mean Difference	0.00	
df	33.00	
t Stat	**0.91**	
P(T<=t) one-tail	0.18	
t Critical one-tail	1.69	
P(T<=t) two-tail	0.37	
t Critical two-tail	2.03	

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	Variable 2
Mean	-0.58	-0.80
Variance	0.45	0.47
Observations	22.00	13.00
Hypothesized Mean Difference	0.00	
df	25.00	
t Stat	**0.91**	
P(T<=t) one-tail	0.19	
t Critical one-tail	1.71	
P(T<=t) two-tail	0.37	
t Critical two-tail	2.06	

The probability of having a difference in means by chance is 0.00 (i.e., the P(T<=t) two tail) So, we can say that the means are statistically significantly different at 95 % level of confidence

Null hypothesis: no mean difference

t-value: 0.91

Critical t-value: 1.71 one tail
                       2.06 two tails

Our t-value does fall within the -2.06 to 2.06 interval. Therefore, we do not reject the null hypothesis, so **the means are not different**.

Average annual growth of total agricultural value (per capita) 1961-2003 — Non-conflict countries

Average annual growth of total agricultural value (per capita) 1961-2003 — Conflict countries
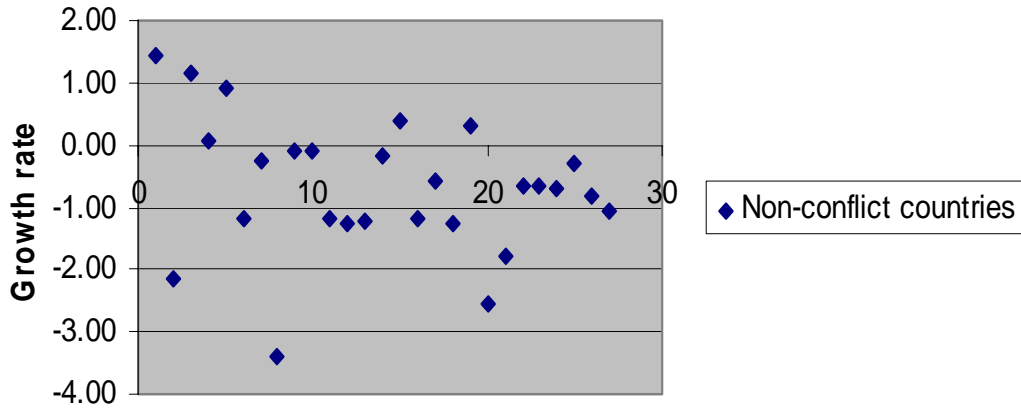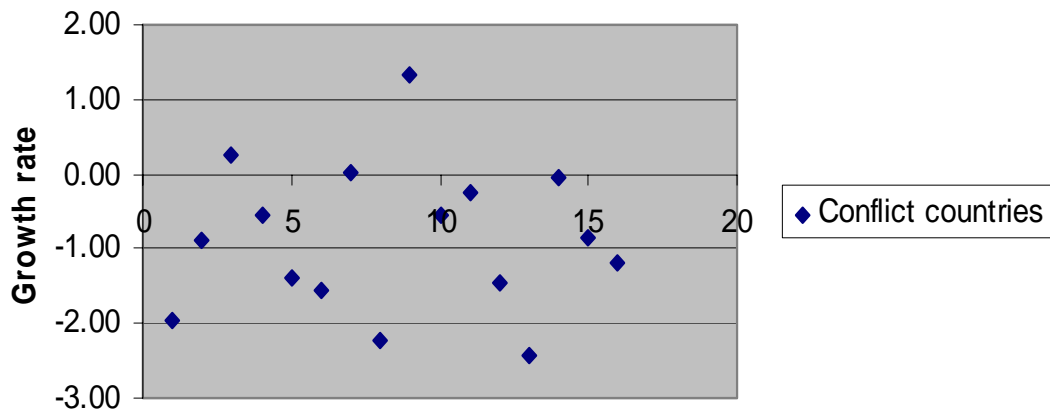
2. Regional differences

Regional classification of countries is based on the classification FAO Global Information and Early Warning System on food and agriculture (GIEWS) is using in its reports. For example in yearly Africa Reports.

2.1 Value of total agricultural production 1961-2003/2004

	Average annual growth	Average annual growth per capita
Eastern Africa	1.53	-0.34
Western Africa	2.94	-0.43
Central Africa	1.64	-0.78
Southern Africa	1.58	-1.23

Average annual growth (known_y's,known_x's,new_x's,const)

The growth in Western Africa has been almost double compared to other regions. The best per capita average is in eastern Africa, but the differences are very small.

	Simple average: growth	Simple average: growth p/c
Eastern Africa	1.80	-0.90
Western Africa	2.24	-0.43
Central Africa	1.57	-1.10
Southern Africa	1.36	-1.20

2.2 Average annual growth of total production & total production per capita

Regions		Average annual growth	Average annual growth p/c
central	Central African Republic	2.54	0.24
	Congo, Dem Republic of	1.46	-1.40
	Congo, Republic of	1.61	-1.54
	Gabon	2.41	-0.26
	Sao Tome and Principe	-0.19	-2.53
central simple average		**1.57**	**-1.10**
eastern	Burundi	1.17	-0.87
	Comoros	1.92	-1.20
	Eritrea	0.18	-2.23
	Ethiopia	1.30	
	Kenya	3.29	-0.09
	Rwanda	2.21	-0.04
	Tanzania, United Rep of	2.40	-0.71
	Uganda	1.93	-1.18

eastern simple average		**1.80**	**-0.90**
southern	Angola	0.64	-1.97
	Botswana	0.82	-2.16
	Lesotho	0.70	-1.18
	Madagascar	1.48	-1.24
	Malawi	2.98	-0.16
	Mauritius	0.71	-0.58
	Mozambique	0.66	-1.47
	Namibia	0.32	-2.43
	South Africa	1.65	-0.64
	Swaziland	2.15	-0.65
	Zambia	2.25	-0.81
	Zimbabwe	2.03	-1.06
southern simple average		**1.36**	**-1.20**
western	Benin	4.29	1.45
	Burkina Faso	3.78	1.14
	Cape Verde	2.74	0.93
	Chad	1.92	-0.54
	Côte d'Ivoire	3.67	0.01
	Gambia	-0.09	-3.39
	Ghana	2.73	-0.09
	Guinea	1.95	-0.54
	Guinea-Bissau	2.38	-0.25
	Liberia	1.05	-1.28
	Mali	2.90	0.38
	Mauritania	1.28	-1.17
	Niger	1.90	-1.27
	Nigeria	3.23	0.30
	Senegal	0.93	-1.80
	Sierra Leone	0.90	-0.85
	Togo	2.56	-0.29
western simple average		**2.24**	**-0.43**

2.2.1 T-test for average annual growth for Eastern and Western Africa

t-Test: Two-Sample Assuming Equal Variances

	Eastern 1	*Western 2*
Mean	1.80	2.24
Variance	0.86	1.39
Observations	8.00	17.00
Pooled Variance	1.23	
Hypothesized Mean Difference	0.00	
df	23.00	
t Stat	**-0.93**	
P(T<=t) one-tail	0.18	
t Critical one-tail	1.71	
P(T<=t) two-tail	0.36	

	Eastern 1	Western 2
t Critical two-tail	2.07	

t-Test: Two-Sample Assuming Unequal Variances

	Eastern 1	Western 2
Mean	1.80	2.24
Variance	0.86	1.39
Observations	8.00	17.00
Hypothesized Mean Difference	0.00	
df	17.00	
t Stat	**-1.01**	
P(T<=t) one-tail	0.16	
t Critical one-tail	1.74	
P(T<=t) two-tail	0.32	
t Critical two-tail	2.11	

There is no difference in means.

2.2.2 T-test for average annual growth per capita for Eastern and Western Africa

t-Test: Two-Sample Assuming Equal Variances

	Eastern 1	Western 2
Mean	-0.90	-0.43
Variance	0.56	1.39
Observations	7.00	17.00
Pooled Variance	1.16	
Hypothesized Mean Difference	0.00	
df	22.00	
t Stat	**-0.98**	
P(T<=t) one-tail	0.17	
t Critical one-tail	1.72	
P(T<=t) two-tail	0.34	
t Critical two-tail	2.07	

t-Test: Two-Sample Assuming Unequal Variances

	Eastern 1	Western 2
Mean	-0.90	-0.43
Variance	0.56	1.39
Observations	7.00	17.00
Hypothesized Mean Difference	0.00	
df	18.00	
t Stat	**-1.18**	
P(T<=t) one-tail	0.13	
t Critical one-tail	1.73	
P(T<=t) two-tail	0.25	
t Critical two-tail	2.10	

There is no difference in means.

There also is not any difference in means when excluding outliers Eritrea and Gambia.

3. Population growth

3.1 The average annual population growth in different regions 1961-2003

central	Central African Republic	2.30
	Congo, Dem Republic of	2.98
	Congo, Republic of	3.19
	Gabon	2.71
	Sao Tome and Principe	2.31
Central simple average		**2.70**
eastern	Burundi	2.09
	Comoros	3.16
	Eritrea	2.90
	Ethiopia	2.55
	Kenya	3.42
	Rwanda	2.27
	Tanzania, United Rep of	3.17
	Uganda	3.14
Eastern simple average		**2.84**
southern	Angola	2.57
	Botswana	3.09
	Lesotho	1.91
	Madagascar	2.78
	Malawi	3.15
	Mauritius	1.31
	Mozambique	2.11
	Namibia	2.84
	South Africa	2.33
	Swaziland	2.90
	Zambia	3.11
	Zimbabwe	3.18
Southern simple average		**2.61**
western	Benin	2.74
	Burkina Faso	2.56
	Cape Verde	1.79
	Chad	2.43
	Co´te d'Ivoire	3.75
	Gambia	3.41
	Ghana	2.74
	Guinea	2.47
	Guinea-Bissau	2.63
	Liberia	2.36
	Mali	2.51
	Mauritania	2.46
	Niger	3.15

Nigeria	2.91		
Senegal	2.78		
Sierra Leone	1.80		
Togo	2.85		
Western simple average	**2.67**		

Regional classification of countries is based on the classification FAO Global Information and Early Warning System on food and agriculture (GIEWS) is using in its reports. For example in yearly Africa Reports.

3.2 Average annual population growth in non-conflict and conflict countries 1961-2003

Non-conflict		Conflict	
Benin	2.74	Angola	2.57
Botswana	3.09	Burundi	2.09
Burkina Faso	2.56	Central African Republic	2.30
Cameroon	2.75	Chad	2.43
Cape Verde	1.79	Co´te d'Ivoire	3.75
Comoros	3.16	Congo, Dem Republic of	2.98
Gabon	2.71	Congo, Republic of	3.19
Gambia	3.41	Eritrea	2.90
Ghana	2.74	Ethiopia	2.55
Kenya	3.42	Guinea	2.47
Lesotho	1.91	Guinea-Bissau	2.63
Madagascar	2.78	Liberia	2.36
Malawi	3.15	Mozambique	2.11
Mali	2.51	Namibia	2.84
Mauritania	2.46	Rwanda	2.27
Mauritius	1.31	Sierra Leone	1.80
Niger	3.15	Uganda	3.14
Nigeria	2.91	Zimbabwe	3.18
Sao Tome and Principe	2.31		
Senegal	2.78		
South Africa	2.33		
Swaziland	2.90		
Tanzania, United Rep of	3.17		
Togo	2.85		
Zambia	3.11		
NC simple average	**2.72**	C simple average	**2.64**

3.2.1 T-test for average annual population growth 1961-2003

t-Test: Two-Sample Assuming Equal Variances

	Non-conflict 1	Conflict 2
Mean	2.72	2.64
Variance	0.25	0.24

72

Observations	25.00	18.00
Pooled Variance	0.25	
Hypothesized Mean Difference	0.00	
df	41.00	
t Stat	**0.51**	
P(T<=t) one-tail	0.31	
t Critical one-tail	1.68	
P(T<=t) two-tail	0.61	
t Critical two-tail	2.02	

t-Test: Two-Sample Assuming Unequal Variances

	Non-conflict 1	Conflict 2
Mean	2.72	2.64
Variance	0.25	0.24
Observations	25.00	18.00
Hypothesized Mean Difference	0.00	
df	38.00	
t Stat	**0.51**	
P(T<=t) one-tail	0.31	
t Critical one-tail	1.69	
P(T<=t) two-tail	0.61	
t Critical two-tail	2.02	

The probability of having a difference in means is 0.31 (one-tailed) and 0.61 (two-tailed).

Null hypothesis: no mean difference

t-value: 0.51

Critical t-value: 1.69 one tail
2.02 two tails

Our t-value does fall within the -1.69 to 1.69 interval. Therefore, we do not reject the null hypothesis, so **the means are not different**.

Average annual population growth 1961-2003

Non-conflict countries

Average annual population growth 1961-2003

Conflict countries
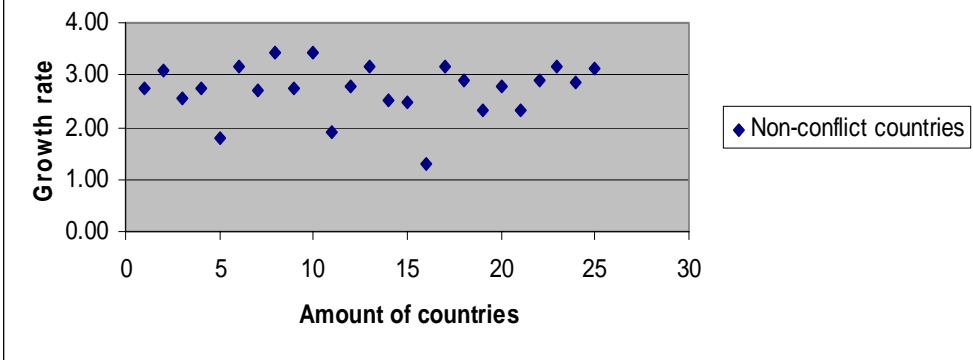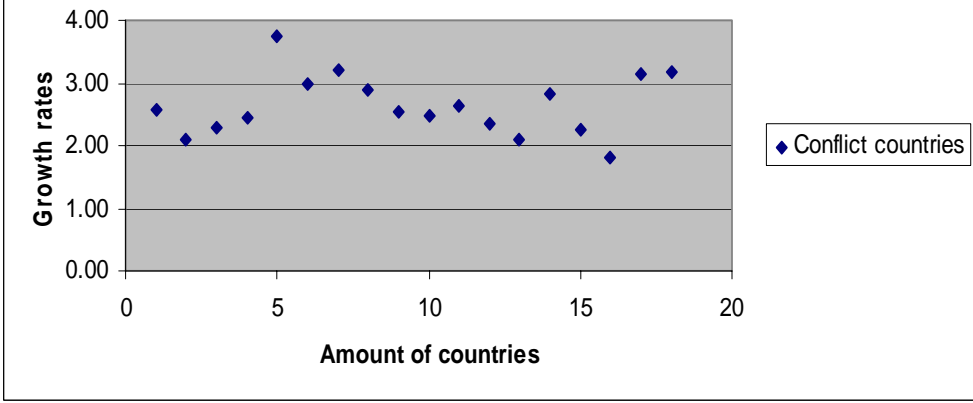
3.2.2 T-test test for average annual population growth 1961-2003 w/o outliers

Outliers:
non-conflict:Mauritius
conflict: Cote d'Ivoire, Sierra Leone

Non-conflict		Conflict	
Benin	2.74	Angola	2.57
Botswana	3.09	Burundi	2.09
Burkina Faso	2.56	Central African Republic	2.30
Cameroon	2.75	Chad	2.43
Cape Verde	1.79	Co´te d'Ivoire	
Comoros	3.16	Congo, Dem Republic of	2.98
Gabon	2.71	Congo, Republic of	3.19
Gambia	3.41	Eritrea	2.90
Ghana	2.74	Ethiopia	2.55
Kenya	3.42	Guinea	2.47
Lesotho	1.91	Guinea-Bissau	2.63
Madagascar	2.78	Liberia	2.36
Malawi	3.15	Mozambique	2.11
Mali	2.51	Namibia	2.84
Mauritania	2.46	Rwanda	2.27
Mauritius		Sierra Leone	
Niger	3.15	Uganda	3.14
Nigeria	2.91	Zimbabwe	3.18
Sao Tome and Principe	2.31		
Senegal	2.78		
South Africa	2.33		
Swaziland	2.90		
Tanzania, United Rep of	3.17		
Togo	2.85		
Zambia	3.11		
NC simple average	**2.78**	C simple average	**2.62**

t-Test: Two-Sample Assuming Equal Variances

	Non-conflict 1	Conflict 2
Mean	2.78	2.62
Variance	0.17	0.14
Observations	24.00	16.00
Pooled Variance	0.16	
Hypothesized Mean Difference	0.00	
df	38.00	
t Stat	**1.19**	
P(T<=t) one-tail	0.12	
t Critical one-tail	1.69	
P(T<=t) two-tail	0.24	
t Critical two-tail	2.02	

t-Test: Two-Sample Assuming Unequal Variances

	Non-conflict 1	Conflict 2
Mean	2.78	2.62
Variance	0.17	0.14
Observations	24.00	16.00
Hypothesized Mean Difference	0.00	
df	35.00	
t Stat	**1.22**	
P(T<=t) one-tail	0.12	
t Critical one-tail	1.69	
P(T<=t) two-tail	0.23	
t Critical two-tail	2.03	

The probability of having a difference in means is 0.12 (one-tailed) and 0.23 (two-tailed).

Null hypothesis: no mean difference

t-value: 1.22

Critical t-value: 1.69 one tail
                         2.03 two tails

Our t-value does fall within the -1.69 to 1.69 interval. Therefore, we do not reject the null hypothesis, so **the means are not different**

4. Differences in periods

Average growth rate before and after 1980

Value of total agricultural production

Average annual growth rate
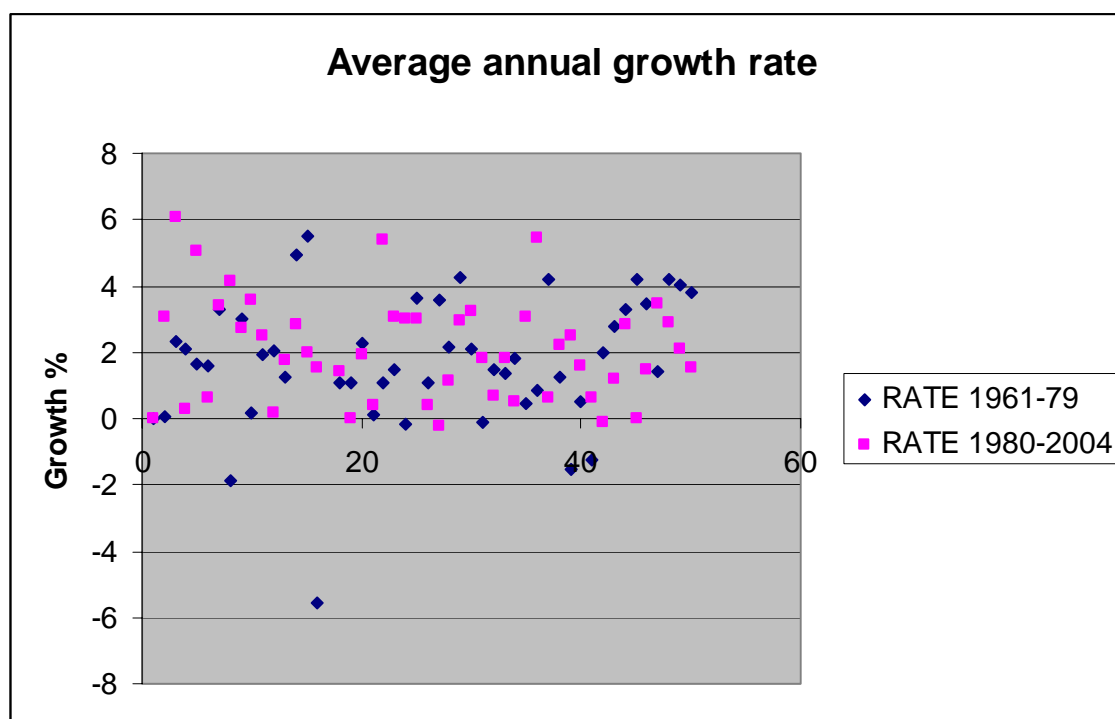
There are no significant differences in the averages.

Country	Situation	Location	RATE 61-79	RATE 80-04
Angola	conflict	southern	0.08	3.06
Benin	non-conflict	western	2.33	6.07
Botswana	non-conflict	southern	2.07	0.26
Burkina Faso	non-conflict	western	1.64	5.03
Burundi	conflict	eastern	1.58	0.63
Cameroon	non-conflict	central	3.26	3.42
Cape Verde	non-conflict	western	-1.88	4.13
Central African Republic	conflict	central	3.02	2.71
Chad	conflict	western	0.15	3.59
Comoros	non-conflict	eastern	1.92	2.47
Congo, Dem Republic of	conflict	central	2.03	0.15
Congo, Republic of	conflict	central	1.26	1.79
Côte d'Ivoire	conflict	western	4.91	2.86

Country	Conflict status	Region	Value 1	Value 2
Djibouti	non-conflict	eastern	5.48	2.00
Equatorial Guinea		central	-5.56	1.52
Eritrea	conflict	eastern	1.06	-17.62
Ethiopia	conflict	eastern	1.06	1.42
Ethiopia PDR		eastern	1.06	
Gabon	non-conflict	central	2.25	1.95
Gambia	non-conflict	western	0.10	0.38
Ghana	non-conflict	western	1.07	5.37
Guinea	conflict	western	1.48	3.08
Guinea-Bissau	conflict	western	-0.16	2.99
Kenya	non-conflict	eastern	3.63	3.02
Lesotho	non-conflict	southern	1.05	0.40
Liberia	conflict	western	3.59	-0.20
Madagascar	non-conflict	southern	2.16	1.12
Malawi	non-conflict	southern	4.23	2.93
Mali	non-conflict	western	2.11	3.22
Mauritania	non-conflict	western	-0.11	1.80
Mauritius	non-conflict	southern	1.46	0.70
Mozambique	conflict	southern	1.39	1.84
Namibia	conflict	southern	1.84	0.49
Niger	non-conflict	western	0.47	3.08
Nigeria	non-conflict	western	0.85	5.46
Rwanda	conflict	eastern	4.21	0.60
Réunion	non-conflict		1.22	2.21
Sao Tome and Principe	non-conflict	central	-1.51	2.52
Senegal	non-conflict	western	0.50	1.58
Seychelles	non-conflict	eastern	-1.24	0.60
Sierra Leone	conflict	western	2.01	-0.13
South Africa	non-conflict	southern	2.80	1.19
Sudan	conflict	eastern	3.30	2.86
Swaziland	non-conflict	southern	4.18	-0.01
Tanzania, United Rep of		eastern	3.49	1.50
Togo	non-conflict	western	1.42	3.48
Uganda	conflict	eastern	4.19	2.88
Zambia	non-conflict	southern	4.02	2.09
Zimbabwe	conflict	southern	3.79	1.52

4. Incidence of drought

D= significant shortage of rain

Country	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Angola											
Benin								D			
Botswana				D							
Burkina Faso			D	D				D			
Burundi											
Cameroon											
Cape Verde			D	D				D			
Central African Rep			D	D				D			
Chad			D	D				D			
Comoros											
Congo, Dem Rep of											
Congo, Republic of											
Côte d'Ivoire								D			
Djibouti											
Equatorial Guinea											
Eritrea											
Ethiopia											
Ethiopia PDR				D							
Gabon											
Gambia			D	D				D			
Ghana								D			
Guinea											
Guinea-Bissau			D	D				D			
Kenya											
Lesotho				D							
Liberia											
Madagascar											
Malawi											
Mali			D	D				D			
Mauritania			D	D				D			
Mauritius											
Mozambique											
Namibia											
Niger			D	D				D			
Nigeria											
Rwanda											
Réunion											
Sao Tome&Principe											
Senegal			D	D				D			
Seychelles											
Sierra Leone											
South Africa				D							
Sudan			D	D				D			
Swaziland				D							
Tanzania, UnitRep of					south D	south D	south D	D			
Togo								D			
Uganda											
Zambia											
Zimbabwe											

Source: FAO Agrometeorology series. Number 9. Gommes, R & Petrassi, F, 1994.

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
SUB-SAHARAN AFRICA	..	..	..	..	..	..	..	..	..	..
excluding South Africa	..	..	..	..	..	..	..	..	..	..
excluding South Africa & Nigeria	..	..	..	..	..	..	..	..	..	..
Angola	..	..	..	..	..	..	..	..	..	..
Benin	..	..	..	..	..	..	..	..	..	..
Botswana	..	..	D	D	D	D	D	D	..	..
Burkina Faso	..	..	..	D	D	..	..	..	..	..
Burundi	..	..	D	D	D	..	..	..	..	..
Cameroon	..	..	..	D	..	..	..	..	..	..
Cape Verde	..	*D*	D	D	D	D	..	..	..	..
Central African Republic	..	..	..	D	D	..	..	..	..	..
Chad	..	..	..	D	D	..	..	..	..	..
Comoros	..	..	..	..	..	..	..	..	..	..
Congo, Democratic Rep. of	..	..	..	..	..	..	..	..	..	..
Congo, Republic of	..	..	..	..	..	..	..	..	..	..
Côte d'Ivoire	..	..	..	D	..	..	..	..	..	..
Djibouti	..	..	..	..	..	..	..	..	..	..
Equatorial Guinea	..	..	..	..	..	..	..	..	..	..
Eritrea				..	..	..	..	..	..	..
Ethiopia	*D*	*D*	..	..	D	D	..	D	D	..
Gabon	..	..	..	..	..	..	..	..	..	..
Gambia, The	..	..	..	..	..	..	..	..	..	..
Ghana	..	..	D	D	D	..	..	..	..	..
Guinea	..	..	..	..	..	..	..	..	..	..
Guinea-Bissau	..	..	..	..	..	..	..	..	..	..
Kenya	..	..	..	..	D	..	..	..	..	..
Lesotho	..	..	D	D	..	..	..	..	..	..
Liberia	..	..	..	..	..	..	..	..	..	..
Madagascar	..	..	..	..	..	..	..	..	..	..
Malawi	*D*	*D*	..	..	..	..	..	..	..	..
Mali	..	..	D	D	D	..	..	..	..	..
Mauritania	..	..	..	D	D	..	..	..	..	..
Mauritius	..	..	..	D	..	..	..	..	..	..
Mozambique	..	*D*	D	..	..	..	..	..	..	..
Namibia	..	..	..	..	..	..	..	..	..	..
Niger	..	..	..	D	D	..	..	D	..	..
Nigeria	..	..	..	..	..	..	..	..	..	..
Rwanda	..	..	..	..	D	..	..	..	..	..
São Tomé and Principe	..	..	D	D	..	..	..	..	..	..
Senegal	*D*	..	..	D	D	..	..	..	..	..
Seychelles	..	..	..	..	..	..	..	..	..	..
Sierra Leone	..	..	..	..	..	..	..	..	..	..
Somalia	..	..	..	D	..	..	..	..	..	..
South Africa	..	..	..	..	..	..	..	..	..	..
Sudan	..	..	..	..	D	..	..	D	..	D
Swaziland	..	..	D	..	..	..	..	D	..	..
Tanzania	..	..	..	..	D	D	..	..	..	..
Togo	..	..	..	D	..	..	..	..	..	..
Uganda	..	..	..	..	..	..	..	..	..	..
Zambia	..	..	D	D	D	..	..	..	..	..
Zimbabwe	..	..	D	D	D	..	..	..	..	..

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
SUB-SAHARAN AFRICA	..	..	..	..	..	..	..	..	..	..	..	..	..	..
excluding South Africa	..	..	..	..	..	..	..	..	..	..	..	..	..	..
excluding South Africa & Nigeria	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Angola	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Benin	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Botswana	..	..	D	..	..	D	..	..	..	..	..	..	..	..
Burkina Faso	..	..	..	..	..	..	..	..	D	..	..	D	..	..
Burundi	..	..	..	..	..	..	..	..	..	D	D	D	..	..
Cameroon	..	..	..	..	..	..	D	D	..	..	..	..	..	..
Cape Verde	..	..	..	D	D	..	..	D	D	D	D	D	D	D
Central African Republic	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Chad	..	..	..	D	..	D	D	D	..	D	D	..	..	..
Comoros	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Congo, Democratic Rep. of	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Congo, Republic of	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Côte d'Ivoire	..	..	..	..	..	..	..	D	..	..	..	..	..	..
Djibouti	..	..	..	..	..	..	..	..	..	D	D	..	..	..
Equatorial Guinea	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Eritrea	..	..	..	..	..	..	D	D	..	D	D	D	D	D
Ethiopia	..	D	D	..	D	..	..	D	..	D	D	D	D	D
Gabon	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gambia, The	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ghana	..	..	..	..	..	..	..	..	D	..	D	..	..	..
Guinea	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Guinea-Bissau	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kenya	..	..	D	D	..	..	..	D	D	D	D	D	D	D
Lesotho	..	..	D	..	..	D	..	..	..	..	..	..	..	..
Liberia	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Madagascar	..	..	..	..	..	..	..	..	..	D	D	D	D	D
Malawi	..	..	D	..	D	D	..	D	D	..	..	..	D	..
Mali	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mauritania	..	..	..	..	..	..	..	..	..	..	..	D	D	D
Mauritius	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mozambique	..	..	D	..	..	D	..	..	D	..	..	D	D	D
Namibia	..	..	D	..	..	D	..	..	..	..	..	..	..	..
Niger	D	..	..	..	..	D	D	D	..	..	D	..	..	..
Nigeria	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Rwanda	..	..	..	..	..	D	D	..	D	D	D	..	..	..
São Tomé and Principe	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Senegal	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Seychelles	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Sierra Leone	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Somalia	..	..	..	..	..	..	..	..	..	D	..	D	D	D
South Africa	..	..	D	..	..	D	..	D	..	..	..	..	..	..
Sudan	D	..	..	..	..	D	..	D	..	..	D	D	D	D
Swaziland	..	..	D	..	..	D	..	..	..	..	..	D	D	D
Tanzania	..	..	D	..	..	..	..	D	D	D	D	..	D	D
Togo	..	..	..	..	..	..	..	..	..	..	D	..	..	..
Uganda	..	..	..	..	..	..	..	..	D	..	D	D	D	D
Zambia	..	..	D	..	D	D	..	D	D	..	..	D	D	D
Zimbabwe	..	..	D	..	D	D	..	..	..	..	..	D	D	D

Source: African Development Indicators, WB (2004)

5. FAO indices of agricultural production

PIN's are calculated at constant prices using the same set of weights for all countries and regions in the world. These weights are the international prices calculated at international dollars

The FAO indices of agricultural production show the relative level of the aggregate volume of agricultural production for each year in comparison with the base period 1999-2001. They are based on the sum of price-weighted quantities of different agricultural commodities produced after deductions of quantities used as seed and feed weighted in a similar manner. The resulting aggregate represents, therefore, disposable production for any use except as seed and feed.

All the indices at the country, regional and world levels are calculated by the Laspeyres formula. Production quantities of each commodity are weighted by 1999-2001 average international commodity prices and summed for each year. To obtain the index, the aggregate for a given year is divided by the average aggregate for the base period 1999-2001.

Since the FAO indices are based on the concept of agriculture as a single enterprise, amounts of seed and feed are subtracted from the production data to avoid double counting them, once in the production data and once with the crops or livestock produced from them. Deductions for seed (in the case of eggs, for hatching) and for livestock and poultry feed apply to both domestically produced and imported commodities. They cover only primary agricultural products destined to animal feed (e.g. maize, potatoes, milk, etc.). Processed and semi-processed feed items such as bran, oilcakes, meals and molasses have been completely excluded from the calculations at all stages.

It should be noted that when calculating indices of agricultural, food and nonfood production, all intermediate primary inputs of agricultural origin are deducted. However, for indices of any other commodity group, only inputs originating from within the same group are deducted; thus, only seed is removed from the group "crops" and from all crop subgroups, such as cereals, oil crops, etc.; and both feed and seed originating from within the livestock sector (e.g. milk feed, hatching eggs) are removed from the group "livestock products". For the main two livestock subgroups, namely, meat and milk, only feed originating from the respective subgroup is removed.

The"international commodity prices" are used in order to avoid the use of exchange rates for obtaining continental and world aggregates, and also to improve and facilitate international comparative analysis of productivity at the national level. These" international prices", expressed in so-called"international dollars", are derived using a Geary-Khamis formula for the agricultural sector. This method assigns a single "price" to each commodity. For example, one metric ton of wheat has the same price regardless of the country where it was produced. The currency unit in which the prices are expressed has no influence on the indices published.

The commodities covered in the computation of indices of agricultural production are all crops and livestock products originating in each country. Practically all products are covered, with the main exception of fodder crops. The category of food production includes

commodities that are considered edible and that contain nutrients. Accordingly, coffee and tea are excluded along with inedible commodities because, although edible, they have practically no nutritive value.

Indices for meat production are computed based on data for production from indigenous animals, which takes account of the meat equivalent of exported live animals but excludes the meat equivalent of imported live animals. For index purposes, annual changes in livestock and poultry numbers or in their average live weight are not taken into account.

The indices are calculated from production data presented on a calendar year basis.

The only difference with previous issues of the yearbook is that the base period has been shifted from 1989-1991 to 1999-2001; the producer prices consequently also now refer to 1999-2001.

 The FAO indices may differ from those produced by the countries themselves because of differences in concepts of production, coverage, weights, time reference of data and methods of calculation.

Conclusions

Means of non-conflict and conflict are different in
      -average grs production per capita w/o outliers
      -average annual growth rate w/o outliers

but there is not difference in means in
      average annual growth rate per capita