Cost of Production
A Global challenge

Keshav R Kranthi
COUNTRY DATA: RESEARCH, WEATHER, PRODUCTION COSTS

STRUCTURE OF COTTON RESEARCH

Cotton Research and Development Corporation, New South Wales plays an important role in cotton research. The Australian cotton research system is a network of professional disciplines, public institutions, non-profit organizations and private companies bound by legislation and commercial relationships. The agencies involved in the cotton research system include the Cotton Research and Development Corporation (CRDC), Cotton Australia, Cotton Seed Distributors (CSRD), the Australian Government’s Department of Agriculture and Water Resources, the Queensland Government’s Department of Agriculture and Fisheries, the NSW Department of Primary Industries and universities including Australian National University, Deakin University, Griffith University, Macquarie University, University of Southern Queensland, Queensland University of Technology, University of Melbourne, University of New England, University of New South Wales, University of Queensland, University of Southern Queensland, University of Sydney, University of Technology Sydney and the University of Western Sydney.

WEATHER 2018-19

MONTHLY DD60 HEAT UNITS

MONTHLY RAINFALL (mm)

COST OF CULTIVATION (US$) PER HECTARE

OVERHEAD INVESTED

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity (ton/ha)</th>
<th>Number per season</th>
<th>Total cost per hectare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-DM seeds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biotex/CM seeds</td>
<td>1</td>
<td></td>
<td>344,406</td>
</tr>
<tr>
<td>RP+Dribe</td>
<td>360</td>
<td></td>
<td>350,952</td>
</tr>
<tr>
<td>Herbicides</td>
<td>1,195 + 0.027 kg</td>
<td></td>
<td>559,930</td>
</tr>
<tr>
<td>Herbicides</td>
<td>4.6 kg + 0.5 L</td>
<td></td>
<td>80.75</td>
</tr>
<tr>
<td>Fungicides &amp; Antimicrobials etc.</td>
<td>0.1 L</td>
<td></td>
<td>3.00</td>
</tr>
<tr>
<td>Growth regulators</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defoliants</td>
<td>7.13 L</td>
<td></td>
<td>35.624</td>
</tr>
<tr>
<td>Mature</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MANUFACTURING/ACQUISITION

<table>
<thead>
<tr>
<th>Item</th>
<th>Price per operation (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land preparation/Bagging etc.</td>
<td></td>
</tr>
<tr>
<td>Sowing</td>
<td></td>
</tr>
<tr>
<td>Fertilizer/irrigation</td>
<td></td>
</tr>
<tr>
<td>Irrigation</td>
<td></td>
</tr>
<tr>
<td>Thinning</td>
<td></td>
</tr>
<tr>
<td>Weeding</td>
<td></td>
</tr>
<tr>
<td>Hoeing</td>
<td></td>
</tr>
<tr>
<td>Pesticide application</td>
<td></td>
</tr>
<tr>
<td>Defoliation application</td>
<td></td>
</tr>
<tr>
<td>Picking / harvesting</td>
<td></td>
</tr>
<tr>
<td>Stalk cutting &amp; removal</td>
<td></td>
</tr>
<tr>
<td>Transportation/Unloading etc.</td>
<td>115.2</td>
</tr>
</tbody>
</table>

INFRASTRUCTURE

<table>
<thead>
<tr>
<th>Item</th>
<th>Price per operation (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tractors</td>
<td>521</td>
</tr>
<tr>
<td>Implement &amp; tools</td>
<td></td>
</tr>
<tr>
<td>Electric / Diesel pumps</td>
<td>191.24</td>
</tr>
<tr>
<td>Electric / Diesel etc</td>
<td></td>
</tr>
<tr>
<td>Harvesting machines</td>
<td>11.5</td>
</tr>
<tr>
<td>Harvesting / Tillage machine etc.</td>
<td>134,832</td>
</tr>
<tr>
<td>Sawmills / Crushers</td>
<td></td>
</tr>
<tr>
<td>Consultant</td>
<td>41.12</td>
</tr>
<tr>
<td>Levees + Insurance</td>
<td>159.24</td>
</tr>
<tr>
<td>Ginning cost (US$) per 100 kg</td>
<td>54.6</td>
</tr>
</tbody>
</table>

MARKET VALUE

<table>
<thead>
<tr>
<th>Item</th>
<th>US$ per 100 kg</th>
<th>Yield kg per hectare</th>
<th>Value per hectare (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed cotton</td>
<td>58.00</td>
<td>0.010</td>
<td>463.00</td>
</tr>
<tr>
<td>Lint fibre</td>
<td>178.04</td>
<td>0.0274</td>
<td>487.15</td>
</tr>
<tr>
<td>Seed</td>
<td>40.80</td>
<td>0.0091</td>
<td>363.22</td>
</tr>
<tr>
<td>Cotton seed-oil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seed-cake</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

YIELD OF CULTIVATION

<table>
<thead>
<tr>
<th>Item</th>
<th>Value per hectare (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Returns (seed-cotton)</td>
<td>2445.03</td>
</tr>
<tr>
<td>Net Returns (lint - seed)</td>
<td>3787.35</td>
</tr>
</tbody>
</table>
LONG TERM TRENDS, INTER-COUNTRY COMPARISONS

LONG TERM TRENDS

Long term comparison of costs has been done without adjusting for inflation.

SEED-COTTON PRODUCTION COST: The cost of seed-cotton production increased from 25 cents per kg in 2001 to 52 cents in 2013 and declined later to 45 cents in 2019 (Figure 1).

LINT PRODUCTION COST: The production cost of lint followed a similar trend to that of seed-cotton with an increase from 62 cents per kg in 2001 to 100 cents in 2013 and declined later to 134 cents in 2019 (Figure 2).

WEIGHING COSTS: Weighing costs per kg lint increased from 7 cents per kg in 2001 to 21 cents in 2013 and declined later to 13 cents in 2019 (Figure 3).

FERTILIZER COSTS: Fertilizer costs per kg lint increased almost constantly over the years from 13 cents per kg in 2001 to 31 cents in 2019 (Figure 4).

INSECTICIDE COSTS: Insecticide costs per kg lint decreased from 17 cents per kg in 2001 to 19 cents in 2013 and increased further to 19 cents in 2019 (Figure 5).

GAMING COSTS: Interestingly, ginning costs seem to fluctuate within a range of 16 to 20 cents during 2001 to 2016 but declined to 14 cents per kg lint in 2019 (Figure 6).

MACHINERY COST: The global average cost of machinery use is USD 256 per hectare. The cost is highest at USD 514 to 937 in South Africa, Australia and Mexico. Machinery usage cost is also high at USD 200 to 450 in Colombia, Turkey, India and China. Machinery cost is lowest in African countries where mechanization has not yet taken place in many of the countries.

GROWING COST: The global average growing cost is USD 141 per hectare of cotton harvested. Growing costs are high, not at USD 530 to 570 in Australia and South Africa, and USD 207 to 355 in Brazil, Colombia and semi-arid regions of Australia. The cost of growing per hectare is lower in Africa and India because of low yields.
CHARTS: PESTS, WEEDS etc., SOWING & HARVESTING CALENDAR
Net return per hectare

Yields
Market price
Production costs
Cost of Cultivation (US$) per Hectare

- China: 3510
- Turkey: 2665
- Australia: 2594
- South Africa: 2343
- Brazil: 2264
- Mexico: 2198
- Egypt: 1911
- Greece: 1826
- Bangladesh: 1805
- Iran: 1610
- USA: 1543
- Colombia: 1118
- India: 865
- Pakistan: 855
- Mali: 769
- Sudan: 708
- Argentina: 680
- Nigeria: 572
- Cote-D'Ivoire: 509
- Tanzania: 479
- Ethiopia: 413
- Burkina: 395
- Uganda: 369
- Zimbabwe: 338
- Kenya: 316
- Chad: 314
- Mozambique: 301
- Zambia: 97
Net Returns on Seed-Cotton (US$) per Hectare

- **AUSTRALIA**: 3000
- **SOUTH AFRICA**: 1207
- **EGYPT**: 1195
- **BRAZIL**: 1034
- **IRAN**: 947
- **ETHIOPIA**: 785
- **MEXICO**: 770
- **TURKEY**: 661
- **ARGENTINA**: 641
- **PAKISTAN**: 575
- **CHINA**: 480
- **USA**: 458
- **BANGLADESH**: 427
- **GREECE**: 261
- **COLOMBIA**: 408
- **UGANDA**: 279
- **INDIA**: 278
- **TANZANIA**: 182
- **SUDAN**: 121
- **KENYA**: 98
- **ZAMBIA**: 74
- **COTE-D'IVOIRE**: 74
- **CHAD**: 51
- **BURKINA**: 26
- **MOZAMBIQUE**: 19
- **ZIMBABWE**: 8
- **NIGERIA**: 5
- **MALI**: 2
Market Price of Seed-Cotton (US$) 100 Kg

- Egypt: 99
- Iran: 95
- China: 87
- USA: 76
- Brazil: 75
- Bangladesh: 72
- India: 70
- Mexico: 69
- Australia: 68
- Colombia: 65
- Nigeria: 62
- Turkey: 60
- Pakistan: 59
- South Africa: 58
- Greece: 56
- Ethiopia: 54
- Mali: 54
- Tanzania: 53
- Zimbabwe: 52
- Sudan: 51
- Kenya: 50
- Uganda: 49
- Chad: 45
- Cote-D'Ivoire: 45
- Burkina: 44
- Argentina: 40
- Mozambique: 37
- Zambia: 28
Production Cost (US$) of 1 Kg seed-cotton

- China: 0.75
- Nigeria: 0.61
- Turkey: 0.59
- Egypt: 0.59
- Bangladesh: 0.58
- Iran: 0.57
- USA: 0.56
- Greece: 0.56
- India: 0.54
- Mali: 0.54
- Zimbabwe: 0.51
- Brazil: 0.50
- Mexico: 0.50
- Colombia: 0.46
- Sudan: 0.43
- Burkina: 0.41
- Cote-D'Ivoire: 0.38
- Chad: 0.38
- Kenya: 0.37
- South Africa: 0.36
- Mozambique: 0.34
- Pakistan: 0.32
- Australia: 0.30
- Uganda: 0.26
- Argentina: 0.26
- Tanzania: 0.25
- Ethiopia: 0.14
- Zambia: 0.13
## Production Cost (US$) of 1 Kg Lint

<table>
<thead>
<tr>
<th>Country</th>
<th>Production Cost (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>2.09</td>
</tr>
<tr>
<td>Iran</td>
<td>2.08</td>
</tr>
<tr>
<td>Egypt</td>
<td>2.01</td>
</tr>
<tr>
<td>Greece</td>
<td>1.71</td>
</tr>
<tr>
<td>India</td>
<td>1.70</td>
</tr>
<tr>
<td>Nigeria</td>
<td>1.68</td>
</tr>
<tr>
<td>USA</td>
<td>1.65</td>
</tr>
<tr>
<td>Turkey</td>
<td>1.55</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1.50</td>
</tr>
<tr>
<td>Mali</td>
<td>1.48</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>1.38</td>
</tr>
<tr>
<td>Mexico</td>
<td>1.35</td>
</tr>
<tr>
<td>Brazil</td>
<td>1.34</td>
</tr>
<tr>
<td>Colombia</td>
<td>1.32</td>
</tr>
<tr>
<td>South Africa</td>
<td>1.27</td>
</tr>
<tr>
<td>Pakistan</td>
<td>1.22</td>
</tr>
<tr>
<td>Chad</td>
<td>1.21</td>
</tr>
<tr>
<td>Kenya</td>
<td>1.20</td>
</tr>
<tr>
<td>Sudan</td>
<td>1.18</td>
</tr>
<tr>
<td>Burkina</td>
<td>1.10</td>
</tr>
<tr>
<td>Argentina</td>
<td>1.05</td>
</tr>
<tr>
<td>Cote-d'Ivoire</td>
<td>0.99</td>
</tr>
<tr>
<td>Australia</td>
<td>0.95</td>
</tr>
<tr>
<td>Mozambique</td>
<td>0.94</td>
</tr>
<tr>
<td>Tanzania</td>
<td>0.86</td>
</tr>
<tr>
<td>Uganda</td>
<td>0.73</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>0.57</td>
</tr>
<tr>
<td>Zambia</td>
<td>0.49</td>
</tr>
</tbody>
</table>
Input Costs (US$) per Hectare in ‘Low-Yield Countries’

- Seeds
- Fertilizers etc.
- Pesticides
- Manpower
- Machinery
- Ginning
- Overheads etc

Countries: Mali, Sudan, Argentina, Nigeria, Côte d'Ivoire, Tanzania, Ethiopia, Burkina, Uganda, Zimbabwe, Kenya, Chad, Mozambique, Zambia
Input Costs (US$) per Hectare in ‘High Yield countries’

- **China**
- **Turkey**
- **Australia**
- **South Africa**
- **Brazil**
- **Mexico**
- **Egypt**
- **Greece**
- **Bangladesh**
- **Iran**
- **USA**
- **Colombia**
- **India**
- **Pakistan**

Legend:
- Seeds
- Fertilizers etc.
- Pesticides
- Manpower
- Machinery
- Overheads
- Overheads
- Overheads
- Overheads
- Overheads
- Overheads
- Overheads
- Overheads
- Overheads
Proportion of Input Costs in ‘High Yield Countries’

- Seeds
- Fertilizers etc.
- Pesticides
- Manpower
- Machinery
- Ginning
- Overheads

Countries: Brazil, USA, Australia, Colombia, Pakistan, Iran, Mexico, Greece, Bangladesh, Egypt, Turkey, China, South Africa, India, Pakistan, Colombia, Australia, USA, Brazil.
Manpower Cost (US$)/Ha

- China: 1325
- Turkey: 1141
- Egypt: 901
- Bangladesh: 878
- Greece: 733
- Mexico: 635
- Iran: 581
- South Africa: 469
- Cote-D'Ivoire: 272
- Tanzania: 248
- Burkina: 215
- Mozambique: 208
- Chad: 194
- Colombia: 185
- Kenya: 178
- Uganda: 149
- Argentina: 136
- Australia: 115
- Zimbabwe: 97
- USA: 61
- Iran: 56
- Egypt: 43
- Brazil: 26
- Sudan: 19
- India: 423
- Pakistan: 352
- Mali: 345
- South Africa: 440
- Nigeria: 469
<table>
<thead>
<tr>
<th>Country</th>
<th>Cost of Seed (US$)/Ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>344</td>
</tr>
<tr>
<td>Mexico</td>
<td>276</td>
</tr>
<tr>
<td>Brazil</td>
<td>203</td>
</tr>
<tr>
<td>China</td>
<td>183</td>
</tr>
<tr>
<td>Colombia</td>
<td>174</td>
</tr>
<tr>
<td>USA</td>
<td>166</td>
</tr>
<tr>
<td>South Africa</td>
<td>153</td>
</tr>
<tr>
<td>Greece</td>
<td>100</td>
</tr>
<tr>
<td>Turkey</td>
<td>77</td>
</tr>
<tr>
<td>Iran</td>
<td>75</td>
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<tr>
<td>Argentina</td>
<td>71</td>
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<tr>
<td>India</td>
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<td>Sudan</td>
<td>53</td>
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<tr>
<td>Egypt</td>
<td>43</td>
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<td>Mali</td>
<td>30</td>
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<td>Zimbabwe</td>
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<td>Pakistan</td>
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<tr>
<td>Ethiopia</td>
<td>23</td>
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<td>Mozambique</td>
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<tr>
<td>Nigeria</td>
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</tr>
<tr>
<td>Kenya</td>
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<tr>
<td>Tanzania</td>
<td>7</td>
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<tr>
<td>Burkina</td>
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</tr>
<tr>
<td>Zambia</td>
<td>4</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>4</td>
</tr>
<tr>
<td>Uganda</td>
<td>2</td>
</tr>
<tr>
<td>Cote-D'Ivoire</td>
<td>0</td>
</tr>
<tr>
<td>Chad</td>
<td>0</td>
</tr>
</tbody>
</table>
Cost of Pesticides (US$)/Ha

- **USA**: $153
- **ZIMBABWE**: $154
- **BANGLADESH**: $197
- **SOUTH AFRICA**: $232
- **SUDAN**: $260
- **MEXICO**: $254
- **AUSTRALIA**: $261
- **COLOMBIA**: $264
- **IRELAND**: $279
- **EGYPT**: $434
- **GREECE**: $411
- **CHINA**: $341
- **IRAN**: $279
- **ARGENTINA**: $546
- **BRAZIL**: $788
- **PAKISTAN**: $104
- **ETHIOPIA**: $64
- **MALI**: $49
- **COTE-D'IVOIRE**: $45
- **INDIA**: $41
- **NIGERIA**: $39
- **BURKINA**: $32
- **UGANDA**: $19
- **KENYA**: $19
- **ZAMBIA**: $17
- **TANZANIA**: $11
- **MOZAMBIQUE**: $10
- **CHAD**: $10
RECOMMENDATIONS

• The proportion of manpower costs is high in Africa
• Man-days are high at more than 100 per hectare in Egypt, Bangladesh, China, Nigeria, Pakistan, Mali, Tanzania, Uganda and Mozambique
• SMALL SCALE MECHANIZATION IS A PRIORITY
• Yields in Africa, India and Pakistan must improve
• USE DELINTED SEEDS, INCREASE HARVEST INDEX

• Seed cotton market price is lowest in Africa
• FARMERS NEED GOVERNMENT SUPPORT

• Brazil, Turkey, Egypt, Greece and China need to cut down costs on pesticides
• PESTICIDE MANAGEMENT AND INSECT RESISTANCE MANAGEMENT

• Biotech seeds are expensive
• AFRICA NEEDS TO CONSIDER DILIGENTLY
Thank You