NASM-Data: Input Data for the Nigerian Agricultural Sector Model (NASM), and Extra-Information/Results

***TABLE 1 Y (C, R) REGIONAL AVERAGE CROP YIELDS (MT PER HA)***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **NW** | **NE** | **NC** | **SW** | **SS** | **SE** |
| MAIZE | 4.57 | 1.67 | 1.61 | 1.68 | 1.77 | 2.37 |
| CASSAVA | 9.93 | 11.06 | 12.82 | 14.78 | 10.73 | 12.22 |
| POTATO\* | 3.27 | 3.27 | 3.27 | 3.27 | 3.27 | 3.27 |
| YAM | 11.96 | 7.98 | 10.35 | 12.13 | 9.57 | 12.88 |
| COCOYAM | 6.18 | 3.59 | 7.70 | 6.84 | 4.12 | 8.32 |
| PLANTAIN\* | 6.10 | 6.10 | 6.10 | 6.10 | 6.10 | 6.10 |
| BEANS | 0.71 | 0.94 | 1.27 | 0.71 | 1.22 | 0.39 |
| SORGHUM | 1.29 | 1.23 | 1.06 | 0.70 | 0.00 | 0.00 |
| SUGARCANE | 25.31 | 10.89 | 9.07 | 12.04 | 7.32 | 18.13 |
| WHEAT\* | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 |
| MILLET | 1.03 | 1.43 | 1.13 | 1.59 | 0.00 | 0.00 |
| RICE | 2.40 | 1.53 | 2.05 | 1.48 | 5.26 | 2.56 |
| GROUNDNUT | 0.85 | 1.28 | 1.90 | 1.05 | 0.78 | 0.73 |
| COTTON | 1.42 | 1.44 | 1.25 | 0.99 | 0.00 | 0.00 |
| SESAME | 0.37 | 0.50 | 0.38 | 0.00 | 0.00 | 0.00 |
| SOYBEAN | 1.36 | 2.05 | 1.62 | 0.88 | 0.00 | 0.00 |
| COCOA | 0.00 | 0.37 | 0.27 | 0.29 | 0.22 | 0.24 |
| CASHEW | 1.76 | 0.80 | 1.33 | 0.49 | 0.99 | 0.78 |
| RUBBER | 0.00 | 0.00 | 0.49 | 0.87 | 0.63 | 0.82 |
| OIL-PALM | 0.41 | 0.38 | 0.74 | 0.80 | 0.75 | 0.78 |
| MELON | 2.82 | 0.89 | 0.99 | 0.96 | 0.44 | 0.44 |

Source: Estimated from the quantity of crops produced and area harvested from NBS -Nigerian Farm Survey Data, 2008 - 2010, and FAOSTAT - Nigerian Crop Production Data, 2008 - 2010 . \* - Imply data sourced from FAOSTAT.

TABLE 2 DP (C, R) OUTPUT DOMESTIC REAL FARMGATE PRICES (US$ PER MT)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | NW | NE | NC | SW | SS | SE |
| MAIZE | 117 | 117 | 117 | 117 | 117 | 117 |
| CASSAVA | 85 | 85 | 85 | 85 | 85 | 85 |
| POTATO | 330 | 330 | 330 | 330 | 330 | 330 |
| YAM | 130 | 130 | 130 | 130 | 130 | 130 |
| COCOYAM | 111 | 111 | 111 | 111 | 111 | 111 |
| PLANTAIN | 618 | 618 | 618 | 618 | 618 | 618 |
| BEANS | 122 | 122 | 122 | 122 | 122 | 122 |
| SORGHUM | 118 | 118 | 118 | 118 | 118 | 118 |
| SUGARCANE | 116 | 116 | 116 | 116 | 116 | 116 |
| WHEAT | 390 | 390 | 390 | 390 | 390 | 390 |
| MILLET | 111 | 111 | 111 | 111 | 111 | 111 |
| RICE | 132 | 132 | 132 | 132 | 132 | 132 |
| GROUNDNUT | 126 | 126 | 126 | 126 | 126 | 126 |
| COTTON | 399 | 399 | 399 | 399 | 399 | 399 |
| SESAME | 272 | 272 | 272 | 272 | 272 | 272 |
| SOYBEAN | 272 | 272 | 272 | 272 | 272 | 272 |
| COCOA | 687 | 687 | 687 | 687 | 687 | 687 |
| CASHEW | 253 | 253 | 253 | 253 | 253 | 253 |
| RUBBER | 386 | 386 | 386 | 386 | 386 | 386 |
| OIL-PALM | 680 | 680 | 680 | 680 | 680 | 680 |
| MELON | 190 | 190 | 190 | 190 | 190 | 190 |

Source: Estimated from the Nigerian Farm Survey Data (NBS, 2010).

TABLE 3 DCP (C, R) REGIONAL DOMESTIC CROP PRODUCTION (MT PER YEAR)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **NW** | **NE** | **NC** | **SW** | **SS** | **SE** |
| MAIZE | 2852317 | 1525507 | 1396757 | 707647 | 472237 | 468430 |
| CASSAVA | 2214215 | 2551303 | 9489083 | 7328383 | 7712223 | 7097350 |
| POTATO | 1252617 | 1103896 | 1338450 | 11616 | 10002 | 9753 |
| YAM | 1921043 | 2240173 | 8873227 | 4774353 | 4458733 | 5415357 |
| COCOYAM | 7207 | 13872 | 236627 | 1133270 | 580023 | 867673 |
| PLANTAIN | 175003 | 201646 | 749982 | 579208 | 609546 | 560948 |
| BEANS | 871877 | 788493 | 452317 | 14408 | 977 | 3257 |
| SORGHUM | 2621190 | 1681370 | 983467 | 24947 |  |  |
| SUGARCANE | 1134887 | 110173 | 89247 | 20547 | 46840 | 3143 |
| WHEAT | 23182 | 17461 | 3997 | 26 |  |  |
| MILLET | 2370730 | 1785643 | 408768 | 2703 |  |  |
| RICE | 1100427 | 801633 | 1137643 | 76733 | 84482 | 297473 |
| GROUNDNUT | 974803 | 859067 | 1041600 | 9040 | 7783 | 7590 |
| COTTON | 362707 | 145113 | 23440 | 483 |  |  |
| SESAME | 41600 | 17070 | 62210 |  |  |  |
| SOYBEAN | 167523 | 24403 | 194697 | 4007 |  |  |
| COCOA |  | 5753 | 2433 | 254423 | 97797 | 3377 |
| CASHEW | 15267 | 1180 | 46953 | 11543 | 9133 | 23393 |
| RUBBER |  |  | 143 | 8850 | 37480 | 297 |
| OIL-PALM | 3610 | 6050 | 116613 | 351073 | 411870 | 346997 |
| MELON | 1990 | 22513 | 212530 | 46242 | 48850 | 49497 |

Source: Extracted from the Nigerian Farm Survey Data (NBS, 2010b).

TABLE 4 PED (C, R) CROP PRICE ELASTICITY OF DEMAND

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **NW** | **NE** | **NC** | **SW** | **SS** | **SE** |
| MAIZE | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 |
| CASSAVA | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 |
| POTATO | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 |
| YAM | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 |
| COCOYAM | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 |
| PLANTAIN | -0.14 | -0.14 | -0.14 | -0.14 | -0.14 | -0.14 |
| BEANS | -0.31 | -0.31 | -0.31 | -0.31 | -0.31 | -0.31 |
| SORGHUM | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 |
| SUGARCANE | -0.303 | -0.303 | -0.303 | -0.303 | -0.303 | -0.303 |
| WHEAT | -0.337 | -0.337 | -0.337 | -0.337 | -0.337 | -0.337 |
| MILLET | -0.337 | -0.337 | -0.337 | -0.337 | -0.337 | -0.337 |
| RICE | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 |
| GROUNDNUT | -0.305 | -0.305 | -0.305 | -0.305 | -0.305 | -0.305 |
| COTTON | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 |
| SESAME | -0.305 | -0.305 | -0.305 | -0.305 | -0.305 | -0.305 |
| SOYBEAN | -0.305 | -0.305 | -0.305 | -0.305 | -0.305 | -0.305 |
| COCOA | -0.14 | -0.14 | -0.14 | -0.14 | -0.14 | -0.14 |
| CASHEW | -0.14 | -0.14 | -0.14 | -0.14 | -0.14 | -0.14 |
| RUBBER | -0.14 | -0.14 | -0.14 | -0.14 | -0.14 | -0.14 |
| OIL-PALM | -0.14 | -0.14 | -0.14 | -0.14 | -0.14 | -0.14 |
| MELON | -0.14 | -0.14 | -0.14 | -0.14 | -0.14 | -0.14 |

Source: Adapted from [Le-Si et al. (1982)](#_ENREF_18).

TABLE 5 EXP (C, R) COMMODITY REAL EXPORT PRICES (US$ PER MT)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **NW** | **NE** | **NC** | **SW** | **SS** | **SE** |
| MAIZE | 117 | 117 | 117 | 117 | 117 | 117 |
| CASSAVA | 85 | 85 | 85 | 85 | 85 | 85 |
| POTATO | 273 | 273 | 273 | 273 | 273 | 273 |
| YAM | 130 | 130 | 130 | 130 | 130 | 130 |
| COCOYAM | 111 | 111 | 111 | 111 | 111 | 111 |
| PLANTAIN | 320 | 320 | 320 | 320 | 320 | 320 |
| BEANS | 122 | 122 | 122 | 122 | 122 | 122 |
| SORGHUM | 118 | 118 | 118 | 118 | 118 | 118 |
| SUGARCANE | 116 | 116 | 116 | 116 | 116 | 116 |
| WHEAT | 192 | 192 | 192 | 192 | 192 | 192 |
| MILLET | 111 | 111 | 111 | 111 | 111 | 111 |
| RICE | 132 | 132 | 132 | 132 | 132 | 132 |
| GROUNDNUT | 126 | 126 | 126 | 126 | 126 | 126 |
| COTTON | 399 | 399 | 399 | 399 | 399 | 399 |
| SESAME | 272 | 272 | 272 | 272 | 272 | 272 |
| SOYBEAN | 207 | 207 | 207 | 207 | 207 | 207 |
| COCOA | 687 | 687 | 687 | 687 | 687 | 687 |
| CASHEW | 253 | 253 | 253 | 253 | 253 | 253 |
| RUBBER | 386 | 386 | 386 | 386 | 386 | 386 |
| OIL-PALM | 680 | 680 | 680 | 680 | 680 | 680 |
| MELON | 190 | 190 | 190 | 190 | 190 | 190 |

Source: Assumed to be the same with the domestic farmgate prices from the Nigerian Farm Survey Data (NBS, 2010), due incomprehensive and unreliable export prices from NBS Commodity Trade Data (2010) which is 200% higher than the farmgate prices, thus influencing the model negatively to export all produced crops.

TABLE 6 IMP (C, R) COMMODITY REAL IMPORT PRICES (US$ PER MT)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **NW** | **NE** | **NC** | **SW** | **SS** | **SE** |
| MAIZE | 129 | 129 | 129 | 129 | 129 | 129 |
| CASSAVA | 93 | 93 | 93 | 93 | 93 | 93 |
| POTATO | 300 | 300 | 300 | 300 | 300 | 300 |
| YAM | 143 | 143 | 143 | 143 | 143 | 143 |
| COCOYAM | 122 | 122 | 122 | 122 | 122 | 122 |
| PLANTAIN | 353 | 353 | 353 | 353 | 353 | 353 |
| BEANS | 134 | 134 | 134 | 134 | 134 | 134 |
| SORGHUM | 130 | 130 | 130 | 130 | 130 | 130 |
| SUGARCANE | 127 | 127 | 127 | 127 | 127 | 127 |
| WHEAT | 212 | 212 | 212 | 212 | 212 | 212 |
| MILLET | 122 | 122 | 122 | 122 | 122 | 122 |
| RICE | 145 | 145 | 145 | 145 | 145 | 145 |
| GROUNDNUT | 138 | 138 | 138 | 138 | 138 | 138 |
| COTTON | 438 | 438 | 438 | 438 | 438 | 438 |
| SESAME | 299 | 299 | 299 | 299 | 299 | 299 |
| SOYBEAN | 228 | 228 | 228 | 228 | 228 | 228 |
| COCOA | 755 | 755 | 755 | 755 | 755 | 755 |
| CASHEW | 279 | 279 | 279 | 279 | 279 | 279 |
| RUBBER | 425 | 425 | 425 | 425 | 425 | 425 |
| OIL-PALM | 748 | 748 | 748 | 748 | 748 | 748 |
| MELON | 209 | 209 | 209 | 209 | 209 | 209 |

Source: Assumed to be 10% higher than the domestic farmgate prices (considering existing discouraging import policies with high import duties) due incomprehensive and unreliable import prices from NBS Commodity Trade Data (2010) which is over 200% higher than the farmgate prices. It does not seem logical for such imported commodities with higher prices to compete favourably with the locally produced ones and/or be sold in the local market where the cheaper ones are.

TABLE 7 EXD (C, R) AVEREAGE REGIONAL EXPORT DEMAND (MT PER YR)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **NW** | **NE** | **NC** | **SW** | **SS** | **SE** |
| MAIZE | 6.31 | 3.38 | 3.09 | 1.57 | 1.04 | 1.04 |
| CASSAVA | 7.37 | 8.5 | 31.6 | 24.4 | 25.68 | 23.63 |
| YAM | 0.2 | 0.23 | 0.93 | 0.5 | 0.47 | 0.56 |
| COCOYAM | 0.22 | 0.43 | 7.38 | 35.33 | 18.08 | 27.05 |
| BEANS | 19.78 | 17.89 | 10.26 | 0.33 | 0.02 | 0.07 |
| SORGHUM | 2.22 | 1.43 | 0.83 | 0.02 |  |  |
| SUGARCANE | 44.42 | 22.95 | 18.59 | 4.28 | 9.76 | 3.65 |
| MILLET | 1.25 | 0.94 | 0.21 | 0.002 |  |  |
| RICE | 75.19 | 54.77 | 77.73 | 15.24 | 15.77 | 20.33 |
| GROUNDNUT | 8.96 | 7.9 | 9.57 | 0.08 | 0.07 | 0.07 |
| COTTON | 118.64 | 107.5 | 33.52 | 0.69 |  |  |
| SESAME | 920 | 463 | 600 |  |  |  |
| SOYBEAN | 47.14 | 13.74 | 58.79 | 12.26 |  |  |
| COCOA |  | 576.32 | 243.62 | 900.61 | 809.57 | 338.08 |
| CASHEW | 134.16 | 100.99 | 260.09 | 107.06 | 100.09 | 109.4 |
| RUBBER |  |  | 34.4 | 27.19 | 21.52 | 9.11 |
| OILPALM | 0.23 | 0.38 | 7.28 | 21.93 | 25.73 | 21.67 |
| MELON |  |  |  |  |  |  |

Source: Nigerian Agricultural Trade Data ([NBS, 2009](#_ENREF_26)).

TABLE 8 IMD (C, R) AVEREAGE REGIONAL IMPORT SUPPLY (MT PER YR)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **NW** | **NE** | **NC** | **SW** | **SS** | **SE** |
| POTATO | 500.4 | 265.3 | 283.4 | 385.7 | 293.8 | 229.1 |
| PLANTAIN | 711.1 | 377.0 | 402.8 | 548.1 | 417.6 | 325.6 |
| BEANS | 246.2 | 130.5 | 139.4 | 189.8 | 144.6 | 112.7 |
| WHEAT | 455.9 | 241.7 | 258.3 | 351.4 |  |  |
| MILLET | 0.3 | 0.2 | 0.2 | 0.2 |  |  |
| RICE | 540.7 | 286.7 | 306.3 | 416.8 | 317.5 | 247.5 |
| GROUNDNUT | 11.0 | 5.8 | 6.2 | 8.5 | 6.5 | 5.1 |
| COTTON | 41.3 | 21.9 | 23.4 |  |  |  |
| SESAME | 96.3 | 51.1 | 54.6 |  |  |  |
| SOYBEAN | 206.2 | 109.3 | 116.8 | 159.0 |  |  |
| COCOA |  | 73.4 | 78.4 | 100.6 | 81.3 | 63.3 |
| RUBBER |  |  | 29.1 | 39.6 | 30.1 | 23.5 |
| OILPALM | 160.2 | 84.9 | 90.9 | 123.5 | 94.1 | 73.3 |
| MELON |  |  |  |  |  |  |

Source: Nigerian Agricultural Trade Data ([NBS, 2009](#_ENREF_26)).

TABLE 9 RE (B, R) AVERAGE REGIONAL FIXED RESOURCE ENDOWNMENTS

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **NW** | **NE** | **NC** | **SW** | **SS** | **SE** |
| LAN (ha) | 18299782 | 24165794 | 19533498 | 6622909 | 7291991 | 2498026 |
| LAB (pers) | 22027818 | 9610344 | 7495854 | 3562984 | 7548086 | 10432639 |
| TRAC (units) | 12634 | 7803 | 6085 | 3655 | 5096 | 4726 |

Source: Estimated from Nigerian Land Use Data (FAOSTAT, 2014b; NBS, 2010b), and Nigerian Population Census Data ([NPC, 2006](#_ENREF_30)).

TABLE 10 BR (B, R) AVERAGE REGIONAL BASE RESOURCE USE

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **NW** | **NE** | **NC** | **SW** | **SS** | **SE** |
| LAN (ha) | 8716425 | 6289383 | 5982128 | 3000395 | 2792808 | 2037848 |
| LAB (pers) | 18127820 | 7908844 | 6168723 | 2932162 | 6211707 | 8585553 |
| TRAC (units) | 12634 | 7803 | 6085 | 3655 | 5096 | 4726 |

Source: Extracted from the Nigerian Farm Survey Data ([NBS, 2010b](#_ENREF_27)).

TABLE 11 RR1 (C, B, ´NW´) NW RESOURCE REQUIREMENT (Coefficients)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **\*** | LAN (ha) | LAB (pers) | SEED (MT) | FERT (MT) | PEST (MT) | TRAC (day) |
| MAIZE | 1 | 2.08 | 0.02 | 0.003 | 0.002 | 0 |
| CASSAVA | 1 | 2.08 | 1.5 | 0.003 | 0.002 | 0 |
| POTATO | 1 | 2.08 | 0.85 | 0.003 | 0.002 | 0 |
| YAM | 1 | 2.08 | 2.25 | 0.003 | 0.002 | 0 |
| COCOYAM | 1 | 2.08 | 0.75 | 0.003 | 0.002 | 0 |
| PLANTAIN | 1 | 2.08 | 2.5 | 0.003 | 0.002 | 0 |
| BEANS | 1 | 2.08 | 0.02 | 0.003 | 0.002 | 0 |
| SORGHUM | 1 | 2.08 | 0.02 | 0.003 | 0.002 | 0 |
| SUGARCANE | 1 | 2.08 | 0.46 | 0.003 | 0.002 | 0 |
| WHEAT | 1 | 2.08 | 0.02 | 0.003 | 0.002 | 0 |
| MILLET | 1 | 2.08 | 0.02 | 0.003 | 0.002 | 0 |
| RICE | 1 | 2.08 | 0.02 | 0.003 | 0.002 | 0 |
| GROUNDNUT | 1 | 2.08 | 0.02 | 0.003 | 0.002 | 0 |
| COTTON | 1 | 2.08 | 0.01 | 0.003 | 0.002 | 0 |
| SESAME | 1 | 2.08 | 0.03 | 0.003 | 0.002 | 0 |
| SOYBEAN | 1 | 2.08 | 0.03 | 0.003 | 0.002 | 0 |
| CASHEW | 1 | 2.08 | 0.02 | 0.003 | 0.002 | 0 |
| RUBBER | 0 | 0 | 0 | 0.000 | 0 | 0 |
| OIL-PALM | 1 | 2.08 | 0.02 | 0.003 | 0.002 | 0 |
| MELON | 1 | 2.08 | 0.01 | 0.003 | 0.002 | 0 |

Source: Estimated from the Nigerian Farm Survey Data ([NBS, 2010b](#_ENREF_27)).

TABLE 12 RR2 (C, B, ´NE´) NE RESOURCE REQUIREMENT (Coefficients)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **\*** | LAN (ha) | LAB (pers) | SEED (MT) | FERT (MT) | PEST (MT) | TRAC (day) |
| MAIZE | 1 | 1.3 | 0.02 | 0.002 | 0.001 | 0 |
| CASSAVA | 1 | 1.3 | 1.5 | 0.002 | 0.001 | 0 |
| POTATO | 1 | 1.3 | 0.85 | 0.002 | 0.001 | 0 |
| YAM | 1 | 1.3 | 2.25 | 0.002 | 0.001 | 0 |
| COCOYAM | 1 | 1.3 | 0.75 | 0.002 | 0.001 | 0 |
| PLANTAIN | 1 | 1.3 | 2.5 | 0.002 | 0.001 | 0 |
| BEANS | 1 | 1.3 | 0.02 | 0.002 | 0.001 | 0 |
| SORGHUM | 1 | 1.3 | 0.02 | 0.002 | 0.001 | 0 |
| SUGARCANE | 1 | 1.3 | 0.46 | 0.002 | 0.001 | 0 |
| WHEAT | 1 | 1.3 | 0.02 | 0.002 | 0.001 | 0 |
| MILLET | 1 | 1.3 | 0.02 | 0.002 | 0.001 | 0 |
| RICE | 1 | 1.3 | 0.02 | 0.002 | 0.001 | 0 |
| GROUNDNUT | 1 | 1.3 | 0.02 | 0.002 | 0.001 | 0 |
| COTTON | 1 | 1.3 | 0.01 | 0.002 | 0.001 | 0 |
| SESAME | 1 | 1.3 | 0.03 | 0.002 | 0.001 | 0 |
| SOYBEAN | 1 | 1.3 | 0.03 | 0.002 | 0.001 | 0 |
| COCOA | 1 | 1.3 | 0.02 | 0.002 | 0.001 | 0 |
| CASHEW | 1 | 1.3 | 0.02 | 0.002 | 0.001 | 0 |
| OIL-PALM | 1 | 1.3 | 0.02 | 0.002 | 0.001 | 0 |
| MELON | 1 | 1.3 | 0.01 | 0.002 | 0.001 | 0 |

Source: Estimated from the Nigerian Farm Survey Data ([NBS, 2010b](#_ENREF_27)).

TABLE 13 RR3 (C, B, ´NC´) NC RESOURCE REQUIREMENT (Coefficients)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **\*** | LAN (ha) | LAB (pers) | SEED (MT) | FERT (MT) | PEST (MT) | TRAC (day) |
| MAIZE | 1 | 1.03 | 0.02 | 0.004 | 0.002 | 0 |
| CASSAVA | 1 | 1.03 | 1.5 | 0.004 | 0.002 | 0 |
| POTATO | 1 | 1.03 | 0.85 | 0.004 | 0.002 | 0 |
| YAM | 1 | 1.03 | 2.25 | 0.004 | 0.002 | 0 |
| COCOYAM | 1 | 1.03 | 0.75 | 0.004 | 0.002 | 0 |
| PLANTAIN | 1 | 1.03 | 2.5 | 0.004 | 0.002 | 0 |
| BEANS | 1 | 1.03 | 0.02 | 0.004 | 0.002 | 0 |
| SORGHUM | 1 | 1.03 | 0.02 | 0.004 | 0.002 | 0 |
| SUGARCANE | 1 | 1.03 | 0.46 | 0.004 | 0.002 | 0 |
| WHEAT | 1 | 1.03 | 0.02 | 0.004 | 0.002 | 0 |
| MILLET | 1 | 1.03 | 0.02 | 0.004 | 0.002 | 0 |
| RICE | 1 | 1.03 | 0.02 | 0.004 | 0.002 | 0 |
| GROUNDNUT | 1 | 1.03 | 0.02 | 0.004 | 0.002 | 0 |
| COTTON | 1 | 1.03 | 0.01 | 0.004 | 0.002 | 0 |
| SESAME | 1 | 1.03 | 0.03 | 0.004 | 0.002 | 0 |
| SOYBEAN | 1 | 1.03 | 0.03 | 0.004 | 0.002 | 0 |
| COCOA | 1 | 1.03 | 0.02 | 0.004 | 0.002 | 0 |
| CASHEW | 1 | 1.03 | 0.02 | 0.004 | 0.002 | 0 |
| RUBBER | 1 | 1.03 | 0.02 | 0.004 | 0.002 | 0 |
| OIL-PALM | 1 | 1.03 | 0.02 | 0.004 | 0.002 | 0 |
| MELON | 1 | 1.03 | 0.01 | 0.004 | 0.002 | 0 |

Source: Estimated from the Nigerian Farm Survey Data ([NBS, 2010b](#_ENREF_27)).

TABLE 14 RR4 (C, B, ´SW´) SW RESOURCE REQUIREMENT (Coefficients)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **\*** | LAN (ha) | LAB (pers) | SEED (MT) | FERT (MT) | PEST (MT) | TRAC (day) |
| MAIZE | 1 | 0.98 | 0.02 | 0.003 | 0.003 | 0 |
| CASSAVA | 1 | 0.98 | 1.5 | 0.003 | 0.003 | 0 |
| POTATO | 1 | 0.98 | 0.85 | 0.003 | 0.003 | 0 |
| YAM | 1 | 0.98 | 2.25 | 0.003 | 0.003 | 0 |
| COCOYAM | 1 | 0.98 | 0.75 | 0.003 | 0.003 | 0 |
| PLANTAIN | 1 | 0.98 | 2.5 | 0.003 | 0.003 | 0 |
| BEANS | 1 | 0.98 | 0.02 | 0.003 | 0.003 | 0 |
| SORGHUM | 1 | 0.98 | 0.02 | 0.003 | 0.003 | 0 |
| SUGARCANE | 1 | 0.98 | 0.46 | 0.003 | 0.003 | 0 |
| WHEAT | 1 | 0.98 | 0.02 | 0.003 | 0.003 | 0 |
| MILLET | 1 | 0.98 | 0.02 | 0.003 | 0.003 | 0 |
| RICE | 1 | 0.98 | 0.02 | 0.003 | 0.003 | 0 |
| GROUNDNUT | 1 | 0.98 | 0.02 | 0.003 | 0.003 | 0 |
| COTTON | 1 | 0.98 | 0.01 | 0.003 | 0.003 | 0 |
| SOYBEAN | 1 | 0.98 | 0.03 | 0.003 | 0.003 | 0 |
| COCOA | 1 | 0.98 | 0.02 | 0.003 | 0.003 | 0 |
| CASHEW | 1 | 0.98 | 0.02 | 0.003 | 0.003 | 0 |
| RUBBER | 1 | 0.98 | 0.02 | 0.003 | 0.003 | 0 |
| OIL-PALM | 1 | 0.98 | 0.02 | 0.003 | 0.003 | 0 |
| MELON | 1 | 0.98 | 0.01 | 0.003 | 0.003 | 0 |

Source: Estimated from the Nigerian Farm Survey Data ([NBS, 2010b](#_ENREF_27)).

TABLE 15 RR5 (C, B, ´SS´) SS RESOURCE REQUIREMENT (Coefficients)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **\*** | LAN (ha) | LAB (pers) | SEED (MT) | FERT (MT) | PEST (MT) | TRAC (day) |
| MAIZE | 1 | 2.22 | 0.02 | 0.003 | 0.002 | 0 |
| CASSAVA | 1 | 2.22 | 1.5 | 0.003 | 0.002 | 0 |
| POTATO | 1 | 2.22 | 0.85 | 0.003 | 0.002 | 0 |
| YAM | 1 | 2.22 | 2.25 | 0.003 | 0.002 | 0 |
| COCOYAM | 1 | 2.22 | 0.75 | 0.003 | 0.002 | 0 |
| PLANTAIN | 1 | 2.22 | 2.5 | 0.003 | 0.002 | 0 |
| BEANS | 1 | 2.22 | 0.02 | 0.003 | 0.002 | 0 |
| SUGARCANE | 1 | 2.22 | 0.46 | 0.003 | 0.002 | 0 |
| RICE | 1 | 2.22 | 0.02 | 0.003 | 0.002 | 0 |
| GROUNDNUT | 1 | 2.22 | 0.02 | 0.003 | 0.002 | 0 |
| COCOA | 1 | 2.22 | 0.02 | 0.003 | 0.002 | 0 |
| CASHEW | 1 | 2.22 | 0.02 | 0.003 | 0.002 | 0 |
| RUBBER | 1 | 2.22 | 0.02 | 0.003 | 0.002 | 0 |
| OIL-PALM | 1 | 2.22 | 0.02 | 0.003 | 0.002 | 0 |
| MELON | 1 | 2.22 | 0.01 | 0.003 | 0.002 | 0 |

Source: Estimated from the Nigerian Farm Survey Data ([NBS, 2010b](#_ENREF_27)).

TABLE 16 RR6 (C, B, ´SE´) SE RESOURCE REQUIREMENT (Coefficients)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **\*** | LAN (ha) | LAB (pers) | SEED (MT) | FERT (MT) | PEST (MT) | TRAC (day) |
| MAIZE | 1 | 4.21 | 0.02 | 0.002 | 0.001 | 0 |
| CASSAVA | 1 | 4.21 | 1.5 | 0.002 | 0.001 | 0 |
| POTATO | 1 | 4.21 | 0.85 | 0.002 | 0.001 | 0 |
| YAM | 1 | 4.21 | 2.25 | 0.002 | 0.001 | 0 |
| COCOYAM | 1 | 4.21 | 0.75 | 0.002 | 0.001 | 0 |
| PLANTAIN | 1 | 4.21 | 2.5 | 0.002 | 0.001 | 0 |
| BEANS | 1 | 4.21 | 0.02 | 0.002 | 0.001 | 0 |
| SUGARCANE | 1 | 4.21 | 0.46 | 0.002 | 0.001 | 0 |
| RICE | 1 | 4.21 | 0.02 | 0.002 | 0.001 | 0 |
| GROUNDNUT | 1 | 4.21 | 0.02 | 0.002 | 0.001 | 0 |
| COCOA | 1 | 4.21 | 0.02 | 0.002 | 0.001 | 0 |
| CASHEW | 1 | 4.21 | 0.02 | 0.002 | 0.001 | 0 |
| RUBBER | 1 | 4.21 | 0.02 | 0.002 | 0.001 | 0 |
| OIL-PALM | 1 | 4.21 | 0.02 | 0.002 | 0.001 | 0 |
| MELON | 1 | 4.21 | 0.01 | 0.002 | 0.001 | 0 |

Source: Estimated from the Nigerian Farm Survey Data ([NBS, 2010b](#_ENREF_27)).

TABLE 17 RC (B, R) AVERAGE REGIONAL PER UNIT RESOURCE COSTS (US$)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **\*** | **NW**  (US$) | **NE**  (US$) | **NC**  (US$) | **SW**  (US$) | **SS**  (US$) | **SE**  (US$) |
| LAN | 345 | 246 | 296 | 443 | 394 | 493 |
| LAB | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| SEED | 680 | 680 | 680 | 680 | 680 | 680 |
| FERT | 500 | 500 | 500 | 500 | 500 | 500 |
| PEST | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| CASH | 30% | 30% | 30% | 30% | 30% | 30% |
| TRAC | 345 | 246 | 296 | 443 | 394 | 493 |

Source: Extracted and estimated from the Nigerian Farm Survey Data ([NBS, 2010b](#_ENREF_27)) and [CBN (2013)](#_ENREF_6).

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|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Table 18 RegTransC (R,R) Regional Crop Transportation Cost (US$ per MT) | | | | | | | |
|  | NW | NE | NC | SW | SS | SE | NIG | |
| NW | 0.00 | 26.27 | 32.84 | 52.55 | 65.68 | 59.11 | 10.95 | |
| NE | 26.27 | 0.00 | 32.84 | 45.98 | 59.11 | 52.55 | 10.95 | |
| NC | 32.84 | 26.27 | 0.00 | 39.41 | 52.55 | 45.98 | 10.95 | |
| SW | 52.55 | 45.98 | 39.41 | 0.00 | 32.84 | 26.27 | 8.76 | |
| SS | 65.68 | 59.11 | 52.55 | 32.84 | 0.00 | 13.14 | 8.76 | |
| SE | 59.11 | 52.55 | 45.98 | 26.27 | 13.14 | 0.00 | 8.76 | |
| NIG | 10.95 | 10.95 | 10.95 | 8.76 | 8.76 | 8.76 | 0.00 | |

Source: Inter-regional transportation fare from Nigeria Union of Road Transport Workers in 2012.

**EXTRA-INFORMATION AND RESULTS (APPENDICES):**

Appendix A, Alternative Empirical Method of Estimating and/or Verifying Product prices

Empirically, the product price from the model’s solution (shadow price at the commodity balance in Table 10) can also be verified using this formula:

where is the estimated demand intercept of crop j in region r (Appendix B); is the quantity demanded (sold) domestically of each crop j in region r (Appendix C) and is the absolute (positive) value of the demand slope for each product demanded in region r (Appendix D). For example, the demand intercept for maize in the NW is US$507, while the absolute value of the demand slope is 0.13673 and the quantity of maize demanded in the region is 2,852 thousand metric tonnes. Substituting these values into Eq. (D.1), the domestic market price of maize in the NW will therefore be equal to US$117 (the exact input domestic market price). The price of each product can be verified or estimated using the same procedure. Hence, the principle of commodity balance shadow price being equal to the product market price in an optimal solution is upheld by results from these models.

Appendix B, Intercept of the Demand Curve at Base Year ()

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **NW** | **NE** | **NC** | **SW** | **SS** | **SE** | **Nig Ave.** |
| MAIZE | 507 | 507 | 507 | 507 | 507 | 507 | 507 |
| CASSAVA | 508 | 508 | 508 | 508 | 508 | 508 | 508 |
| POTATO | 1,637 | 1,637 | 1,637 | 1,637 | 1,637 | 1,637 | 1,637 |
| YAM | 779 | 779 | 779 | 779 | 779 | 779 | 779 |
| COCOYAM | 668 | 668 | 668 | 668 | 668 | 668 | 668 |
| PLANTAIN | 2,610 | 2,610 | 2,610 | 2,610 | 2,610 | 2,610 | 2,610 |
| BEANS | 516 | 516 | 516 | 516 | 516 | 516 | 516 |
| SORGHUM | 513 | 513 | 513 | 513 |  |  | 513 |
| SUGARCANE | 498 | 498 | 498 | 498 | 498 | 498 | 498 |
| WHEAT | 764 | 764 | 764 | 764 |  |  | 764 |
| MILLET | 442 | 442 | 442 | 442 |  |  | 442 |
| RICE | 792 | 792 | 792 | 792 | 792 | 792 | 792 |
| GROUNDNUT | 537 | 537 | 537 | 537 | 537 | 537 | 537 |
| COTTON | 1,727 | 1,727 | 1,727 | 1,727 |  |  | 1,727 |
| SESAME | 1,162 | 1,162 | 1,162 |  |  |  | 1,162 |
| SOYBEAN | 885 | 885 | 885 | 885 |  |  | 885 |
| COCOA |  | 5,590 | 5,590 | 5,590 | 5,590 | 5,590 | 5,590 |
| CASHEW | 2,062 | 2,062 | 2,062 | 2,062 | 2,062 | 2,062 | 2,062 |
| RUBBER |  |  | 3,146 | 3,146 | 3,146 | 3,146 | 3,146 |
| OILPALM | 5,536 | 5,536 | 5,536 | 5,536 | 5,536 | 5,536 | 5,536 |
| MELON | 1,547 | 1,547 | 1,547 | 1,547 | 1,547 | 1,547 | 1,547 |

Source: Results from the NASM. Key: NW = North-West, NE = North-East, NC = North-Central, SW = South-West, SS = South-South, and SE = South-East, geo-political zones. Nig Ave. = National Average.

Appendix C, Regional Crop Demand (Domestic Consumption Demand) Levels (1000 MT)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Crops | **NW**  **(1000 MT)** | **NE**  **(1000 MT)** | **NC**  **(1000 MT)** | **SW**  **(1000 MT)** | **SS**  **(1000 MT)** | **SE**  **(1000 MT)** |
| MAIZE | 2,852 | 1,526 | 1,397 | 708 | 472 | 468 |
| CASSAVA | 2,214 | 2,551 | 9,489 | 7,328 | 7,712 | 7,097 |
| POTATO | 1,254 | 1,104 | 1,339 | 12 | 11 | 10 |
| YAM | 1,921 | 2,240 | 8,873 | 4,774 | 4,459 | 5,415 |
| COCOYAM | 7 | 14 | 237 | 1,133 | 580 | 868 |
| PLANTAIN | 176 | 202 | 750 | 580 | 610 | 561 |
| BEANS | 872 | 789 | 452 | 15 | 1 | 3 |
| SORGHUM | 2,621 | 1,681 | 983 | 25 | N/A | N/A |
| SUGARCANE | 1,135 | 110 | 89 | 21 | 47 | 3 |
| WHEAT | 479 | 259 | 262 | 351 | N/A | N/A |
| MILLET | 2,371 | 1,786 | 409 | 3 | N/A | N/A |
| RICE | 1,208 | 859 | 1,199 | 160 | 148 | 347 |
| GROUNDNUT | 975 | 859 | 1,042 | 9 | 8 | 8 |
| COTTON | 362 | 145 | 23 | 0.5 | N/A | N/A |
| SESAME | 43 | 18 | 63 | N/A | N/A | N/A |
| SOYBEAN | 169 | 25 | 196 | 6 | N/A | N/A |
| COCOA | N/A | 1 | 1 | 1 | 1 | 1 |
| CASHEW | 15 | 1 | 47 | 12 | 9 | 23 |
| RUBBER | N/A | N/A | 3 | 20 | 70 | 3 |
| OILPALM | 5 | 7 | 118 | 352 | 413 | 348 |
| MELON | 2 | 23 | 213 | 46 | 49 | 49 |

Source: Results from the NASM. Key: NW = North-West, NE = North-East, NC = North-Central, SW = South-West, SS = South-South, and SE = South-East, geo-political zones. Nig Ave. = National Average.

Appendix D, Slope of the Demand Curve at Base Year (

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | NW | NE | NC | SW | SS | SE | Nig Ave. |
| MAIZE | -0.13673 | -0.25565 | -0.27922 | -0.55112 | -0.82586 | -0.83257 | -0.48019 |
| CASSAVA | -0.19126 | -0.16599 | -0.04463 | -0.05779 | -0.05491 | -0.05967 | -0.09571 |
| POTATO | -1.08797 | -1.23497 | -1.01862 | -109.411 | -128.069 | -132.968 | -62.2982 |
| YAM | -0.3381 | -0.28993 | -0.0732 | -0.13604 | -0.14567 | -0.11994 | -0.18381 |
| COCOYAM | -77.219 | -40.118 | -2.35188 | -0.49107 | -0.95947 | -0.64139 | -20.2968 |
| PLANTAIN | -13.0285 | -11.3318 | -3.05082 | -3.9487 | -3.75315 | -4.07873 | -6.53195 |
| BEANS | -0.45126 | -0.49904 | -0.86982 | -26.9601 | -350.897 | -116.793 | -82.745 |
| SORGHUM | -0.15044 | -0.23453 | -0.40096 | -15.8069 |  |  | -4.1482 |
| SUGARCANE | -0.33682 | -3.46961 | -4.28314 | -18.6041 | -8.16093 | -121.622 | -26.0794 |
| WHEAT | -1.19234 | -2.20433 | -2.17864 | -1.6254 |  |  | -1.80018 |
| MILLET | -0.13931 | -0.18496 | -0.80796 | -122.175 |  |  | -30.8267 |
| RICE | -0.54613 | -0.76842 | -0.55055 | -4.12299 | -4.46005 | -1.90225 | -2.0584 |
| GROUNDNUT | -0.42211 | -0.47898 | -0.39504 | -45.4748 | -52.825 | -54.1773 | -25.6289 |
| COTTON | -3.6671 | -9.16551 | -56.6941 | -2754.11 |  |  | -705.908 |
| SESAME | -20.9214 | -50.65 | -14.1898 |  |  |  | -28.5871 |
| SOYBEAN | -4.00234 | -26.6206 | -3.46535 | -121.261 |  |  | -38.8374 |
| COCOA |  | -6752.56 | -6284.62 | -6475.58 | -7064.55 | -7788.52 | -6873.16 |
| CASHEW | -118.458 | -1532.58 | -38.519 | -156.674 | -198.025 | -77.3136 | -353.596 |
| RUBBER |  |  | -872.874 | -140.222 | -39.6437 | -959.631 | -503.093 |
| OILPALM | -931.819 | -703.947 | -41.3272 | -13.7856 | -11.7652 | -13.9671 | -286.102 |
| MELON | -681.982 | -60.2826 | -6.38566 | -29.3487 | -27.7819 | -27.4187 | -138.867 |

Source: Results from the NASM. Key: NW = North-West, NE = North-East, NC = North-Central, SW = South-West, SS = South-South, and SE = South-East, geo-political zones. Nig Ave. = National Average.

Appendix E, Regional Labour Employment at the Base Year (Figures 8b to 8f):

Appendix E.1 (Figure 8b), NE Family Labour Employment: NLP versus NBS

Source: NE.NLP Family Labour results are from researchers’ NASM (Calibration) models while NE.NBS Family Labour are data from National (Nigerian) Bureau of Statistics (NBS).

Key: NE.NLP Family Labour = average number of NE family labour employed per year in the NASM model while NE.NBS Family Labour = reference average number of NE family labour employed at the base-year from NBS.

Appendix E.2 (Figure 8c), NC Family Labour Employment: NLP versus NBS

Source: NC.NLP Family Labour results are from researchers’ NASM (Calibration) models while NC.NBS Family Labour are data from National (Nigerian) Bureau of Statistics (NBS). Key: NC.NLP Family Labour = average number of NC family labour employed per year in the NASM model while NC.NBS Family Labour = reference average number of NC family labour employed at the base-year from NBS.

Appendix E.3 (Figure 8d), SW Family Labour Employment: NLP versus NBS

Source: SW.NLP Family Labour results are from researchers’ NASM (Calibration) models while SW.NBS Family Labour are data from National (Nigerian) Bureau of Statistics (NBS).

Key: SW.NLP Family Labour = average number of SW family labour employed per year in the NASM model while SW.NBS Family Labour = reference average number of SW family labour employed at the base-year from NBS.

Appendix E.4 (Figure 8e), SS Family Labour Employment: NLP versus NBS

Source: SS.NLP Family Labour results are from researchers’ NASM (Calibration) models while SS.NBS Family Labour are data from National (Nigerian) Bureau of Statistics (NBS).

Key: SS.NLP Family Labour = average number of SS family labour employed per year in the NASM model while SS.NBS Family Labour = reference average number of SS family labour employed at the base-year from NBS.

Appendix E.5 (Figure 8f), SE Family Labour Employment: NLP versus NBS

Source: SW.NLP Family Labour results are from researchers’ NASM (Calibration) models while SW.NBS Family Labour are data from National (Nigerian) Bureau of Statistics (NBS).

Key: SW.NLP Family Labour = average number of SW family labour employed per year in the NASM model while SW.NBS Family Labour = reference average number of SW family labour employed at the base-year from NBS.