



Learning from the Economics of networks

**...to enhance poverty alleviation in
African cotton zones**

Michel Fok
CIRAD, Montpellier, France



Context

- Cotton is economically important to Africa
 - But its fate is under threat
- Cotton sectors are under reform
 - But outcomes are far from being satisfactory
- Scientists can help
 - Through better understanding on how cotton sectors have evolved



Something original

- An attempt to mobilize a theory seldom used in agriculture
 - Economics of network : theory from the industry world
- Of interest?
 - Analysis only specific to African cotton development?
 - or valid also to preserve the effectiveness of agricultural activities in other contexts?



Clarification

- Network of services: what's
- Observable characteristics of network of services
 - Public monopolies for a long time and in most countries
 - But submitted to reform or "deregulation"
 - ...with questionable outcomes (air transport, train, telephone)
- African cotton sectors have got the same characteristics!



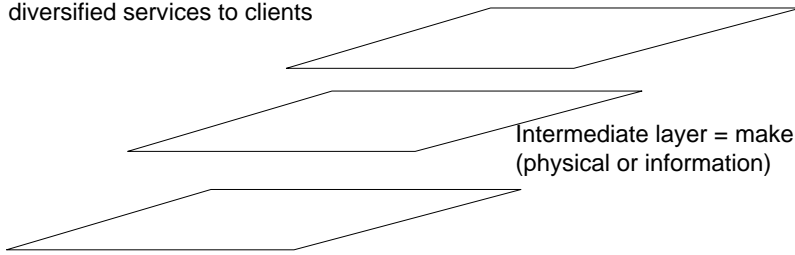
Economic and organizational features of service networks

- 3-layer Morphology
- 5 functional criteria
 - Club effects
 - Production synergies
 - Crossed subsidies
 - Border conflict between monopole and competition in service supply
 - Strong State regulation



3-layer morphology of networks of services

High layer for supply of final and diversified services to clients



Intermediate layer = make connection
(physical or information)

Low layer = infrastructures for production
(with great economies of scale)



Major characteristics of cotton promotion in Africa

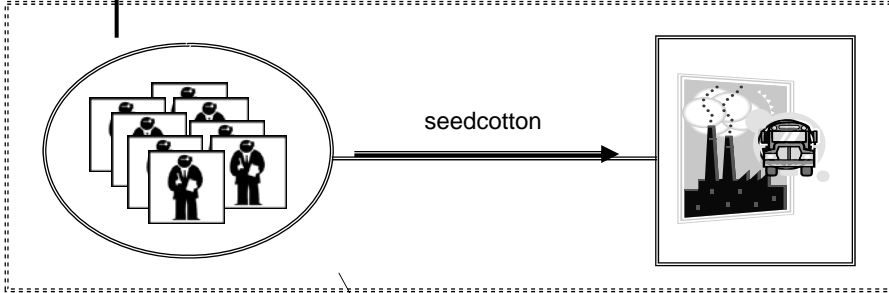
- Production before colonization...by cotton trees!
- Promotion since mid-19th century
- "success" since 1921-1952 according to countries



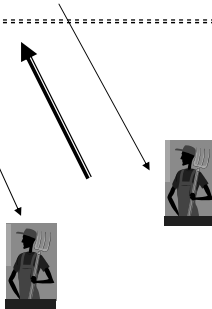
Major facts about cotton production in Africa

- Production by smallholding farmers
 - 2-3 ha/farm, today
- Farms grouped in villages
 - Various sizes, ten to hundreds of "families"
- Villages scattered
- Insufficient and bad tracks to reach villages

View of the basic organisation, around 1950s



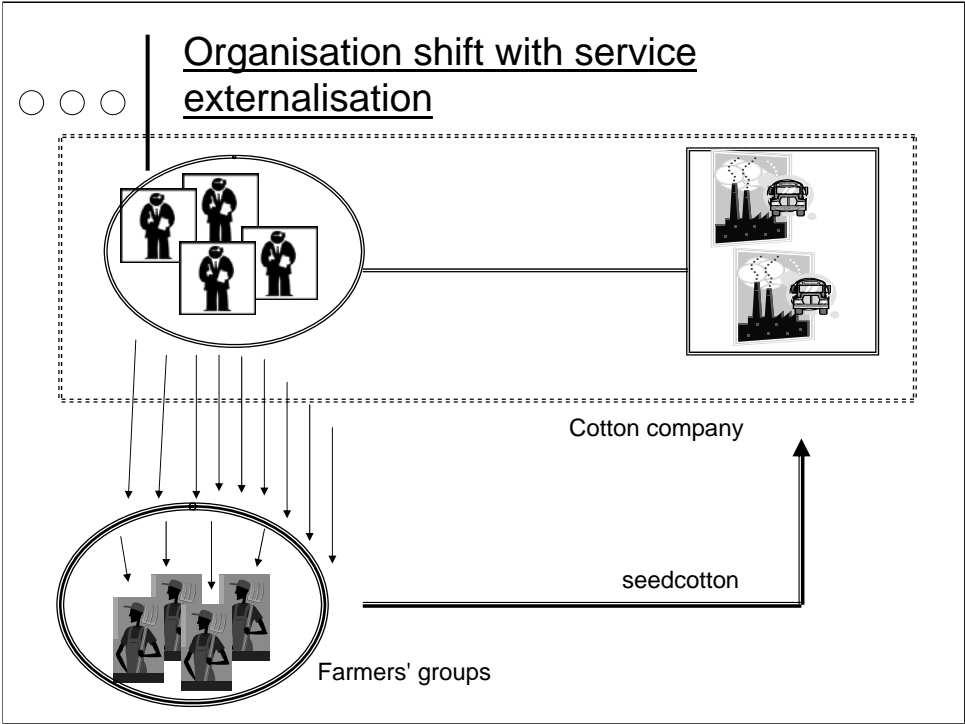
inputs





Evolution and diversification of the services offered to farmers

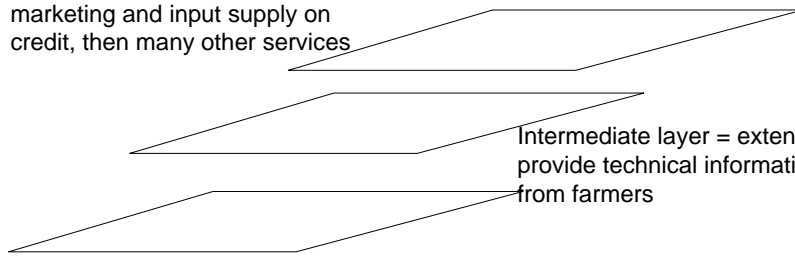
- Service externalisation
 - Seedcotton marketing by farmers' groups
 - ...along with the management of input credit
- Diversification of services
 - Adult literacy program for practical purpose
 - Training and equipment of village blacksmiths
 - Assistance to food crop production
 - Wells and drillings for water supply in villages
 - Assistance to village women in production
 - ...assistance to pest control according to threshold program





3-layer morphology of cotton organisation from the 1960s

High layer = seedcotton marketing and input supply on credit, then many other services



Intermediate layer = extension staff to provide technical information to and from farmers

Low layer = gins, park of trucks, energy central

○○○ | Club effects

- General case
 - More and better services at lower prices as the Club grows
- Cotton case
 - Decrease of transaction costs in marketing up to negative cost
 - Lower price for inputs
 - Indirect effects
 - Extension of rural tracks
 - ...

○○○ | Production Synergies

- General case
 - Synergies deriving from using the same infrastructures to achieve more types of products/services
- Cotton case
 - The truck park has enabled to market more agricultural commodities from farmers
 - Advantage deriving mainly from the infostructure
 - The same extension staff has been mobilized to provide more types of technical assistance to villagers



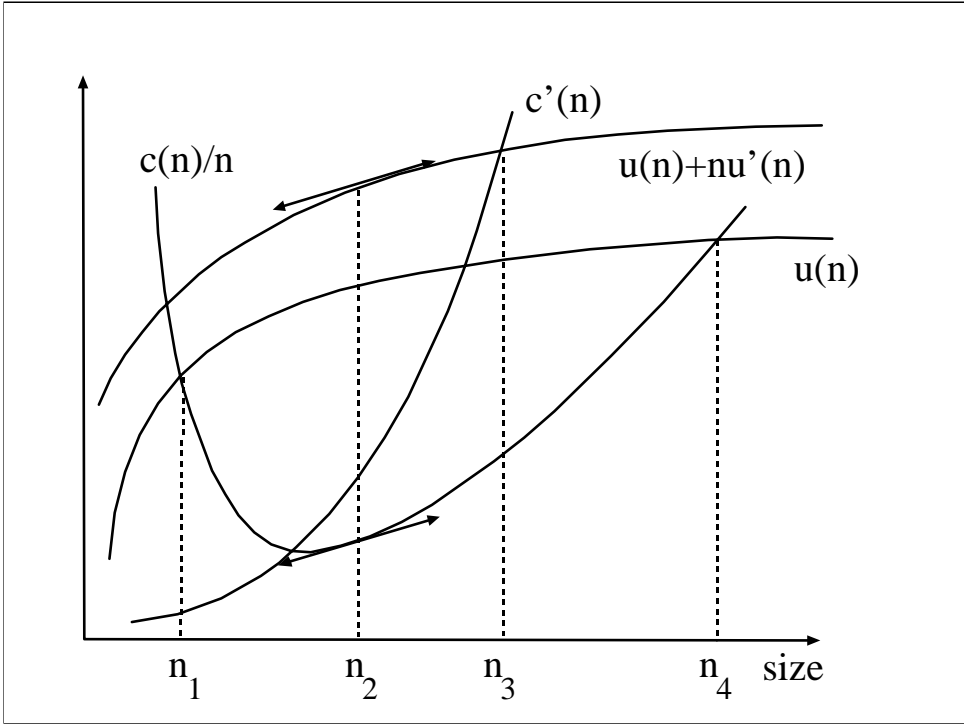
Crossed Subsidies

- General case
 - Subsidies between clients
 - Subsidies between types of services
 - The launch of a new product is subsidized by the financial resources generated by older ones
- Cotton case
 - Subsidies between farmers
 - Same price everywhere in the country
 - Between services
 - Seedcotton marketing and input supply
 - Same prices for differentiated inputs...



Dynamics of networks

- Through rather simple models
 - Based on the network functioning cost at a given size
 - and on the analysis of the utility resulting from being member to the "club", with nevertheless two possible options
 - Maximisation of the individual utility of each member
 - Or maximisation of the collective utility of the whole membership
 - Leading to distinct optimal size of the club





Dynamics with 4 stages

- Initial phase to overpass a critical size n_1 ;
- Phase of auto-sustained growth, members can afford alone the club's growth ;
- Phase of monitored growth so as to reach the collective optima beyond the "private" optima,
- A phase of growth to ensure universal service to prevent the exclusion of a few clients
- Intervention is needed from the State
- Intervention of the State not necessary, but it can help to grow faster
- Public intervention is compulsory
- Public intervention is needed



state's role in network construction

- Compulsory role because of the requirement to overpass quickly the critical size
- Role generally through regulation
 - By allocation of monopoly
- The Role often has lasted and enabled the set up of powerful networks



Lessons on the state's role on deregulation

- "deregulation" of networks in developed countries always has called upon regulation
- Ineffectiveness of deregulation experiences has resulted from naive modalities
- Regulation needed to preserve the club effects
 - By maintaining the inter-dependence of the 3-layer morphology
- Regulation needed
 - to mitigate the exclusion phenomenon or its effects
 - to prevent the wastage of the infrastructures investment



Conclusion

- A first attempt to apply industrial economics to agriculture
- The reform of cotton sectors in Africa must take their sizes into account
 - Hence must be reasoned...but not the case so far
- Deregulation still needs regulation
 - Important role to the State...
 - ...finally acknowledged?
 - To preserves advantages resulting from the network functioning (club effects, production synergies)