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Tobacco production and the use of fertilizers

**Assessment of the situation based on
independent publicly available information**

January 2012

Document prepared for UNITAB and FETRATAB

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Abstract

Tobacco is often associated with soil degradation. Even if there is very little information available in terms of comparison between crops and their requirements of fertilizers, some information is available in the FAO database which shows that the amount of fertilizers used on tobacco is in line with the amount of fertilizers used on other crops.

Background

The Conference of the Parties of the FCTC mandated the creation of a Working Group on articles 17 and 18 (economically sustainable livelihood alternatives to tobacco production). The technical report that the team of experts presented at the third Conference of the Parties makes two statements concerning the impact of tobacco production on soil: “The study group addressed the environmental impact of tobacco growing, paying special attention to soil degradation and loss of vegetation. It noted that 90% of tobacco is grown in tropical dry forest and woodland areas – areas in developing countries with high population densities and high biodiversity losses. **Tobacco depletes soil nutrients at a much faster rate than most crops. The tobacco seed contains no nicotine, and it is only through human intervention during the growing that nicotine is generated, resulting in a massive outflow of nutrients.**”¹

Tobacco and the depletion of soil nutrients

The first statement “tobacco depletes soil nutrients at a much faster rate than most crops” requires a detailed approach, since there are few comparative studies on nutrient needs of different crops. It is also difficult to say whether a high consumption of N is better or worse than a high consumption of P, or of K.

The FAO database on fertilizer use contains only 40 countries, which specifically mention tobacco in their fertilizer statistics. As tobacco is a minor crop compared to other crops even in most major tobacco producers, the use of fertilizers on tobacco may fall under the generic class “Other crops”, and therefore be impossible to compare. These 40 countries include many of the most important tobacco-growing nations. Data are presented in attachment 1. They demonstrate that tobacco does not need higher inputs of fertilizers than other crops to replace depletion of nutrients.²

The tobacco seed contains no nicotine, and it is only through human intervention during the growing that nicotine is generated, resulting in a massive outflow of nutrients

To address the second point, it is not true that the tobacco seed contains no nicotine and that it is only through human intervention that the growing of nicotine is generated. The subject has been studied and well-known for a very long time, as a study published in an international journal on plant physiology demonstrates: the study tested three varieties of *Nicotiana tabacum* (Ky 16, Burley 21 and Robinson) and in *Nicotiana rustica*: nicotine was detected in the seeds of all varieties of *N. tabacum* tested. Nicotine was the predominant alkaloid in the seeds of cultivars Ky 16 and Burley 21, and the same pattern is found in the leaf of these tobaccos. Seeds of cultivars Robinson contained primarily nornicotine (99%) and nornicotine is the principal alkaloid in air-dried leaves of cv. Robinson. To ensure that

¹ FCTC “Study group on economically sustainable alternatives to tobacco growing (in relation to Articles 17 and 18 of the Convention)”, FCTC/COP/3/11, 4 September 2008, http://apps.who.int/gb/fctc/PDF/cop3/FCTC_COP3_11-en.pdf

² FAO : Fertilizer statistics, <http://www.fao.org/ag/agl/fertistat/>

the alkaloids detected were present in the seeds and not on the surface of the seed or in trash associated with the seeds, the seeds were extracted without grinding. In these extracts, less than 3% of alkaloids found with the grinding process were detected.³

In addition, the claim of the FCTC experts that “human intervention” creates an outflow of nutrients is unacceptable from an agronomy point of view. Apart from cereals and some leguminous plants which are grown for the consumption of their seed, most crops are grown for the consumption of other parts of the plant than the seed. It is very common that the consumable parts of the plant contain substances which are present in completely different proportions in the seed, as part of the normal biological processes which take place during growth. For instance, apple seeds are rich in oil content and protein ranging from 27.5 to 28% and 33.8 to 34.5% respectively⁴, while the composition of an apple is: water 85.3%, proteins 0.3%, oils 0.4%, carbohydrates 11.8%.⁵

If the argument of the Study Group experts was valid, it should then be dangerous to grow a crop like apples. The growing process from seed to fruit destroys a precious source of proteins to transform them in sugars (potential cause of obesity) and water. In many common slimming regimes the consumption of fruit is decreased to very low levels to minimize the consumption of sugars.

³W.W. Weeks, L.P. Bush : « Alkaloid changes in tobacco seed during germination”, published in Plant Physiology in 1974, <http://www.plantphysiol.org/content/53/1/73.full.pdf+html>

⁴ X. Yu, F. van de Voort , Z. Li, T. Yue: “Proximate Composition of the Apple Seed and Characterization of Its Oil”, International Journal of Food Engineering, 2007

⁵ [http://www.food-allergens.de/symposium-vol1\(3\)/data/apple/apple-composition.htm](http://www.food-allergens.de/symposium-vol1(3)/data/apple/apple-composition.htm)

Appendix 1

Extract from the FAO Database on fertilizer statistics

Comparative use of fertilizers, Albania, 1999

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Wheat	109.0	No data	50.00	22.00	0.00
Fodder	10.5	No data	20.00	10.00	0.00
Potatoes	11.4	No data	30.00	30.00	10.00
Sunflower	1.6	No data	40.00	30.00	0.00
Tobacco	6.7	No data	15.00	10.00	0.00
Vegetables	39.6	No data	22.70	48.70	0.00

Comparative use of fertilizers, Argentina, 2002/03

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Citrus	148	70	116.00	36.00	55.00
Fruits	603	90	90.60	129.40	0
Tobacco	65	95	93.00	74.00	117.00
Wheat	6,175	88	40.00	26.00	0.00

Comparative use of fertilizers, Azerbaijan, 1998

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Cotton	136.4	No data	21.00	10.50	5.00
Wheat	319.1	No data	10.50	10.50	5.00
Fruits	105.2	No data	9.50	11.00	6.00
Tea	6.6	No data	13.00	9.50	7.50
Tobacco	6.4	No data	9.00	10.50	5.00
Beet	1.5	No data	9.00	10.00	7.50
Fodder	53.8	No data	6.00	9.00	6.00

Comparative use of fertilizers, Bolivia, 1999

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Barley	86	10%	30.00	30.00	0.00
Potato	130	50%	60.00	60.00	0.00
Rice	194	10%	40.00	20.00	40.00
Wheat	124	10%	30.00	40.00	60.00
Tobacco	21	20%	20.00	30.00	0.00
Vegetables	5	40%	40.00	30.00	10.00

Comparative use of fertilizers, Cambodia, 2001

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Fruits	57	10%	55.00	35.00	20.00
Tobacco	15	10%	50.00	20.00	45.00
Vegetables	75	20%	45.00	30.00	20.00

Comparative use of fertilizers, Chile, 1997

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Barley	35	90%	100.00	80.00	30.00
Maize	120	No data	200.00	100.00	30.00
Wheat	420	No data	100.00	80.00	20.00
Rice	29	80%	120.00	80.00	40.00
Potato	70	95%	100.00	110.00	60.00
Tobacco	10	90%	100.00	40.00	30.00

Comparative use of fertilizers, China, 1997

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Potato	3,207.6	No data	125.00	55.00	75.00
Sweet potato	6,511	No data	125.00	50.00	75.00
Sugar cane	1,056	No data	150.00	75.00	65.00
Tobacco	1,489.8	No data	100.00	75.00	70.00
Vegetables	8,920.7	No data	150.00	75.00	40.00

Comparative use of fertilizers, Colombia, 1997

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Banana	52	No data	200.00	50.00	400.00
Cane	50	70%	100.00	150.00	100.00
Coffee	1,006	75%	150.00	40.00	120.00
Cotton	61.3	65%	80.00	30.00	40.00
Fruits	22.5	60%	80.00	20.00	60.00
Palm oil	120	No data	100.00	30.00	150.00
Potato	167	No data	100.00	100.00	80.00
Rice	394	90%	120.00	80.00	70.00
Tobacco	10	70%	80.00	10.00	30.00
Vegetables	94	No data	100.00	80.00	40.00

Comparative use of fertilizers, Costa Rica, 1997

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Banana	66.2	No data	450.00	100.00	450.00
Coffee	180	No data	200.00	50.00	100.00
Potato	3.7	No data	150.00	400.00	150.00
Tobacco	0.3	No data	200.00	300.00	200.00

Comparative use of fertilizers, Croatia, 1999

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Beet	28	No data	100.00	60.70	78.60
Maize	385.7	No data	100.10	35.00	35.00
Pulses	10.5	No data	76.20	57.10	47.60
Rape	16.4	No data	79.30	54.90	67.10
Sunflower	42.3	No data	80.40	40.20	49.60
Vegetables	34.2	No data	117.00	35.10	791.8 (sic)
Tobacco	6.5	No data	15.40	61.50	76.9
Wheat	169.8	No data	104.80	34.70	34.70

Comparative use of fertilizers, Cuba, different years

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Rice	97.5	No data	151.00	53.00	37.00
Vegetables	3,235	No data	122.60	49.50	72.20
Tobacco	48	No data	116.00	63.00	154.00

Comparative use of fertilizers, Dominican Republic, 1998

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Citrus	11.8	90%	100.00	60.00	80.00
Sugarcane	265.5	60%	80.00	60.00	60.00
Rice	121.2	90%	120.00	60.00	60.00
Sorghum	8.5	50%	80.00	60.00	60.00
Tobacco	30.6	90%	80.00	60.00	60.00

Comparative use of fertilizers, Ghana, 1998-2002

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Cotton	19	No data	252.6	0.00	00.00
Fruits	582	No data	0.00	0.00	5.60
Palm oil	304	No data	0.00	0.00	10.70
Tobacco	1	No data	0.00	0.00	5.50

Comparative use of fertilizers, Guatemala, 1997

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Coffee	263.5	80%	120.00	40.00	60.00
Sugarcane	132.3	70%	100.00	80.00	50.00
Maize	620.0	No data	100.00	60.00	60.00
Sesame	36.9	No data	90.00	60.00	120.00
Wheat	12.3	80%	120.00	80.00	80.00
Tobacco	8.1	60%	80.00	40.00	40.00

Comparative use of fertilizers, Honduras, 1997

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Banana	22.7	No data	200.00	100.00	150.00
Sugar cane	41.9	No data	150.00	40.00	100.00
Citrus	5.1	No data	80.00	30.00	40.00
Coffee	191	80%	150.00	40.00	100.00
Fruits	6.1%	No data	200.00	120.00	120.00
Maize	453.2	60%	100.00	50.00	80.00
Palm oil	24	No data	120.00	40.00	70.00
Plantains	17.5	50%	120.00	20.00	60.00
Potato	1.6	No data	180.00	100.00	120.00
Rice	22.9	No data	120.00	40.00	80.00
Tobacco	6.7	No data	80.00	30.00	40.00

Comparative use of fertilizers, Indonesia, 2001

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Fruits	868.0	60%	135.00	40.00	75.00
Palm oil	2,500.0	80%	95.00	30.00	75.00
Tobacco	223.0	80%	75.00	25.00	85.00
Vegetables	773.0	80%	145.00	40.00	75.00

Comparative use of fertilizers, Japan, 1998

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Tea	51.2	No data	661.00	360.00	277.00
Tobacco	25.3	No data	280.00	531.00	407.00
Vegetables	422.8	No data	220.80	208.40	268.70
Roots	29.7	No data	205.60	237.80	211.50
Maize	0.1	No data	200.00	200.00	150.00

Comparative use of fertilizers, Kenya, 1997

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Barley	23	80%	25.00	80.00	40.00
Cane	58	50%	60.00	40.00	40.00
Fibres	21	30%	10.00	150.00	30.00
Potato	95	60%	100.00	60.00	0.00
Tobacco	8.8	80%	30.00	80.00	30.00
Vegetables	81.9	No data	60.00	80.00	20.00

Comparative use of fertilizers, Laos, 2001

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Sugar cane	5	10%	60.00	20.00	0.00
Coffee	42	50%	45.00	35.00	45.00
Tobacco	8	55%	65.00	25.00	15.00
Vegetables	42	20%	65.00	40.00	25.00

Comparative use of fertilizers, Lebanon, 1995

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Banana	36.6	95%	150.00	75.00	200.00
Beet	4	98%	25.00	100.00	450.00
Citrus	7.5	90%	120.00	75.00	150.00
Groundnut	2.5	50%	80.00	40.00	100.00
Oil crops	42.7	50%	75.00	50.00	100.00
Potato	13.7	98%	150.00	150.00	226.00
Tobacco	3.1	80%	75.00	50.00	100.00
Wheat	23.6	80%	90.00	60.00	40.00

Comparative use of fertilizers, Madagascar, 1998

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Wheat	0.1	No data	80.00	40.00	40.00
Sugar cane	17.0	No data	37.00	38.00	28.00
Tobacco	3.3	30.3%	32.00	32.00	23.00
Potato	49	60.2%	23.00	22.00	17.00

Comparative use of fertilizers, Malawi, 1997

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Sugar cane	17.5	50%	60.00	40.00	10.00
Maize	1,233.5	30%	60.00	15.00	2.00
Potato	101.8	60%	100.00	40.00	00.00
Vegetables	29.6	No data	60.00	40.00	10.00
Tobacco	114.8	80%	30.00	10.00	15.00

Comparative use of fertilizers, Malaysia, 2002

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Banana	28.5	No data	269.10	269.10	108.1
Flowers	1.8	No data	68.90	68.90	2.00
Fruits	158.1	No data	42.30	42.20	55.10
Groundnuts	0.1	No data	110.00	220.00	0.20
Maize	7.5	No data	91.60	40.10	7.90
Other crops	1.3	No data	18.50	9.20	0.50
Pulses	3.7	No data	48.90	48.90	2.90
Sweet Potato	1.4	No data	89.30	89.30	2.00
Tobacco	15.6	No data	0.20	0.50	0.10
Vegetables	23.3	No data	88.2	59.50	122.20

Comparative use of fertilizers, Mexico, 1998

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Banana	66.4	90%	100.00	20.00	120.00
Sugar cane	630.6	90%	100.00	45.00	40.00
Potato	62.5	90%	120.00	100.00	80.00
Tobacco	31.9	80%	80.00	50.00	60.00

Comparative use of fertilizers, Moldova, 1999

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Beet	48.1	No data	14.60	0.00	0.00
Wheat	241.2	No data	7.50	0.40	0.00
Soya	13.0	No data	7.70	0.00	0.00
Tobacco	14.6	No data	6.80	0.00	0.00
Vegetables	14.2	No data	7.00	0.00	0.00

Comparative use of fertilizers, Myanmar, 2001

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Sugar cane	158	50%	35.00	15.00	10.00
Coffee	4	10%	45.00	20.00	10.00
Fruits	286	20%	45.00	20.00	10.00
Rice	6,000	60%	35.00	12.00	40.00
Tea	63	20%	45.00	15.00	0.00
Tobacco	30	30%	25.00	15.00	15.00
Vegetables	275	35%	45.00	30.00	25.00

Comparative use of fertilizers, Nicaragua, 1998

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Banana	1.9	70%	150.00	60.00	80.00
Sugar cane	53.3	60%	80.00	40.00	40.00
Citrus	14.9	60%	60.00	30.00	40.00
Cocoa	1.5	50%	30.00	30.00	30.00
Coffee	93.1	80%	80.00	50.00	40.00
Fruits	3.1	60%	80.00	80.00	80.00
Maize	251.6	70%	50.00	20.00	20.00
Palm oil	2	80%	80.00	40.00	60.00
Potato	2	40%	80.00	60.00	0.00
Rice	83.6	50%	50.00	30.00	30.00
Sorghum	41.1	90%	40.00	40.00	20.00
Tobacco	1.5	60%	40.00	30.00	0.00
Vegetables	11.3	No data	60.00	60.00	40.00

Comparative use of fertilizers, Paraguay, 1997

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Sugar cane	57.8	50%	60.00	40.00	40.00
Citrus	19.4	60%	60.00	30.00	40.00
Coffee	6.0	60%	60.00	10.00	40.00
Cotton	110.7	10%	40.00	30.00	30.00
Fruits	18.7	60%	60.00	30.00	80.00
Maize	384.1	30%	30.00	30.00	30.00
Palm oil	11.5	80%	60.00	40.00	60.00
Pulses	81.6	50%	20.00	30.00	30.00
Rice	40.5	50%	50.00	40.00	40.00
Sorghum	41.1	90%	40.00	30.00	30.00
Soya	939.7	30%	10.00	30.00	30.00
Sunflower	47.9	70%	40.00	60.00	80.00
Tobacco	7.8	60%	30.00	30.00	0.00
Vegetables	20.3	No data	80.00	80.00	40.00
Wheat	200.7	40%	40.00	50.00	30.00

Comparative use of fertilizers, Philippines, 2001

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Sugar cane	375	80%	85.00	55.00	30.00
Cocoa	15	50%	85.00	45.00	45.00
Coffee	137	40%	75.00	35.00	40.00
Fruits	943	50%	75.00	35.00	40.00
Palm oil	15	80%	75.00	25.00	70.00
Potato	5	80%	85.00	55.00	45.00
Tobacco	44	80%	75.00	20.00	55.00

Comparative use of fertilizers, Slovakia, 1999/2000

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Maize	105.1	No data	85.80	9.80	8.80
Oil crops	84.8	No data	97.70	16.90	11.50
Potato	11.5	No data	84.90	30.90	45.90
Tobacco	1.1	No data	29.30	33.70	120.10
Vegetables	10.5	No data	75.60	40.20	52.30
Wheat	338.3	No data	76.30	14.60	11.70

Comparative use of fertilizers, South Africa, 2008

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Potato	50	No data	170.00	160.00	120.00
Sugarcane	432	95%	92.00	57.00	133.00
Tobacco	17	No data	38.00	144.00	98.00
Vegetables	95	No data	170.00	159.00	120.00

Comparative use of fertilizers, Sri Lanka, 1988

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Tea	189	No data	210.60	36.50	122.80
Tobacco	6.7	No data	44,80	74.60	74.60
Rice	820.1	No data	103.90	13.90	25.40

Comparative use of fertilizers, Tanzania, 1997

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Maize	1,564.0	10%	80.00	40.00	5.00
Tobacco	64.0	95%	30.00	80.00	80.00

Comparative use of fertilizers, Thailand, 2001

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Sugar cane	923.0	95%	70.00	55.00	65.00
Fruits	662.0	70%	110.00	70.00	100.00
Palm oil	204.0	98%	105.00	35.00	170.00
Vegetables	331.0	80%	125.00	40.00	105.00
Tobacco	52.0	85%	75.00	30.00	40.00

Comparative use of fertilizers, Togo, 1997

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Coffee	15.0	60%	30.00	20.00	10.00
Cotton	181.1	80%	40.00	30.00	20.00
Maize	422.8	20%	35.00	15.00	10.00
Palm oil	1.5	20%	30.00	30.00	0.00
Rice	51.7	20%	50.00	20.00	20.00
Tobacco	4.0	20%	30.00	10.00	15.00
Vegetables	26.2	No data	60.00	40.00	30.00

Comparative use of fertilizers, Turkey, 1999

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Barley	3,306	85.3%	53.70	28.20	0.00
Sugar cane	424	96.1%	109.40	64.20	35.10
Citrus	100	98%	201.00	56.00	34.00
Cotton	718	98.6%	126.90	38.90	3.50
Fodder	526	53.2%	35.30	15.20	0.60
Maize	676	97%	128.70	32.40	5.00
Oil crops	623	53.9%	46.50	15.30	6.20
Other cereals	380	71.2%	65.80	26.30	3.40
Other crops	1,277	75.3%	49.80	19.00	5.40
Potato	211	90.5%	238.90	71.60	27.50
Pulses	1,301	71.5%	26.20	18.30	3.20
Soya	23	98.1%	30.40	8.70	0.00
Sunflower	591	97.9%	92.40	37.60	4.70
Tea	77	94.2%	214.2	39.0	71.40
Tobacco	289	67.7%	3.10	1.40	5.50
Vegetables	824	87.3%	102.10	49.90	13.50
Wheat	9,457	88.3%	64.60	29.80	0.50

Comparative use of fertilizers, USA, 1998

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Potato	561.6	95%	220.00	200.00	150.00
Rape	437.4	95%	150.00	120.00	80.00
Sweet potato	33.9	No data	150.00	180.00	120.00
Vegetables	646.9	90%	190.00	130.00	150.00
Tobacco	290.4	No data	100.00	120.00	220.00

Comparative use of fertilizers, Venezuela, 1997

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Banana	51.9	40%	120.00	50.00	120.00
Sugar cane	104.2	70%	150.00	100.00	100.00
Citrus	35.5	70%	120.00	80.00	60.00
Cocoa	62.1	20%	120.00	40.00	20.00
Coffee	179.4	60%	200.00	60.00	80.00
Cotton	48.1	60%	100.00	60.00	60.00
Rice	172.9	90%	150.00	60.00	40.00
Sesame	44.5	80%	100.00	40.00	40.00
Sorghum	232.0	80%	100.00	40.00	40.00
Tobacco	8.6	No data	120.00	40.00	30.00
Vegetables	76.9	No data	90.00	60.00	40.00

Comparative use of fertilizers, Vietnam, 1999

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Sugar cane	351.0	85%	105.00	50.00	55.00
Coffee	360.0	90%	175.00	80.00	165.00
Maize	687.0	90%	105.00	60.00	55.00
Rice	7,648.0	90%	115.00	45.00	42.00
Tobacco	33.0	95%	110.00	60.00	40.00

Comparative use of fertilizers, Zimbabwe, 1998

Crop	Area ('000 ha)	Area on which fertilizers are used (%)	Rate N (kg nutrients/ha)	Rate P (kg nutrients/ha)	Rate K (kg nutrients/ha)
Maize	1,223.8	61%	153.00	22.00	21.00
Wheat	58.0	90%	203.00	44.00	41.00
Tobacco	91.9	No data	35.00	33.00	55.00