

PROMOTING COTTON BY-PRODUCTS

in Eastern and Southern Africa

Zimbabwe National Action Plan

Agreed by consensus at the multi-stakeholder national workshop
(Bronte Hotel, Harare, Zimbabwe, 28 September 2017)

Validated by Mrs. Abigail Shonhiwa, Secretary for Industry,
Commerce and Enterprise

31 January 2018



in partnership with United Nations
Economic Commission for Africa
and Common Market for Eastern
and Southern Africa



Project: 1617K - Funded by the United Nations Development Account - 2016-2019

Summary

The participants of the national workshop on “Promoting cotton by-products in Zimbabwe” recommended, by consensus, the following National Action Plan to develop value added activities on cotton by-products in Zimbabwe. The plan includes three concrete initiatives:

1. Establish a stabilisation fund for cotton prices;
2. Develop a new value chain for cotton stalks; and
3. Extend the market for cottonseed to the non-ruminants feed segment by implementing de-gossypol technology.

Participants also proposed a multi-stakeholder committee to oversee the implementation of these initiatives, the related activities of the UNCTAD technical cooperation project, as well as any follow-up activities.

On behalf of the Government, the Secretary for Industry, Commerce and Enterprise validated this National Action Plan on 31 January 2018 (see Annex 2).

The following section introduces the national workshop and the context for this National Action Plan, while the subsequent sections provide a detailed description of the proposed initiatives and oversight committee.

Introduction

The United Nations Conference on Trade and Development (UNCTAD) and the Ministry of Industry and Commerce organised a three-day national capacity-building workshop in Harare on 27-29 September 2017, as part of the technical cooperation project “Promoting cotton by-products in Eastern and Southern Africa”. Approximately 60 participants attended the workshop, including policy makers, researchers and stakeholders from the cotton value chain.

The objectives of the workshop included: a) equipping stakeholders to identify priority value added activities on cotton by-product to develop in Zimbabwe; and b) assisting government officials in drafting evidence-based policies to support the identified initiatives. Correspondingly, the national workshop comprised a two-day programme for stakeholders (27-28 September) and a one-day programme for policy makers (29 September).

During the stakeholder component of the workshop, participants agreed on a National Action Plan for developing cotton by-products in Zimbabwe, detailed below.

In support of the National Action Plan, participants at the policy-making component of the workshop agreed by consensus on the following policy recommendations:

1. Enable the use of cotton stalks in value added activities;
2. Favour the acquisition and adoption of appropriate technologies to add value to cotton by-products;
3. Establish a consensus pricing model for seed cotton producer prices;
4. Favour self-sufficiency in oilseeds and edible oils; and
5. Establish a unified, public-private funding model for increased productivity and production of seed cotton.

At the request of participants, UNCTAD drafted the agreed recommendations, to submit alongside the National Action Plan, for validation by the Secretary for Industry, Commerce and Enterprise.

Initiative 1: Establish a stabilisation fund for cotton prices

Background

In a survey commissioned by the UNCTAD project, farmers identified volatile producer prices as a disincentive to plant cotton. Volatility derives from international cotton prices and is transmitted by ginners through the producer prices they offer to farmers.

To avoid the downside risk of cotton price cycles, risk-averse farmers devote less land and resources to cotton. This is particularly acute in growing areas where cotton competes with less risky crops, such as maize, for which the Government offers a guaranteed price.

As a result, volatile prices lead to farmers dropping in and out of cotton cultivation over the years. This turnover erodes the level of agronomic knowledge and techniques among farmers, contributing to lower yields.

Altogether, farmers' exposure to volatile producer prices undermines the size and predictability of the national seed cotton harvest.

To attenuate the downside effects of volatile international cotton prices, the Ministry of Agriculture, the Agricultural Marketing Authority (AMA) and the Association of Cotton Value Adders of Zimbabwe (ACVAZ) began discussions on the establishment of a stabilisation fund for cotton prices. The participants at the national workshop encouraged the parties to pursue this initiative, as an important way to increase incentives for farmers to grow more cotton.

Business case

Based on its previous discussions with the Government, ACVAZ estimates that a stabilisation fund for cotton prices would require an up-front capital infusion of approximately US\$ 15-20 million, followed by an administrative budget of approximately US\$ 250,000 per year. Please note that these figures are estimates only, provided for illustrative purposes.

In return for this investment, the fund could provide the following benefits:

- Motivate farmers to grow more cotton;
- Assure a more predictable supply of seed cotton to value added producers;
- Cushion the detrimental effects on farming households and communities when cotton prices fall; and
- Reduce expenditures on relief programmes for farmers when cotton prices fall.

Requirements

Investment:	An up-front capital infusion of approximately US\$ 15-20 million, followed by an administrative budget of approximately US\$ 250,000 per year.
Technology:	Appropriate software to model producer prices and administer the fund.
Capacity-building:	Training of fund managers. Outreach to farmers to design appropriate rules and procedures for the fund. Training of claims adjusters, either existing extension officers or new personnel.
Infrastructure:	Representation in cotton-growing areas, either through the existing extension network or dedicated field offices.

Implementing agencies

Lead: Association of Cotton Value Adders of Zimbabwe (ACVAZ)

Support: Ministry of Agriculture, AMA

Initiative 2: Develop a new value chain for cotton stalks

Background

Stalks are the main cotton by-product at the farm level. There are currently no commercial applications for cotton stalks in Zimbabwe, as regulations¹ require farmers to destroy their stalks. Nevertheless, in other cotton-producing countries, new technologies have been commercialised to process cotton stalks into final products.

¹ The cotton amendment to the Plant Pests and Diseases Regulations of 1988

These technologies are often small in scale and relatively affordable, making them suitable for use in rural areas, either directly by farmers or by rural collectives.

If these technologies can be adapted to Zimbabwe – and regulations that require the destruction of cotton stalks can be lifted – this represents a potential new value chain, creating new jobs and economic activity, as well as a new income stream for farmers.

Based on examples from India, participants recommend that the Government of Zimbabwe import prototypes of the machines necessary to pilot a supply chain to convert cotton stalks into, for example: pellets and briquettes for heating; mushrooms; compost; and manure. Lessons from the pilot phase can then inform the design and implementation of a national value chain for cotton stalks.

Business case

Establishing a pilot cotton stalk supply chain, centred on one briquetting and one pelleting plant, would involve establishing the following activities:

1. Deploying mobile chipping machines throughout the plants' feeder area;
2. Loading and trucking chipped stalks to the plants;
3. Processing the chips into pellets or briquettes;
4. Delivering the pellets and briquettes to end users.

Please see Annex 1 for a more detailed analysis of the business case for this value chain, applying the Indian model to Zimbabwe's figures for seed cotton production. Below is a summary of the investment, financial and marketing components of the business case.

Establishing a pilot supply chain for one briquetting and one pelleting plant would require an estimated total capital investment of approximately US\$ 96,000, with the breakdown shown in Table 1.

Table 1 – Summary of capital requirements

Item	Quantity	Total installed cost (estimated, US\$)
Briquetting plant	1	70,000
Pelleting plant	1	26,000
Grand total		96,000

Assumptions: The total installed cost of the plants includes the cost of the mobile chipping machines that would supply it with sufficient chipped stalks to operate at full capacity.

Chipped stalks will be transported to the plants by the existing fleet of lorries.

For their investments in a briquetting or pelleting plants, investors could expect a guaranteed supply of chipped stalks, an estimated gross profit margin of 8-10 per cent and a payback period of approximately 2-3 years, as show in Table 2.

Table 2 - Summary of financial projections

Item	Briquetting plant	Pelleting plant
Total investment (US\$)	70,000	26,000
Gross income / yr	369,000	104,000
Net income / yr	37,000	8,000
Gross profit margin	10%	7.7%
Investment payback period (months)	23	33

Assumptions: The above calculations assume paying farmers an average price for chipped stalks of US\$ 43.25 per tonne and an average logistics cost to deliver the feedstock to the plant of US\$ 23 per tonne (Source: CIRCOT).

The products of these plants would be marketed as fuels to industrial and commercial users. For example, in India, briquettes are used as a substitute for coal in industrial boilers and pellets as a substitute for liquefied petroleum gas (LPG) in commercial boilers and cooking equipment used by restaurants. In Zimbabwe, participants identified tobacco drying operations as a target market for briquettes and pellets.

Both cotton stalk-based fuels differentiate themselves on cost from the existing fuels used by users in the target market. In the Indian example, briquettes cost industrial users, on average, 20 per cent less than coal, while pellets sold at a 50 per cent discount to LPG.

These products also differentiate themselves as a renewable source of energy, a feature of policy interest to the Government of Zimbabwe, and of marketing interest to businesses that wish to promote a lower carbon footprint in their supply chains.

Lastly, cotton stalk-based fuels are substitutes to fossil fuel imports. By increasing the market share of domestically produced fuels, the Government of Zimbabwe and the national economy can benefit by reducing the country's import bill. In parallel, business can reduce the amount of scarce hard currency they require to operate.

Requirements

Investment:	An up-front total capital investment for the pilot project of approximately US\$ 96,000. Costs to adapt the technologies to the Zimbabwe context. For the briquetting plant, working capital of US\$ 300-350,000 per year. For the pelleting plant, working capital of US\$ 80-100,000 per year.
Technology:	Importation of the technologies from India or elsewhere, along with their spare parts and specialized maintenance equipment. Licencing of any technical training programmes. Provisions in the licencing agreement, allowing for these technologies to eventually be manufactured in Zimbabwe.
Capacity-building:	Outreach to farmers unions and associations to inform them on the opportunity for them to invest in these technologies for village-level operations. Outreach to target customers to obtain their user requirements and specifications for the products. Training of technicians.
Infrastructure:	Adequate roads to accommodate loaded lorries travelling from farm, to processing plant, to market. Trucks and lorries. Warehouse collection points at the village level.

Implementing agencies

Lead:	Ministry of Industry and Commerce
Support:	Ministries and Finance and Agriculture, Agricultural Research Council, Zimbabwe Association of Consulting Engineers

Initiative 3: Extend the market for cottonseed to the non-ruminants feed segment by implementing de-gossypol technology

Background

In a survey commissioned by the UNCTAD project, stockfeed producers indicated that they face a short supply of domestically produced feedstock, such as meal from cottonseed or soya. Among these, cottonseed meal is attractive due to its high protein content. Nevertheless, the presence in cottonseed of the enzyme gossypol

renders it unsuitable for use in feeds for non-ruminants, such as poultry, pigs or fish, limiting its use to feed for ruminants, mainly cattle.

In Zimbabwe, poultry represents the main stockfeed market. Meanwhile, cattle are often pasture-fed, limiting the demand for stockfeed from that segment. These conditions mean that cottonseed meal has a small share of the stockfeed market, relative to other feedstocks, such as soya.

Meanwhile, in India, a new process has been commercialised to remove gossypol from cottonseed meal. The commercial process is small-scale and the Central Institute for Cotton Research (CIRCOT) was trialling a larger-scale process at the time of writing.

If de-gossypol technology can be economically implemented in Zimbabwe, it would extend the market for cottonseed meal to the larger non-ruminants segment. This would increase demand for cottonseed meal and, by extension, seed cotton, as well as increase domestic value added to cotton by-products.

Participants recommend that the Government facilitate the licencing and importation from India of the equipment for a small-scale de-gossypol operation, to pilot for its implementation in the non-ruminants feed segment in Zimbabwe.

Business case

Please see Annex 1 for a more detailed analysis of the business case for de-gossypol technology, applying the Indian model to Zimbabwe's figures for cottonseed meal production. Below is a summary of the investment, financial and marketing components of the business case.

Establishing a pilot de-gossypol plant would require an estimated total capital investment of approximately US\$ 23,000, including land, plant and auxiliary equipment.

In return, investors could expect an estimated gross profit margin of 7.9 per cent and a payback period of approximately 38 months, as shown in Table 3.

Table 3 - Summary of financial projections

Item	De-gossypol plant
Total investment (US\$)	23,000
Gross income / yr	93,300
Net income / yr	7,400
Gross profit margin	7.9%
Investment payback period (months)	38

Gossypol-reduced cottonseed meal would be marketed to stockfeed producers as an ingredient for feed for non-ruminants. The product differentiates itself from substitutes by its high protein content.

More generally, removing gossypol from cottonseed meal increases the total available domestic supply of feedstock, replacing the supply stockfeed producers currently import. For the Government of Zimbabwe and the national economy, this reduces the country's import bill. Businesses also benefit by reducing their hard currency requirements.

Requirements

Investment:	An up-front total capital investment for the pilot project of approximately US\$ 23,000. Costs to adapt the technologies to the Zimbabwe context. Working capital of US\$ 85-90,000 per year.
Technology:	Importation of the technologies from India or elsewhere, along with their spare parts and specialized maintenance equipment. Licencing of any technical training programmes. Provisions in the licencing agreement, allowing for these technologies to eventually be manufactured in Zimbabwe.

Capacity-building:	Outreach to farmers unions and associations to inform them on the opportunity for them to invest in these technologies for village-level operations. Outreach to target customers to obtain their user requirements and specifications for the products. Training of technicians.
Infrastructure:	As this process would be installed alongside existing oil expression operations, there would be no new infrastructure to build, outside of the processing equipment itself.

Implementing agencies

Lead:	Ministry of Industry and Commerce
Support:	Ministries of Finance and Agriculture, Agricultural Research Council, Zimbabwe Association of Consulting Engineers

Multi-stakeholder oversight committee

Participants propose that the Secretary for Industry, Commerce and Enterprise convene a multi-stakeholder committee to oversee the implementation of this plan, including any related activities of the UNCTAD project.

The three above initiatives represent the committee's initial remit. Nevertheless, as it begins working, the committee can also begin to undertake other important initiatives to overcome challenges to the development of value added activities on cotton by-products in Zimbabwe.

Participants invite the Secretary for Industry, Commerce and Enterprise to chair the committee and set its membership criteria, e.g. the appropriate expertise, rank and decision-making authority of committee members. The group proposes the committee include the following organisations or groups:

- | | | |
|------------|--------------------------------------|-----------------------------|
| 1. ACVAZ | 6. Ginners | 10. Oil expressers |
| 2. Agritex | 7. Ministry of Agriculture | 11. Stockfeed manufacturers |
| 3. AMA | 8. Ministry of Finance | 12. ZIA |
| 4. CRI | 9. Ministry of Industry and Commerce | 13. Zimtrade |
| 5. Farmers | | |

Role of UNCTAD

UNCTAD will support the Government of Zimbabwe and the proposed oversight committee in the implementation of the National Action Plan, where the scope and budget of its technical cooperation project permit. Among the three identified initiatives, for example, Initiative 1 on a cotton price stabilisation fund is outside of the scope of the project, whereas the other two initiatives fit well.

In this context, UNCTAD can support the implementation of the National Action Plan with the following services, for example:

- Secretarial support and drafting of documents for project-related activities;
- Introducing the Government of Zimbabwe to technology owners, for example in India;
- Organising a study tour (Activity 1.4 in the project plan);
- Procuring advisory services (A 2.2);
- Drafting investment profiles (A2.3); and
- Organising a regional workshop among all four project countries (A 2.4).

Annexes

- 1) *Detailed analysis of the business case for de-gossypol technology, applying the Indian model to Zimbabwe's figures for cottonseed meal production*

Author and source of figures: Dr. P.G.PATIL, Director, ICAR-CIRCOT, Mumbai (India).

- 2) *Validation letter of the Zimbabwe National Action Plan*

Author: Ministry of Commerce and Industry, Zimbabwe.

Annex 1

Pilot Scale Production: Degossypolised cake

A	Capital Investment (0.8 TPD Capacity)	INR (Mn.)	USD
	Land and Building (Land Area: 2000 sq. m; Building for Machinery: 50 Sq. M ; Material storage area:500 Sq. M ; Office Building: 40 Sq. M)	0.50	7,962
	Plant and Equipment	0.90	13,846
	Auxiliary and Service Equipment (Electricals and handling tools)	0.10	1,538
	Total investment	1.50	23,077
B	Operational Expenses		
	Raw Material Cost for 1 year (0.8 TPD for 300 days @ Rs. 20,000 per tonne)	4.80	73,846
	Operational cost including repair and Maintenance and other charges (Rs. 3000/tonnee) for 1 year	0.72	11,077
C	Gross Annual Income (Rs. 25000/tonne)	6.0	93,308
	Net annual income (Rs. 2000/tonne)	0.48	7,385
D	Payback period: 38 months		Return on investment : 26.3%

Commercial utilization: Briquetting Plant

A	Capital Investment (20 TPD Capacity)	INR in million	USD
	Land and Building (Land Area: 2 acre; Building for Machinery: 150 Sq. M ; Material storage area:1000 Sq. M ; Office Building: 50 Sq. M)	1.50	23,077
	Plant and Equipment	2.50	38,462
	Auxiliary and Service Equipment (Chipper: 3 & Handling Tools)	0.50	7,692
	Total investment	4.50	69,231
B	Operational Expenses		
	Raw Material Cost for 1 year (20 TPD for 300 days @ Rs. 2800 per tonne)	16.80	258,462
	Operational cost including repair and Maintenance and other charges (Rs. 600/tonne) for 1 year	3.60	55,385
C	Gross Annual Income (Rs. 4000/tonne)	24.00	369,231
	Net annual income (Rs. 400/tonne)	2.40	36,923
D	Payback period: 23 months		Return on investment : 43.5%

Commercial utilization: Pelletting Plant

A	Capital Investment (3TPD Capacity)	INR in million	USD
	Land & Building: (Land Area: 0.5 acre; Building for Machinery: 100 Sq. M ; Material storage area:500 Sq. M ; Office Building: 50 Sq. M)	0.50	7,692
	Plant and Equipment	1.00	15,385
	Auxiliary and Service Equipment (Chipper: 1 & Handling Tools)	0.20	3,077
	Total investment	1.70	26,154
B	Operational Expenses		
	Raw Material for 1 year (3 TPD for 300 days @ Rs. 2800 per tonne)	2.52	38,770
	Operational cost including repair and Maintenance and other charges (Rs. 2950/tonne) for 1 year	2.66	40,923
C	Gross Annual Income (Rs. 7500/tonne)	6.75	103,846
	Net annual income (Rs. 1000/tonne)	0.54	8,308
D	Payback period: 33 months		Return on investment : 30.3%

Annex 2

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ZIMBABWE

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**MINISTRY OF INDUSTRY &
COMMERCE**

Mukwati Building
4th Street, Livingstone Avenue
Harare, Zimbabwe

31 January, 2018

United Nations Conference on Trade and Development
Special Unit on Commodities
Chief, Commodity Policy Implementation Outreach Section

Attention: Yanchun Zhang

Dear Madam,

**NATIONAL WORK PLAN ON PROMOTING COTTON – BY
PRODUCTS IN EASTERN AND SOUTHERN AFRICA.**

We acknowledge with thanks, receipt of your letter dated 18 January, 2018 and are pleased to inform you that the Ministry has approved the report.

We are now ready to call for a meeting with the multi- stakeholder committee that was approved at the workshop held in Harare in September, 2017.

We thank you for your continued support as we move towards the implementation stage of this programme.

Yours sincerely,

B. Manatsa

**for: Secretary for Industry, Commerce and Enterprise
Development**